R15

Code No: 123AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

MATHEMATICS-II

(Common to CE, MMT, AE, PTE, CEE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What is the greatest rate of increase of $\phi = xy^2z^2$ at the point (-1,1,2)? [2]

b) If $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$ then show that $\nabla^2(r^n) = n(n+1)r^{n-2}$ where $r = |\bar{r}|$. [3]

c) Write the Euler's formula in the interval (c,c+2π), for finding Fourier series. [2]

d) Find the value of a_0 for the function $f(x)=e^{-x}$ in the interval $0 < x < 2\pi$. [3]

e) Evaluate $\frac{\Delta^2}{E}e^x$. [2]

f) Express the function $f(x)=2x^4-6x^3+5x^2-20x+10$ in factorial notation. [3]

g) Show that the rate of convergence of Bisection method is linear. [2]

h) Establish Newton Raphson's method for determining the approximate value of the root of the equation f(x)=0. [3]

i) Write Simpson's $\frac{1}{3}$ rule. [2]

j) Evaluate K_3 for the equation $\frac{dy}{dx} = y - x,\ y(0) = 1.5$ by using Runge-Kutta 4th order method. [3]

PART-B

(50 Marks)

2.a) Find the directional derivative of $f = xy + yz + zx$ in the direction of vector $i + 2j + 2k$ at the point(1,2,0).

b) Find the scalar potential of $\bar{F} = (z + \sin y)i + (-z + x\cos y)j + (x - y)\bar{k}$. [5+5]

OR

3.a) Prove that $(y^2 - z^2 + 3yz - 2x)\bar{i} + (3xz + 2xy)j(3xy - 2xz + 2z)k$ is both solenoidal and irrotational.

b) Find the flux of the vector field $\bar{A} = (X - 2Z)\bar{i} + (x + 3y + z)\bar{j} + (5x + y)\bar{k}$ through the upper side of the triangular ABC with vertices at the points A(1,0,0), B(0,1,0), C(0,0,1) [5+5]

4.a) Obtain a Fourier expansion for $\sqrt{1-\cos x}$ in $-\pi < x < \pi$.

b) Find the Fourier transform of $f(x) = \begin{cases} 1 \text{ if } |x| < a \\ 0 \text{ if } |x| \geq a \end{cases}$ where a is a positive real number. Hence deduce that: i) $\int_0^\infty \frac{\sin t}{t} dt = \frac{\pi}{2}$ and ii) $\int_0^\infty \left(\frac{\sin t}{t}\right)^2 dt = \frac{\pi}{2}$. [5+5]

OR

5.a) Express coshx in Fourier series in $0 < x < 2\pi$.

b) Find the Fourier transform of f(x) given by $f(x) = \begin{cases} x^2 \text{ if } |x| \leq a \\ 0 \text{ if } |x| > a \end{cases}$. [5+5]

6.a) Find the cubic polynomial interpolation which takes on the values:
$f_0=5$, $f_1=1$, $f_2=9$, $f_3=25$, $f_4=55$.

b) The mode of a certain frequency curve y = f(x) is very near x = 9 and the value of the frequency density f(x) for x=8.9, 9.0 and 9.3 are respectively equal to 0.30, 0.35 and 0.25. Calculate the approximate value of the mode. [5+5]

OR

7.a) From the following table, find the number of students who obtained less than 45 marks:

Marks	30-40	40-50	50-60	60-70	70-80
No of Students	31	42	51	35	31

b) Fit a second degree parabola to the following data, taking x as the independent variable. [5+5]

x:	1	2	3	4	5	6	7	8	9
y:	2	6	7	8	10	11	11	10	9

8.a) Evaluate $\sqrt{29}$ by Newton-Raphson formula. Correct to four places of decimals.

b) Apply Gauss-Seidal iteration method to solve equations.
$10x_1+x_2+x_3=12$, $2x_1+10x_2+x_3=13$ and $2x_1+2x_2+10x_3=14$. [5+5]

OR

9.a) By iteration method, find the root of $\tan x = x$ up to four decimal places.

b) Apply Jacobi iteration method to solve equations.
$27x + 6y - z = 85$, $6x + 15y + 2z = 72$ and $x + y + 54z = 110$. [5+5]

10.a) Calculate the approximate value of $\int_0^{\frac{1}{2}\pi} \sin x \, dx$.

i) By Trapezoidal rule
ii) By Simpson's rule, Using 11 ordinates.

b) Given the differential equation $\frac{dy}{dx} = \frac{x^2}{y^2+1}$ with the initial condition y=0 when x=0, use Picard's method to obtain y for x=0.25, 0.5 and 1.0 correct to three decimal places. [5+5]

OR

11.a) Use Simpson's three-eights rule to obtain the value of $\int_0^{0.3} (1-8x^3)^{\frac{1}{2}} dx$.

b) Solve the boundary-value problem y''=y(x); y(0)=y(1)=0 by the shooting method. [5+5]

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R15

Code No: 123BX

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

FLUID MECHANICS AND HYDRAULIC MACHINERY

(Electrical and Electronics Engineering)

Time: 3 Hours Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART - A (25 Marks)

1.a) Explain intensity of pressure and pressure head. [2]
b) How the pressure can be measured by a manometer? [3]
c) What is Reynold's number and mention its significance? [2]
d) Explain the working principle of an orifice meter. [3]
e) What is the need of surge tank on penstock? [2]
f) What is catchment area and mention its importance? [3]
g) Differentiate between impulse and reaction turbine. [2]
h) How governing of speed is done on Pelton wheel? [3]
i) Differentiate between centrifugal pump and reciprocating pump. [2]
j) What is water hammer and how can it be eliminated? [3]

PART - B (50 Marks)

2.a) Describe the working of U-tube manometer with enlarged ends.
b) In a Brahma press, the plunger and cylinder are having areas of 50 and 5000 sq.cms. respectively. A weight of 4500 kg is kept on cylinder. The vessel and passages connecting plunger and cylinder is filled with oil of sp.gr 0.85. What force on the plunger is required for equilibrium? [3+7]

OR

3.a) Distinguish between i) steady and unsteady flow ii) uniform and non-uniform flow.
b) In a steady flow, two points A and B are 0.5 m apart on a straight stream line. If the velocity of flow varies linearly between A and B, What is the acceleration at each point, if the velocity at 'A' is 3 m/sec and velocity at 'B' is 8 m/sec. [3+7]

4.a) Explain the principle and working of venturi meter with a neat sketch.
b) Derive Darcy weisbach equation. [5+5]

OR

5.a) Derive Bernoulli's equation for incompressible fluids and mention its limitations.
b) A compound piping system consists of 2000 m of 0.6 diameter, 1000 m of 0.5 m diameter, 800 m of 0.4 m diameter, with new cast-iron pipes connected in series. Convert this system to i) an equivalent length of pipe of 0.4 m. diameter ii) an equivalent size of 4000 m. long. [3+7]

6.a) How the power can be estimated from the hydro-electric power station?

b) A Jet of water of 80 mm diameter with a velocity of 25 m/sec strikes a series of flat plates arranged around the periphery of a wheel such that each plate appears successively before the Jet. If the plates are moving at a velocity of 6 m/sec, find the force exerted by the Jet on the plate, work done per second and efficiency. [3+7]

OR

7.a) Explain about hydraulic efficiency, mechanical efficiency, volumetric efficiency of hydraulic turbine.

b) An inward flow reaction turbine with radial discharge has an overall efficiency of 85% is required to develop 160kW. The head is 10 m, peripheral velocity of the wheel is $0.95\sqrt{2gH}$, the radial velocity of flow is $0.4\sqrt{2gH}$, the wheel is made to run at160 rpm and the hydraulic losses to be 22% of the available energy. Find i) angle of guide blade at inlet. ii) vane angle at inlet. iii) diameter of wheel. [3+7]

8.a) What factors are to be considered during the selection of hydraulic turbine?

b) A Kaplan turbine produces 80 MW under a head of 30 m with an efficiency of 85%. Taking the value of speed ratio K_u as 1.6, flow ratio as 0.55 and hub diameter as 0.4 times the outer diameter, find the diameter and speed of turbine. [3+7]

OR

9.a) What are the various elements needed for hydro-electric power plant?

b) A Jet of water having a velocity of 50 m/sec impinges without shock on a series of moving vanes at 20 m/sec at an angle 20^0 to the direction of motion. The relative velocity at outlet is 0.9 of that at inlet and water at exit is normal to the motion. Find i) vane angles at inlet and exit ii) work done per unit weight iii) hydraulic efficiency. [3+7]

10.a) What are the hydraulic losses in centrifugal pump?

b) Find the power required to drive a centrifugal pump, which delivers 50 litres of water per sec to a height of 25 m through 125 mm diameter and 100 m long pipe line. The overall efficiency of pump is 80% and frictional coefficient f = 0.07 for the pipe line. Assume the inlet losses in suction pipe equal to 0.4 m. [3+7]

OR

11.a) Differentiate between volute diffuser type of pumps used in practice.

b) Derive an expression for specific speed of a centrifugal pump. [3+7]

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Code No: 123AW

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
SIGNALS AND SYSTEMS
(Common to ECE, EIE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Define even and odd components of the signal how do you get it. [2]
b) Sketch the unit step function and signum function bring the relation between them. [3]
c) Distinguish between Series and Transform in the Fourier representation of a signal. [2]
d) Define and write the conditions of sampling theorem. [3]
e) Characterize a Linear Time Invariant (LTI) System. [2]
f) Express and derive the Relationship between Bandwidth and Rise time. [3]
g) Write the Convolution property of Fourier Transform. [2]
h) Distinguish between Cross Correlation and Auto Correlation. [3]
i) Write the Fundamental difference between Continuous and Discrete time signals. [2]
j) Find the Z transform of $x[n] = u[-n]$. [3]

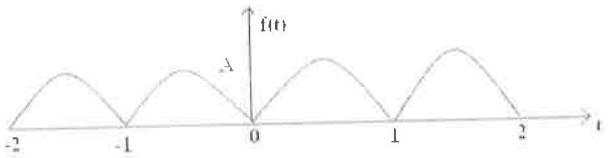
PART-B

(50 Marks)

2.a) Explain orthogonality property between two complex functions $f_1(t)$ and $f_2(t)$ for a real variable t.
b) Define and derive the expression for evaluating mean square errors and its types. [5+5]

OR

3. Find the Exponential Fourier series for the rectified Sine wave as shown in figure. [10]



4. Obtain the Fourier transform of the following functions:
a) Impulse Signal
b) Single symmetrical Gate Pulse. [5+5]

OR

5.a) Write about the types of Sampling and compare the Impulse Sampling, Natural and Flat top Sampling methods.
b) Describe about the Hilbert Transform and express its properties. [5+5]

6. Explain the difference between the following systems with examples.
   a) Linear and Non-linear systems.
   b) Causal and Non-Causal systems. [5+5]

OR

7. Define Time invariant and shift invariant systems and given the system function of a LTI system be 1/jw+2 evaluate the output of the system for an input $(0.9)^t$ u (t). [10]

8.a) Discuss and Prove Properties of auto correlation function.
   b) Explain briefly extraction of a signal from noise by filtering. [5+5]

OR

9. Discuss the impact of convolution for find the system output and Use the Convolution theorem to find the spectrum of $x(t) = A \cos^2 \omega_c t$. [10]

10.a) State the properties of the ROC of Laplace Transform and its existances.
   b) Find the step response of series RL circuit using Laplace transform method. [5+5]

OR

11.a) Find the inverse Z-transform and ROC given $X(z) = \log(1/\ 1-az^{-1})$.
   b) Derive relationship between z and Laplace Transform and describe about the stability. [5+5]

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R15

Code No: 223AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year I Semester Examinations, November/December-2016

PHYSICAL PHARMACY – I

Time : 3 hours **Max Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A (25 Marks)

1.a) Define dipole moment. [2]
b) What is dielectric constant? [3]
c) Define first law of thermodynamic. [2]
d) Define phase rule and phase equilibria. [3]
e) Write Arrhenius equation and application. [2]
f) Write three properties of electrolyte solutions. [3]
g) Define pH and write its significance. [2]
h) Define acidity constants and their use. [3]
i) What is buffer capacity? [2]
j) Enumerate isotonicity adjustment methods. [3]

PART-B (50 Marks)

2.a) Write a note on the following properties and their importance in the pharmacy
i) Dipole moment ii) Molar refraction.
b) Describe dielectric constant induced polarization. [5+5]

OR

3.a) Describe the applications of refractive index and optical rotation in the elucidation of chemical structure with examples.
b) Discuss the physical properties of drug molecules and its significance. [5+5]

4.a) Describe the characteristics of a spontaneous reaction with examples. Explain the thermodynamic state functions for such processes.
b) Explain phase equilibria for system containing two component. [5+5]

OR

5.a) What do you understand by Helmholtz free energy and Gibbs free energy? Derive the relationship between them.
b) Derive thermodynamically the Clapeyron and Clausius equation and its significance. [5+5]

6.a) What are Colligative property? Discuss freezing point depression with significance.
b) Explain the modern theories of electrolytic dissociation of strong electrolytes. [5+5]

OR

7.a) Explain the Arrhenius theory of electrolysis.
b) What are ideal and real solutions? Discuss in detail with examples. [5+5]

8.a) What are the uses of pKa value in pharmacy?
b) Describe the modern theories of acids and bases.
c) Discuss on Sorenson's pH scale. [3+4+3]

OR

9.a) Describe the principal involved in the determination of pH of a solution using electrometric method.
b) What do you meant by conjugate acid-base pair? [5+5]

10.a) Write in brief about class II methods of adjustment of tonicity of solutions.
b) Write a short note on buffers in Pharmaceuticals. [5+5]

OR

11.a) Write the postulates of Debye-Huckel theory of electrolytes.
b) Describe Henderson Hassalbalch equation for an acid buffer and write its applications. [5+5]

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R13

Code No: 113AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

MECHANICS OF SOLIDS

(Common to ME, MCT, MMT, AE, AME, MSNT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) Define proof stress. [2]
b) Define factor of safety and its importance. [3]
c) What do you mean by point of inflection? [2]
d) What is the meaning of strength of a section? [3]
e) Define section modulus and its importance? [2]
f) What is meant by pure bending? What are the assumptions made in theory of pure bending? [3]
g) What do you understand by the term Theories of failure? [2]
h) What is Mohr's circle? How is it useful in the solution of stress analysis problem? [3]
i) What do you mean by equivalent torque? [2]
j) Distinguish between circumferential stress and longitudinal stress? [3]

PART – B

(50 Marks)

2.a) Prove that the maximum stress induced in a body due to suddenly applied load is twice the stress induced when the same load is applied gradually?
b) A bar of 30 mm. dia. is tested in tension under a load of 60 kN. The extension measured over a length of 250 mm is 0.21 mm and construction in diameter is 0.008 mm. Find Poisson's ratio and elastic constants, E and G (Modulus of elasticity and modulus of rigidity). [5+5]

OR

3.a) Define modular ratio, thermal stress, thermal strain and Poisson's ratio.
b) A steel rod 5 cm diameter and 6 m long is connected to two grips and the rod is maintained at a temperature of 100^0C. Determine the stress and exerted when the temperature falls to 20^0C if i) the ends do not yield ii) the ends yield by 0.15 cm. Take $E = 2 \times 10^5$ N/mm^2 and $\alpha = 12 \times 10^{-6}/^0$C. [5+5]

4. A simply supported beam of length 8 m rests on supports 6 m apart, the right hand end is overhanging by 2 m. The beam carries a uniformly distributed load of 1500 N/m over the entire length. Draw S.F and B.M diagrams and find the point of contra flexure, if any. [10]

OR

5. A beam of length 12 m is simply supported and carries point load of 3 kN at a distance of 3 m, and 5 kN at a distance of 7 m from left support and also a uniformly distributed load of 3 kN/m between the point loads. Draw the S.F and B.M diagrams for the beam. [10]

6.a) What do you understand by neutral axis and moment of resistance?

b) A beam of I-section is having overall depth as 500 mm and overall width as 190 mm. The thickness of flanges is 25 mm where as the thickness of the web is 15 mm. The moment of inertia about N-A is given as 6.45×10^8 mm^4. If the section carries a shear force of 40 kN. Calculate the maximum shear stress. Also sketch the shear stress distribution across the section. [5+5]

OR

7.a) Prove that the maximum shear stresses in a circular section of a beam is 4/3 times the average shear stress?

b) A beam of a T-section is used as a cantilever with flange at top. The flange is 130 mm wide × 25 mm deep and web is 20 mm wide and 130 mm deep is 2m long. Determine the maximum permissible load which may be suspended from the free end of the cantilever if the limiting stresses in tension and compression are 90 N/mm^2 and 150 N/mm^2 respectively. [5+5]

8.a) Define and explain the following theories of failure.
i) Maximum principal stress theory
ii) Maximum Principal strain theory

b) The normal stresses in two mutually perpendicular directions are 620 N/mm^2 and 310 N/mm^2 both tensile. The complimentary shear stresses in these directions are of intensity 400 N/mm^2. Find the normal and tangential stresses on the two planes which are equally inclined to the planes carrying the normal stresses mentioned above. [5+5]

OR

9.a) Write a note on Mohr's circle of stresses.

b) The principal stresses at a point in an elastic material are 22 N/mm^2 (tensile), 110 N/mm^2 (tensile), and 55 N/mm^2 (Compressive), If the elastic limit in simple tension is 220 N/mm^2 and $\mu = 0.3$. Determine whether the failure of material will occur or not according to the i) Maximum shear stress theory ii) Maximum strain energy theory. [5+5]

10.a) Explain briefly about the effect of internal pressure on the dimensions of a thin cylindrical shell.

b) Find the maximum shear stress induced in a solid circular shaft of diameter 20 cm when the shaft transmits 187.5 kW at 200 rpm. [5+5]

OR

11.a) Derive an expression for the shear stress produced in a circular shaft which is subjected to torsion. What are the assumptions made in the derivation?

b) A water main 90 cm diameter contains water at a pressure head of 110 m. If the weight density of the water is 9810 N/mm^3. Find the thickness of the metal required for the water main. Given the Permissible stress as 22 N/mm^2. [5+5]

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R13

Code No: 113BJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

STRENGTH OF MATERIALS-I

(Common to CE, CEE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks.

PART- A

(25 Marks)

1.a) Distinguish between elasticity and plasticity. [2]

b) Find the bulk modulus of the material of a bar of length 200 mm and diameter 30 mm, whose Young's modulus is 2.1×10^5 N/mm^2. It is observed that due to the action of an axial load, the elongation of the bar is 0.12 mm and the change in the diameter is 0.005 mm. [3]

c) Define the point of contra flexure. [2]

d) Obtain the relationship between shear force and bending moment. [3]

e) The cross-section of a beam has rectangular shape and is subjected to a shear force of 100 kN. Determine the ratio of the maximum shear stress to mean shear stress. [2]

f) State the assumption made in the theory of simple bending. [3]

g) Define the principal planes and the principal stresses. [2]

h) Explain the maximum principal strain theory of failure. [3]

i) State the Mohr's theorems to find the deformations of a beam subjected to bending. [2]

j) A beam of length 'L' and constant flexural rigidity is subjected to pure bending. Determine the mid-span deflection if the magnitude of the moment is 'M'. [3]

PART-B

(50 Marks)

2.a) A solid steel bar 500 mm long and 70 mm diameter is placed inside an aluminium tube having 100 mm outside diameter and 75 mm inside diameter. The aluminium tube is 0.15 mm longer than the steel bar. An axial load of 600 kN is applied to the bar and tube assembly through the rigid cover plates. Determine the stresses developed in the steel bar and aluminium tube. Adopt modulus of elasticity for steel is 2×10^5 N/mm^2 and the Young's modulus for aluminium is 0.7×10^5 N/mm^2.

b) Derive the relationship between modulus of elasticity, bulk modulus and Poisson's ratio. [6+4]

OR

3.a) A steel bar of length 1.5 m and 50 mm diameter is subjected to suddenly applied axial load of 125 kN. Determine the instantaneous stress induced and also the instantaneous elongation of the bar.

b) Derive an expression for the strain energy stored in a body due to suddenly applied axial load. [7+3]

4. Draw the shear force and bending moment diagrams for a beam supported and loaded as shown in figure 1. [10]

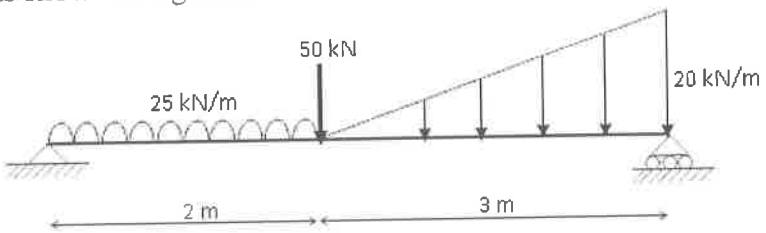

Figure: 1

OR

5. Draw the shear force and bending moment diagrams for the beam supported and loaded as shown in figure 2. [10]

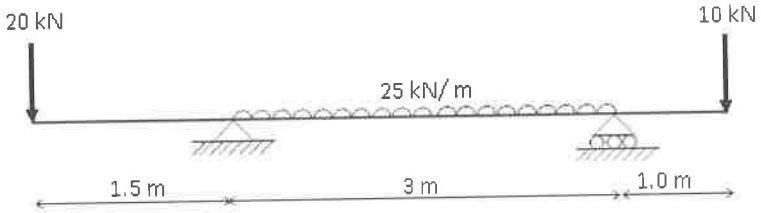

Figure: 2

6. A simply supported beam of span 5 m has an unsymmetrical I-section as shown in figure 3. The total depth of the section is 200 mm. Determine the intensity of uniformly distributed load that the beam can carry if the permissible stress is 165 N/mm^2. [10]

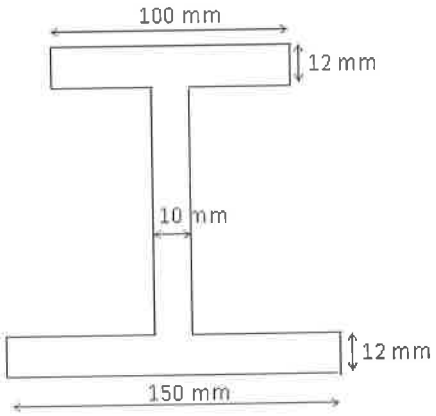

Figure: 3

OR

7. Draw the shear stress distribution of a T-section having flange width of 250 mm and total depth of 300 mm. The thickness of the flange as well as web is 16 mm. The section is subjected to a shear force of 200 kN. Also find the ratio of the maximum shear stress to the average shear stress. [10]

8. The state of stress at a point in a strained member is shown in Figure 4, using the Mohr's circle of stress, determine (a) the plane of action and the magnitude of the principal stresses, (b) the maximum shear stress and (c) the stresses acting on a plane making 60^0 in the anti-clockwise direction with respect to x-axis. [10]

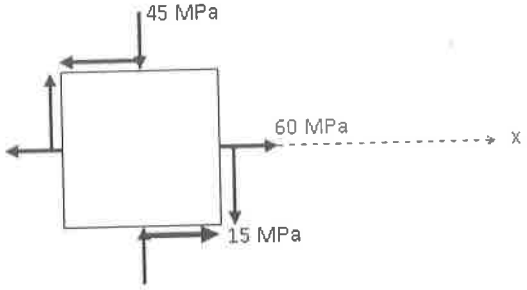

Figure: 4

OR

9. The principal stresses in a strained three dimensional body are 100 MPa (Tensile), 50 MPa (Tensile) and 25 MPa (Compressive). Determine the factor of safety according to Strain energy theory and Shear strain energy theory. The yield stress of the material of the body is 260 N/mm^2. Adopt E = 200 GPa and the Poisson's ratio = 0.3. [10]

10. A simply supported beam of span 4 m is subjected to the loading as shown in figure 5, find the maximum deflection and the slopes at the supports. Assume *EI* is constant. [10]

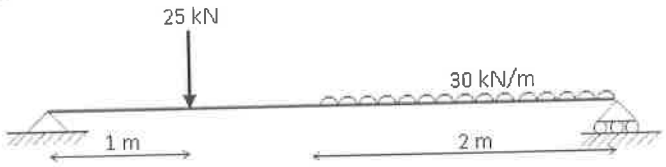

Figure: 5

OR

11. A cantilever beam of span 2 m is subjected to the loading as shown in Figure 6. Using conjugate beam method, determine the slope and the deflection at the free end. [10]

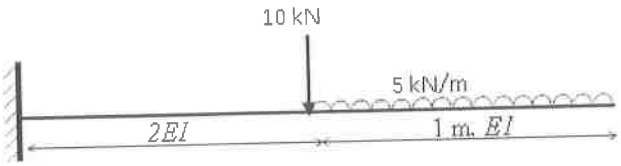

Figure: 6

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R13

Code No: 113BW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ELECTRICAL CIRCUITS

(Common to EEE, ECE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART – A (25 Marks)

1.a) What are the limitations of ohm's law? [2]
b) State Kirchoff's laws. [3]
c) Define the average value. [2]
d) What is the concept of Power Factor? [3]
e) What is the significance of coefficient of coupling? [2]
f) States the Faraday's laws of electromagnetic induction. [3]
g) What is meant by duality? [2]
h) States the properties tree. [3]
i) What are the conditions for Maximum Power Transfer in DC and AC networks? [2]
j) State the Thevenin's theorem. [3]

PART - B (50 Marks)

2.a) Explain the Independent and Dependent Sources with diagrams.
b) For the circuit shown in the figure 1, find the current flowing in all the branches. [4+6]

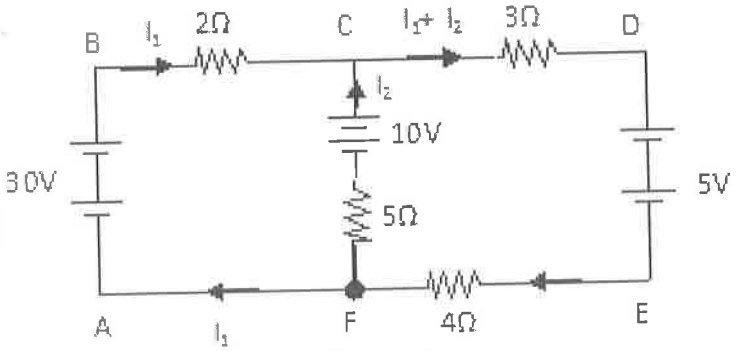

Figure: 1

OR

3.a) Two resistances of 10 Ω and 40 Ω respectively are connected in parallel. A third resistance of 5 Ω is connected in series with the combination and a D.C supply of 240 V is applied to the ends of the completed circuit. Calculate the current in each resistance.
b) Obtain the V-I relationship for R,L,C components. [5+5]

4.a) Define the following:
i) RMS value
ii) Form factor and
iii) Peak factor.
Derive an expression for these when a sinusoidal source is applied to a circuit.

b) Explain the concept of complex power. [6+4]

OR

5. A coil of insulated wire of resistance 10Ω and inductance 0.003H is connected to an a.c. supply at 240V, 50-Hz. Calculate:
a) The current, p.f and the power
b) The value of capacitance which when connected in series with the above coil, causes no change in the values of the current and power taken from the supply. [5+5]

6.a) Derive the expression for resonance frequency of parallel circuit considering a coil parallel to pure capacitance.

b) Draw the locus diagram of R-L circuit when excited by constant voltage and variable frequency supply. [5+5]

OR

7.a) Define leakage factor and its effects on magnetic circuits.

b) Explain dot convention in coupled circuit. [5+5]

8.a) Explain the following terms with respect to graph theory.
i) Node ii) tree iii) link iv) sub-graph.

b) Find the incidence matrix in the figure 2. [4+6]

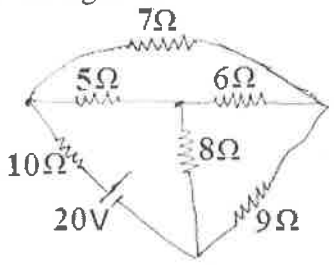

Figure: 2

OR

9. For the network shown in figure 3 determine all branch currents and the voltage across the 6-Ω resistor by loop current analysis. [10]

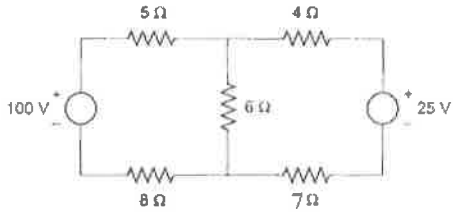

Figure: 3

10.a) State and explain superposition theorem.

b) Find Norton's equivalent circuit for the circuit shown in figure 4. [4+6]

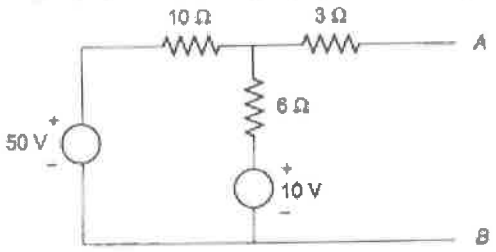

Figure: 4

OR

11. Determine the current I in the branch AB of circuit shown in figure 5 by using Norton's theorem. [10]

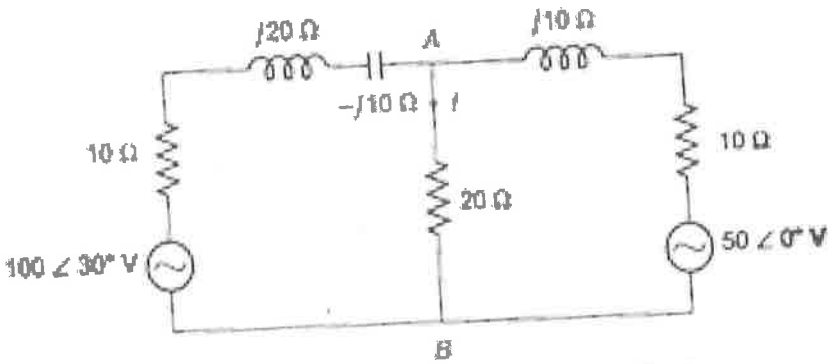

Figure: 5

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Code No: 113BN **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART – A **(25 Marks)**

1.a) Write the inverse and contra positive for the statement "If 2+2 = 9 then Mr. Kumar is a good teacher" [2]
b) The propositional function ((p->q) ∨ (q->r)) -> (p->r) is tautology or not? [3]
c) Which of the following are partitions of {1,2,3}, explain the reason.
i) { {1}{2}{3}} ii) {{1,3},{2,3}} [2]
d) Find the inverse of the function $f(x) = x^4 + 5$. [3]
e) How many 3-digit even numbers can be formed? [2]
f) License plates of certain state requires 4-English letters followed by 4 - digits. How many plates can be manufactured if only letters are allowed to repeat? [3]
g) Write the characteristic roots equation for $a_n+3a_{n-1}+4a_{n-2}-8a_{n-3}=0$, n>=3. [2]
h) Find the co-efficient of X^{23} in the $(1+X^5+X^9)^{10}$. [3]
i) Find the number of edges need to be deleted from K_5 to form spanning tree. [2]
j) Define planar graph. Verify whether $K_{22,2}$ planar or not? [3]

PART - B **(50 Marks)**

2.a) Obtain PDNF and PCNF for the formula $(\sim p \vee \sim q) \rightarrow (\sim p \wedge r)$.
b) Show that R V S follows logically from the premises
$C \vee D, (C \vee D) \rightarrow \sim H, \sim H \rightarrow (A \wedge \sim B)$ AND $(A \wedge \sim B) \rightarrow (R \vee S)$. [5+5]

OR

3.a) Obtain principal disjunctive normal form (PDNF) for $p \rightarrow ((p \rightarrow q) \wedge \sim(\sim q \vee \sim p))$.
b) Using automatic theorem proving, prove that $(\sim Q \wedge (P \rightarrow Q)) \Rightarrow \sim P$. [5+5]

4.a) Let X={1,2,3....10}, and R is a relation defined on set X as follows: R={(x,y) | x,y ∈ X and x-y is divisible by 5}. Show that R is Equivalence relation.
b) Let A= {1, 2, 3, 4, 5} and relation
R={(1,1),(2,2),(3,3),(1,3),(3,4),(3,5),(1,4),(4,4),(1,5),(2,3),(2,4),(2,5),(5,5)}
Draw the Hasse diagram for R. [5+5]

OR

5.a) Let X={bed, ball, egg, dog, let}, and R is a relation defined on set X as follows: R={(x,y) | x,y ∈ X and there is at least a common letter between x and y}. Show that R is a compatibility relation. Draw the corresponding graph and also give maximum compatibility blocks for it.
b) Explain properties of binary relation with examples. [5+5]

6.a) Find the number of ways of distributing 26 similar balls into 6 numbered boxes where each box contains at least 2 balls.

b) How many different 10-digit numbers can be formed by arranging the digits 1,1,1,1,2,3,3,3,4,4. [5+5]

OR

7.a) Expand the multinomial $(2x-6y-3z)^4$.

b) A certain computer center employs 100 computer programmers of these 49 can program in C, 36 in C++ and 25 can program in both language. How many can program in neither of these two language. [5+5]

8.a) Find the solution for the recurrence relation $a_n-a_{n-1}-9a_{n-2}+9a_{n-3}=0$ for $n\geq 3$, and $a_0=0$, $a_1=1$, $a_2=2$.

b) Find the solution for the recurrence relation $a_n=a_{n-1}+n(n-1)$, where $a_0=1$. [5+5]

OR

9..a) Solve the recurrence relation using characteristic roots method $a_n+a_{n-1}-5a_{n-2}+3a_{n-3}=0$ where $a_0=0$, $a_1=1$ and $a_2=2$.

b) Solve $a_n=a_{n-1}+2n+1$ where $a_0=1$, using substitution method. [5+5]

10.a) Find the chromatic number for the following graph (Figure 1).

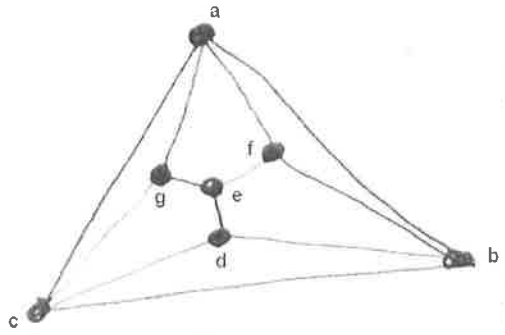

Figure 1

b) Show that in any connected planar graph |V|-|E|+|R|=2. [2+8]

OR

11.a) Show that the following graph is not containing Hamiltonian Cycle (Figure 2).

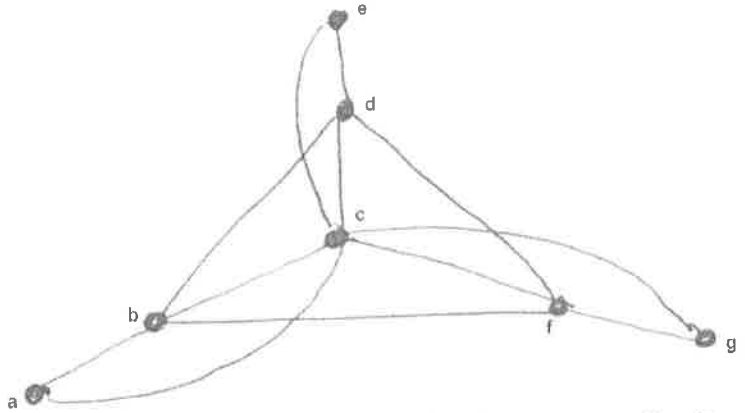

Figure 2

b) Show that in any Polyhedral graph, |E| <= 3|V|-6. [5+5]

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R09

Code No: 53021

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
SIGNALS AND SYSTEMS
(Common to ECE, EIE, ETM)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

- - -

1.a) Define a Signal. What are the different types of signals?
b) Derive the expression for component vector C12 of approximating the function $f_1(t)$ over $f_2(t)$ and also prove that the component vector becomes zero if the $f_1(t)$ and $f_2(t)$ are orthogonal.
c) Show that the following two signals are orthogonal over a interval [0 1] for $f_1(t) = 2$ and $f_2(t) = \sqrt{3}(1 - 2t)$. [3+6+6]

2.a) State the properties of the Fourier series.
b) Determine the Fourier series representation for $x(t) = 2\sin(2\pi t - 3) + \sin 6\pi t$. [7+8]

3.a) What is Hilbert transform? How does it differ from other transforms?
b) Find the Fourier transform of the signal [7+8]

$$x(t) = \begin{cases} e^{-|t|} & for -4 \le t \le 4 \\ 0 & otherwise \end{cases}$$

4.a) Show that the output of an LTI system is given by the convolution sum of the input and system function.
b) Let the system function of an LTI system be $1/(j\omega + 3)$. What is the output of the system $y(t)$ for an input $(0.5)^t u(t)$? [7+8]

5.a) Find the convolution of the signals $x_1(t) = e^{-at} u(t)$; $x_2(t) = e^{-bt} u(t)$ using Fourier transform.
b) Obtain the relation between convolution and correlation. [8+7]

6.a) State and prove the sampling theorem for band-limited signals.
b) A signal having a spectrum ranging from dc to 20 kHz is to be sampled and converted into discrete form. What is the minimum number of samples per second that must be taken to ensure recovery? [8+7]

7.a) Define Laplace Transform and discuss its existence.
b) Find Laplace Transform of: i) $x(t) = t^2 u(t)$ ii) $x(t) = e^{-at} \sinh\omega t\, u(t)$. [7+8]

8.a) Distinguish between one-sided and two sided Z-transforms. What are their applications?
b) Solve the following difference equation
$y(n) + y(n - 1) = x(n)$
with $x(n) = (1/3)^n u(n)$ and the initial condition $y(-1) = 1$. [8+7]

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R09

Code No: 53014

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
PROBABILITY AND STATISTICS
(Common to ME, CSE, AME, MIE, MSNT)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) Six persons toss a coin turn by turn. The game is won by the player who first throws head. Find the probability of success of the fourth player.

b) A box contains 4 right-handed and 6 left handed screws 3 screws are drawn at random without replacement let X be the number of left handed screws drawn. Find: (i) The probability distribution of X (ii) Expectation of X (iii) Variance of X. [7+8]

2.a) With the usual notations, find p for a binomial random variable X if n= 6 and if $9P(X=4) = P(X=2)$.

b) The hourly wages of 1000 workmen are normally distributed around a mean wage of Rs.70 and with a standard deviation of Rs. 5. Estimate the number of workers whose hourly wages will be:
i) between Rs. 69 and Rs.72.
ii) more than Rs.75
iii) less than Rs. 63
iv) Also estimate the lowest hourly wages of the 100 highest paid workers. [7+8]

3.a) The mean yield of wheat from a district A was 210 kgs with standard deviation 10kgs. per acre from a sample of 100 plots. In another district B, the mean yield was 220 kgs with standard deviation of 12 kgs from a sample of 150 plots. Assuming that the standard deviation of the yield in the entire state was 11 kgs, test whether there is any significant difference between the mean yield of crops in the two districts.

b) In order to make a survey of the buying habits, two markets A and B are chosen at two different parts of a city 400 women shoppers are chosen at random in market A. Their average daily expenditure on food is found to be Rs 250 with a standard deviation of Rs 40. The figures are Rs 220 and Rs 55 respectively in the market B where also 400 women shoppers are chosen at random. Test at 1% level of significance whether the average daily food expenditures of the two populations of shoppers are equal. [7+8]

4.a) 500 apples are taken at random from a large basket and 50 are found to be bad. Estimate the proportion of bad apples in the basket and assign limits within which the percentage most probably lies.

b) A machine produced 20 defectives articles in a batch of 400. After over handling it produced 10 defectives in a batch of 300. Has the machine improved? (Take $\alpha=0.01$). [7+8]

5.a) A machine is a designed to produce insulating washers for electrical devices of average thickness of 0.025cm. A random sample of 10 washers was found to have an average thickness of 0.024 cm with a standard deviation of 0.002 cm. Test the significant of the deviation value of t for 9 degrees of freedom at 5% level is 2.262.

b) Two random samples were drawn from two normal populations and their values are:

A:	66	67	75	76	82	84	88	90	92		
B:	64	66	74	78	82	85	87	92	93	95	97

Test whether the two populations have the same variance at the 5% level of significance (F=3.36) at 5% level for v_1=10 and v_2=8. [7+8]

6.a) Calculate coefficient of correlation from the following date.

X	12	9	8	10	11	13	7
Y	14	8	6	9	11	12	3

b) Calculate the coefficient of correlation and obtain the lines of regression for the following data:

X	1	2	3	4	5	6	7
Y	9	8	10	12	11	13	14

Obtain an estimate of y which should correspond to the average X= 6.2. [7+8]

7.a) Customers arrive at a sales counter manned by a single person according to a Poisson process with a mean rate of 20 per hour. The time required to serve a customer has an exponential distribution with a mean of 100 seconds. Find the average waiting time of a customer.

b) Customers arrive at a one-window drive according to a Poisson distribution with mean of 10 minutes and service time per customer is exponential with mean of 6 minutes. The space in front of the window can accommodate only three vehicles including the serviced one. Other vehicles have to wait outside this space.
Calculate:
i) Probability that an arriving customer can drive directly to the space in front of the window.
ii)Probability that time arriving customer will have to wait outside the directed space.
iii)How long arriving customer is expected to wait before getting the service?
[5+10]

8. Consider the Markov chain with transition matrix $P = \begin{bmatrix} 1/2 & 1/3 & 1/6 \\ 3/4 & 0 & 1/4 \\ 0 & 1 & 0 \end{bmatrix}$.

a) Show that this is irreducible and aperiodic.
b) The process is started in state 1; find the probability that it is in state 3 after two steps.
c) Find the matrix which is the limit of P_n as $n \to \infty$. [5+5+5]

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R09

Code No: 53001

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

MATHEMATICS-II

(Common to CE, CHEM, MMT, AE, BT, PTE)

Time: 3 hours **Max. Marks: 75**

Answer any five questions

All questions carry equal marks

1.a) Find whether the following system of equations are consistent. If so solve them $x + 2y + 2z = 2$, $3x - 2y - z = 5$, $2x - 5y + 3z = -4$; $x + 4y + 6z = 0$.

b) If A, B are invertible matrices of the same order, then show that

i) $(AB)^{-1} = B^{-1}A^{-1}$ ii) $(A')^{-1} = (A^{-1})'$ [8+7]

2.a) If λ is an Eigen value of A corresponding to the Eigen-vector X, then λ^n is Eigen value of A^n corresponding to the Eigen vector X.

b) Identify the nature of the quadratic forms $x_1^2 + 9x_2^2 + x_3^2 - 6x_1x_2 + 2x_1x_3 - 6x_2x_3$. [7+8]

3.a) Show that $A = \begin{pmatrix} i & 0 & 0 \\ 0 & 0 & i \\ 0 & i & 0 \end{pmatrix}$ is a Skew-Hermitian matrix and also unitary. Find the Eigen values and the corresponding Eigen vectors of A.

b) The Eigen values of a Skew-Hermitian matrix are purely imaginary or zero. [8+7]

4.a) Write the quadratic form corresponding to the matrix $\begin{pmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{pmatrix}$

b) Using the lagrange's reduction, transform

$x_1^2 - 4x_2^2 + 5x_3^2 + 2x_1x_2 - 4x_1x_3 + 2x_4^2 - 6x_3x_4$

to canonical form. [8+7]

5.a) Find a Fourier series to represent $f(x) = x^2$ in the interval $(0, 2\pi)$

b) Expand $f(x) = e^{ax}$ in a Fourier series in $0 < x < 2\pi$. [7+8]

6. Solve the boundary value problem

$u_{tt} = a^2 u_{xx}$; $0 < x < l$; $t > 0$ with $u(0, t) = 0$; $u(l, t) = 0$ and

$u(x, 0) = 0$, $u_t(x, 0) = sin^3\left(\frac{\pi x}{l}\right)$. [15]

7. An infinitely long plane uniform plate is bounded by two parallel edges and an end at right angles to them. The breadth is π. This end is maintained at a temperature u_0 at all points and the other edges are at zero temperature. Determine the temperature at any point of the plate in the study state. [15]

8. Find the Fourier sine transform of $f(x) = \frac{1}{x(x^2+a^2)}$ and hence deduce cosine transform of $\frac{1}{x^2+a^2}$. [15]

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R15

Code No: 123AP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ELECTRICAL AND ELECTRONICS ENGIGEERING

(Common to CE, ME, AME, PTE, CEE, MSNT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

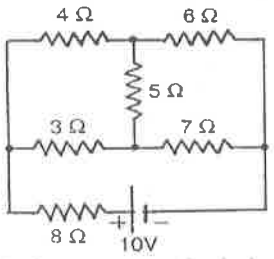
(25 Marks)

1.a)	Define Kirchhoff's Laws.	[2]
b)	What is the purpose of controlling torque and damping torque?	[3]
c)	Give the significance of back emf in a dc motor.	[2]
d)	Derive the condition for Maximum Efficiency of a D.C generator.	[3]
e)	"Transformer is a constant flux device". Justify the statement.	[2]
f)	What are the different losses in a transformer?	[3]
g)	What is the primary function of a rectifier filter?	[2]
h)	State different applications of diode.	[3]
i)	What is the difference between CRO and CRT?	[2]
j)	List the applications of CRO.	[3]

PART-B

(50 Marks)

2.a) Explain any one type of MI instruments.
b) Calculate the current in 5Ω resistor shown in figure. [5+5]



OR

3.a) State necessary equations to convert a delta network into equivalent star network. Explain with an example.
b) Explain the principle of operation of PMMC instruments. [5+5]

4.a) Write the torque equation of DC motor and explain.
b) Draw the neat diagram of three point starter and explain different parts. [5+5]

OR

5.a) Derive the induced e.m.f equation of a D.C. Generator.
b) An 8-pole, D.C generator has 500 armature conductors, and a useful flux of 0.05 Wb per pole. What will be the emf generated if it is lap-connected and runs at 1200 rpm? What must be the speed at which it is to be driven to produce the same emf if it is wave wound? [5+5]

6.a) Explain the operation of single phase transformer with neat diagram.
b) Discuss how regulation of an alternator can be determined by synchronous impedance method. [5+5]

OR

7.a) Draw the phasor diagram of transformer on load considering an inductive load and write the relevant expressions.
b) List out the various starting methods of a three phase induction motor. [5+5]

8.a) What is a transistor? Distinguish different configurations of transistors.
b) Describe the different modes of operation of a SCR with help of its V-I characteristics. [5+5]

OR

9.a) Explain the operation of a full wave bridge rectifier.
b) A single phase 230V, 1 kW heater is connected across single-phase 230V, 50Hz supply through a diode. Calculate the power delivered to the heater element. [5+5]

10.a) Discuss about the electrostatic focusing of a Cathode Ray Oscilloscope (CRO).
b) Explain with a block diagram the major parts of CRT. [5+5]

OR

11.a) Derive the expression for magnetic deflection sensitivity of a Cathode ray tube.
b) Discuss how voltage, current and frequency are measured with CRO. [5+5]

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R15

Code No: 123AU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, November/December - 2016

ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE, ECE, CSE, EIE, IT, ETM, MCT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A **(25 Marks)**

1.a)	Define static and dynamic resistance of P-N diode.	[2]
b)	Explain about Zener break down.	[3]
c)	Define ripple factor.	[2]
d)	Explain about voltage regulation.	[3]
e)	What are the applications of UJT?	[2]
f)	What do you mean by early effect?	[3]
g)	Explain about collector feedback bias.	[2]
h)	Write about thermal runaway.	[3]
i)	Mention small signal parameters of JFET.	[2]
j)	Differentiate between BJT and JFET.	[3]

PART-B **(50 Marks)**

2.a) Compare the characteristics of PN junction diode, Zener Diode and Tunnel diode.
b) For a Ge diode, the I_0=2μA and the voltage of 0.26V is applied. Calculate the forward and reverse dynamic resistance values at room temperature. [5+5]

OR

3.a) Derive an expression for transition capacitance of a diode.
b) Explain Avalanche and Zener Breakdowns. [5+5]

4.a) Explain the operation of Full Wave Rectifier with Induction filter with necessary diagrams.
b) A diode whose internal resistance is 20Ω is to supply power to a 100Ω load from 110V (R.M.S) source of supply. Calculate:
i) Peak Load Current
ii) DC Load Current
iii) AC Load Current
iv) % Regulation from No load to given load. [5+5]

OR

5.a) Explain the operation of Full Wave Rectifier with necessary graphs.
b) A 3KΩ resistive load is to be supplied with a D.C. voltage of 300V from A.C. voltage of adequate magnitude and 50Hz frequency by wave rectification. The LC filter is used along the rectifier. Design the bleeder resistance, turns ratio of transformer, VA rating of transformer and PIV rating of diodes. [5+5]

6.a) Derive Emitter Efficiency, Transport factor and large signal current gain and derive the relation between them.

b) Explain how transistor works as an amplifier? [5+5]

OR

7.a) Explain the operation of CC Configuration of BJT and its input and output characteristics briefly.

b) Explain about Punch through and Base width modulation. [5+5]

8.a) What is Biasing? Explain the need of it. List out different types of biasing methods.

b) In a Silicon transistor circuit with a fixed bias,
V_{CC}=9V, R_C=3KΩ, R_B=8KΩ, β=50, V_{BE}=0.7V.
Find the operating point and Stability factor. [5+5]

OR

9.a) Derive the expression for stability factor of self bias circuit.

b) Explain in detail about Thermal Runaway and Thermal Resistance. [5+5]

10.a) Why we call FET as a Voltage Controlled Device.

b) For the Common Source Amplifier, calculate the value of the voltage gain, given
i) r_d=100KΩ, R_L=10KΩ, g_m=300μ and R_O=9.09KΩ.
ii) If C_{DS}=3pF, determine the output impedance at a signal frequency of 1 MHz.
[5+5]

OR

11.a) Define DC Drain resistance, AC Drain Resistance, Amplification Factor and derive them.

b) What are the values of I_D and g_m for V_{GS} = -0.8V if I_{DSS} and V_P are given as 12.4mA and -6V respectively? [5+5]

--ooOoo--

R15

Code No: 223AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year I Semester Examinations, November/December-2016

STATISTICAL METHODS AND COMPUTER APPLICATIONS

Time: 3hours **Max.Marks:75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A **(25 Marks)**

1.a) Define Primary data and Secondary data. [2]
b) Describe the distribution of area under the Normal curve. [3]
c) Write the properties of F-distribution. [2]
d) Write the uses of ANOVA. [3]
e) Define Random sampling. [2]
f) Write advantages and disadvantages of completely randomized design. [3]
g) Which view can be used to insert and test the animated effects? [2]
h) Briefly discuss about the slide controls in MS Power Point? [3]
i) What are the reserved words in SQL? [2]
j) Give the examples of Database packages? [3]

PART – B **(50 Marks)**

2.a) Describe the different types of diagrammatic representation of statistical data.
b) If the probability that an individual suffers a bad reaction from a certain injection is 0.001, determine the probability that out of 2000 individuals more than 2 individuals suffer a bad reaction. [5+5]

OR

3.a) The chance that doctor A will diagnose a disease X correctly is 60%. The chance that a patient will die by his treatment after correct diagnosis is 40% and the chance of death by wrong diagnosis is 70%. A patient of doctor A, who had disease X, died. What is the chance that his disease was diagnosed correctly?
b) The heights of mothers and daughters are given in the following table, from that table of regression estimate the expected average height of daughter when the height of the mother is 64.5 inches. [5+5]

Height of the mother (in inches)	62	63	64	64	65	66	68	70
Height of the daughter (in inches)	64	65	61	69	67	68	71	65

4.a) Explain the two-way classification technique of analysis of variances.
b) The number of automobile accidents per week in a certain community are as follows; 12, 8, 20, 2, 14, 10, 15, 6, 9, 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period? (Table value Is 16.9). [5+5]

OR

5.a) The following figures relate to the number of trees planted in five different areas by four persons.

	Number of trees			
Area	A	B	C	D
1	44	38	47	36
2	46	40	52	43
3	34	36	44	32
4	43	38	46	33
5	38	42	49	39

Is there a significant difference in the efficiency of these persons? (Table value at 5% is 3.49)

b) Explain the student t-distribution, its properties and applications. [6+4]

6.a) What is statistical quality control? Explain its purpose and advantages.

b) Three varieties A, B, C of a crop are tested in CRD with four replications, the plot yield in pounds are as follows. Analyze the experimental yield and state your conclusion($F_{0.05}(2,6) = 5.14,\ F_{0.05}(3,6) = 4.76$) [6+4]

A 6	C 5	A 8	B 9
C 8	A 4	B 6	C 9
B 7	B 6	C 10	A 6

OR

7.a) What is Latin square design? Under what conditions can this design are used? Discuss briefly the advantages and disadvantages of Latin square design.

b) The following table gives the number of defects in a sample, construct appropriate control chart with the control limits and comment on the process. [5+5]

Sample number	1	2	3	4	5	6	7	8	9	10
Number of Defects	15	11	25	10	12	20	15	10	17	13

8. Create 4 Slides on annual day of your college and write down the steps to perform the following:

a) Give Header and Footer
b) Give Background Color
c) Insert Picture from Clip Art
d) Insert Slide Numbers [10]

OR

9. Write formulas for the operations (a) – (d) based on the spreadsheet given below along with the relevant cell address:

	A	B	C	D	E	F	G
1	SNO	Name	Science	Maths	Computers	Total	Average
2	1	Swati	70	80	87	--	--
3	2	Shruti	90	98	89	--	--
4	3	Neelu	90	90	98	--	--
5	4	Rosy	60	76	79	--	--
6	5	Shreya	50	45	67	--	--
7	Max				--		
8	Total		--				

a) To calculate the Total Marks as sum of Science, Maths & Computers for each student and display them in column F.
b) To calculate the average marks for each student and display them in column G.
c) To calculate the highest marks in Computers and display it in cell E7.
d) To calculate the total number of students appearing for the Science test and display it in cell C8. [10]

10. Give examples to explain "INSERT" , "DELETE", "SELECT" queries in SQL? [10]

OR

11. Give examples to explain the computer applications in clinical studies? [10]

--ooOoo--

Code No: 113BK

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
FLUID MECHANICS
(Common to CE, CEE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 marks)

1.a) What is the difference between dynamic viscosity and kinematic viscosity? State their units of measurements. [2]
b) List out the examples where surface tension effects play a prominent role. [3]
c) What are the methods of describing fluid flow? [2]
d) Explain path line and streak line. [3]
e) What is Euler's equation of motion? How will you obtain Bernoulli's equation from it? [2]
f) Name the different forces present in a fluid flow. For the Eulers's equation of motion, which forces are taken into consideration? [3]
g) Define: laminar boundary layer and boundary layer thickness. [2]
h) Derive an expression for the displacement thickness. [3]
i) How will you determine the loss of head due to friction in pipes by using Darcy's formula? [2]
j) What do you understand by terms: Major energy loss and minor energy losses in pipes? [3]

PART- B

(50 Marks)

2.a) Find the expression for the force exerted and centre of pressure for a completely submerged inclined plane surface. Can the same method be applied for finding the resultant force for a curved surface immersed in the liquid? If not, why?
b) The opening in the dam is 3 m wide and 2 m high. A vertical sluice gate is used to cover the opening. On the upstream of the gate, the liquid of sp. gr. 1.5, lies upto height of 2.0 m above the top of the gate, whereas the downstream side, the water is available upto a height of the top of the gate. Find the resultant force acting on the gate and position of centre of pressure. Assume that the gate is higher at the bottom. [5+5]

OR

3.a) What is the difference between U-tube differential manometers and inverted U-tube deferential manometers? Where are they used?
b) An inverted differential manometers containing an oil of sp. gr. 0.9 is connected to find the difference of pressure at two points of a pipe containing water. If the manometer reading is 40 cm, find the difference of pressures. [5+5]

4. A fluid flow is given by:

$$V = xy^2 i - 2yz^2 j - \left(zy^2 - \frac{2z^3}{3} \right) k$$

Prove that it is a case of possible steady incompressible fluid flow. Calculate the velocity and acceleration at the point [1, 2, 3]. [10]

OR

5. Define rotational and irrotational flow. The stream function and velocity potential for a flow are given by $\psi = 2xy$, $\Phi = x^2 - y^2$. Show that the conditions of continuity and irrotational flow are satisfied. [10]

6. A 20 × 10 cm venturimeter is provided in a vertical pipe line carrying oil of sp. gr. 0.8, the flow being upwards. The difference in elevation of the throat section and entrance section of venturimeter is 50 cm. The differential U-tube mercury manometer shows a gauge deflection of 40 cm. calculate:
a) the discharge of oil, and
b) the pressure difference between the entrance section and the throat section. Take $C_d = 0.98$ and sp. gr. of mercury as 13.6. [5+5]

OR

7. A conical tube of length 3.0 m is fixed vertically with its smaller end upwards. The velocity of flow at the smaller end is 4m/s while at the lower end it is 2 m/s. The pressure head at the smaller end is 2.0 m of liquid. The loss of head in the tube is $0.95 (v_1 - v_2)^2 / 2g$, where v_1 is the velocity at the smaller end and v_2 at the lower end respectively. Determine the pressure head at the lower end. Flow takes place in downward direction. [10]

8. Find the ratios of displacement thickness to momentum thickness and momentum thickness to energy thickness for velocity distribution in the boundary layer given by $\frac{u}{U} = 2(y/\delta) - (y/\delta)^2$

Where u = Velocity in the boundary layer at the distance y
U = Free-stream velocity
δ = Boundary layer thickness. [10]

OR

9. A kite weighing 0.8 kgf (7.848 N) has an effective area of 0.8 m^2. It is maintained in air at an angle of 10^0 to the horizontal. The string attached to the kite makes an angle of 45^0 to the horizontal and at this position the value of coefficient of drag and lift are 0.6 and 0.8 respectively. Find the speed of the wind and tension of the spring. The density of air is 1.25 kg/m^3. [10]

10.a) For the two cases in the flow in a sudden contraction in a pipeline and flow in a sudden expansion in a pipeline, draw the flow pattern, piezometric grade line and total energy line.

b) A horizontal pipe-line 50 m long is connected to a water tank at one end and discharge freely into the atmosphere at the other end. For the first 30 m of its length from the tank, the pipe is 200 mm diameter and its diameter is suddenly enlarged to 400 mm. The height of water level in the tank is 10 m above the centre of the pipe. Considering all minor losses, determine the rate of flow. Take f = 0.01 for both sections of the pipe. [5+5]

OR

11.a) Three pipes of different diameter and different lengths are connected in series to make a compound pipe. The ends of the compound pipe are connected with two tanks whose difference of water level is H. If coefficient of friction for these pipes is same, then derive the formula for the total head loss, neglecting first the minor losses and then including them.

b) A pipe of diameter 300 mm and length 1000 m connects two reservoirs, having difference of water levels as 15. Determine the discharge through the pipe. If an additional pipe of diameter 300 mm and length 600 mm is attached to the last 600 m length of the existing pipe, find the increase in the discharge. Take f = 0.02 and neglect minor losses. [5+5]

---ooOoo---

Code No: 113BS **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

DIGITAL LOGIC DESIGN

(Computer Science and Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What is the simplest technique for detecting errors? [2]
b) What are the basic operations in Boolean algebra? [3]
c) What is a flip-flop? What are its functions? [2]
d) Define maxterm and minterm. [3]
e) What is a ripple carry-adder? [2]
f) Write truth table for 2×4 priority encoder. [3]
g) Compare synchronous and Asynchronous counters. [2]
h) What are the various methods used for triggering flip-flops? [3]
i) What are types of ROM? [2]
j) What is PLA? [3]

PART-B

(50 Marks)

2.a) Solve for x:
i) $(367)_8=(x)_2$ ii) $(378.93)_{10} = (x)_8$ iii) $(B9F.AE)_{16} = (x)_8$ (iv) $(16)_{10} = (100)_x$
b) Convert $(163.875)_{10}$ to binary, octal, hexadecimal. [5+5]

OR

3.a) What are universal gates? Realize AND, OR, NOT, XOR gates using universal gates.
b) Obtain the canonical SOP form of the following functions.
i) Y (A,B) = A+B ii) Y(A,B,C,D) = AB+ACD. [5+5]

4.a) Simplify the expression $Y=\sum m(7,9,10,11,12,13,14,15)$ using the k-map method.
b) Simplify the following Boolean function:
$F(A,B,C,D)= \sum m(1,3,7,11,15) + \sum d(0,2,5)$. [5+5]

OR

5.a) Simplify the expression $Y = \pi(7,9,10,11,12,13,14,15)$ using the k-map method.
b) Simplify the expression $Y = m_1+m_5+m_{10}+m_{11}+m_{12}+m_{13}+m_{15}$ using the k-map method. [5+5]

6.a) Draw the schematic diagram and truth table for half adder. Explain the design approach for half adder using universal gates. Draw the logic diagrams with relevant expressions.
b) Design, draw and explain a 4-bit binary carry look ahead adder. [5+5]

OR

7.a) Describe the operations performed by the following logic circuits with an example: i) Comparator ii) Decoder iii) Encoder.

b) Explain the operation of a 3-to-8 decoder 74LS138. Realize 4-to-16 decoder using two 3-to-8 decoders. [5+5]

8.a) Realize D-FF and T-FF using JK-FF. Draw the logic diagrams with their truth tables.

b) Deduce the design procedure for sequential logic circuits and give the classification of sequential logic circuits. [5+5]

OR

9.a) Design, draw and explain a synchronous MOD-12 down-counter using j-k flip-flop.

b) Design, draw and explain a 4-bit ring counter using D-flip flops with relevant timing diagrams. [5+5]

10.a) Give the logic implementation of a 32×4 bit ROM using decoder of suitable size.

b) Implement the following Boolean function with PLA:
$F(A,B,C) = \sum m(1,5,6,7)$. [5+5]

OR

11.a) Derive the PLA programming table for the combinational circuit that squares a 3-bit number. Draw the relevant logic diagram.

b) A ROM chip of 4,096 × 8 bits has two chip select inputs and operates from a 5-volt power supply. How many pins are needed for the integrated circuit package? Draw and explain the relevant block diagram. [5+5]

--ooOoo--

Code No: 113BU

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
SWITCHING THEORY AND LOGIC DESIGN
(Common to ECE, EIE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Convert the number $AB33_{(16)}$ to binary and then to gray code. [2]
b) Show that the dual of the exclusive-OR is equal to its complement. [3]
c) Simplify the expression (A+B′) (A′+B′+D) (B′+C′+D′) to minimum number of literals using boolean algebra. [2]
d) What is a decoder? Construct a 4×16 decoder with two 3×8 decoders. [3]
e) Define Sequential circuit and draw the block diagram of Sequential Circuit. Give the classification of Sequential circuits. [2]
f) Explain the excitation table of SR and JK Flip-flops. [3]
g) Define: i) State Reduction ii) State Assignment. [2]
h) Give the classification of Shift registers with neat diagrams. [3]
i) List out the capabilities and limitations of FSM. [2]
j) Draw the ASM chart for D Flip-flop. [3]

PART-B

(50 Marks)

2.a) Perform the following conversions.
i) $AB_{(16)} = (\ )_{10}$ ii) $1234_{(8)} = (\ )_{10}$
iii) $456_{(8)} = (\ )_2$ iv) $100011001_{(2)} = (\ )_{16}$
b) Perform the following using BCD arithmetic.
i) $7129_{10}+7711_{10}$ ii)$8124_{10}+8127_{10}$. [5+5]

OR

3.a) Implement the following boolean function using only NAND gates.
F(A,B,C,D) = (A'B+AB')(CD'+C'D)
b) Find the complement of the following functions.
i) (A'B+CD)E'+E ii)XY'+X'Y. [5+5]

4.a) Simplify the following function using K-map method.
F(A,B,C,D)= Σ(0,1,2,3,4,6,9,10)+d(7,11,12,13,15)
b) Realize Ex-OR gate using 2×1 Multiplexer. [5+5]

OR

5. Design a code converter that converts 4-bit gray code to 4-bit binary number. [10]

6. What is race around condition? How does it get eliminated in a Master-slave JK flip-flop? [10]

OR

7. Draw a neat diagram of positive edge triggered SR flip-flop and explain its operation. [10]

8. Design a Finite state machine which can detect a sequence of 1011 (Overlapping output) using JK Flip-flops. [10]

OR

9. Design a synchronous counter which counts 0,2,4,6,8,0,2…. Sequence. Use JK Flip-flops in the design. [10]

10. Reduce the number of states in the following state table using Partition method. [10]

PS	NS		Output	
	x=0	x=1	x=0	x=1
A	H	C	1	0
B	C	D	0	1
C	H	B	0	0
D	F	H	0	0
E	C	F	0	1
F	F	G	0	0
G	G	C	1	0
H	A	C	1	0

OR

11. Design a Weighing machine and its control logic by drawing ASM chart and realize the same using decoder, MUX and D flip flops. [10]

---ooOoo---

R13

Code No: 113BY

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ELECTROMAGNETIC FIELDS

(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Define electric field intensity. [2]
b) Give the statement of Coulomb's law. [3]
c) Define polarization. [2]
d) Define Electric dipole. [3]
e) Write the formula of ampere's circuital Law. [2]
f) What is Maxwell's second equation? [3]
g) What is scalar magnetic potential? [2]
h) What is magnetic dipole moment? [3]
i) Define displacement current. [2]
j) What is statically and dynamically induced emfs? [3]

PART-B

(50 Marks)

2.a) State and explain Gauss's law.
b) Four concentrated charges $Q_1 = 0.3\ \mu c$, $Q_2 = 0.2\ \mu c$, $Q_3 = -0.3\ \mu c$, $Q_4 = 0.2\ \mu c$ are located at the vertices of a plane rectangle. The length of rectangle is 5 cm and breadth of the rectangle is 2 cm. Find the magnitude and direction of resultant force on Q_1. [5+5]

OR

3.a) If $D = \left[2y^2 + z\right]a_x + 4xy\ a_y + xa_z$ C/m^2, find:
i) The volume charge density at (-1, 0, 3)
ii) The flux through the cube defined by $0 \le x \le 1$, $0 \le y \le 1$, $0 \le z \le 1$.
iii) The total charge enclosed by the cube.
b) Infinite uniform line charge of 5n C/m lie along the (positive and negative) x and y axes in free space. Find E at i) P_A= (0,0,4) ii) P_B=(0,3,4). [5+5]

4.a) State and explain the continuity equation.
b) Parallel plate capacitor consists two square plate metals with 500 mm side and separated by 10 mm. A slab of sulphur $(\epsilon_r = 4)$ 6 mm thick is placed on the lower plate and air gap of 4 mm. Find the capacitance of a capacitor. [5+5]

OR

5.a) Derive the boundary conditions between a conductor and a dielectric.

b) A parallel plate capacitor consists of two square metal plates of side 600 mm and separated by a 12 mm. A slab of Teflon with $\varepsilon_r = 3$ and 5 mm thickness is placed on the lower plate leaving an air gap of 8 mm thick between it and upper plate. If 200 V is applied across the capacitor, find D, E, and V in Teflon and air. [5+5]

6.a) Deduce the relationship between magnetic flux, magnetic flux density and magnetic field intensity.

b) A square conducting loop 4 cm on each side carries a current of 10 A. Calculate the magnetic field intensity at the center of the loop. [5+5]

OR

7.a) State and Explain Biot-Savart's law.

b) A circuit carrying a direct current of 10A forms a regular hexagon inscribed in a circle of radius of 1.5 m. Calculate the magnetic flux density at the centre of the hexagon. Assume the medium to be free space. [5+5]

8.a) Derive the Neumann's formulae for the calculation of self inductance of a solenoid and toroid.

b) Explain about the Vector Poisson's equation for steady magnetic field. [5+5]

OR

9.a) A two-conductor transmission line is made up of conductors, which are separated by a distance of 2 meters. The radius of each conductor is 1 cm. The medium is air. Compute the exact value of inductance of each conductor per km length. Derive the formula used.

b) Discuss the characteristics and applications of permanent magnets. [5+5]

10.a) State and derive the Maxwell's Fourth Equation.

b) The parallel plate capacitor with plate area of $5cm^2$ and plate separation of 3mm has a voltage of $50\ sin\ 10^3\ t$ V applied to its plates. Calculate the displacement current assuming $\varepsilon = 2\varepsilon_0$. [5+5]

OR

11.a) Obtain an expression for the displacement current density.

b) Let the current I=80 t A be present in the a_z direction on the Z axis in free space within the interval $-0.1 < z < 0.1$ m. Find A_z at P(0,2,0). [5+5]

---ooOoo---

R09

Code No: 53015

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CE, ME, AME, PTE)

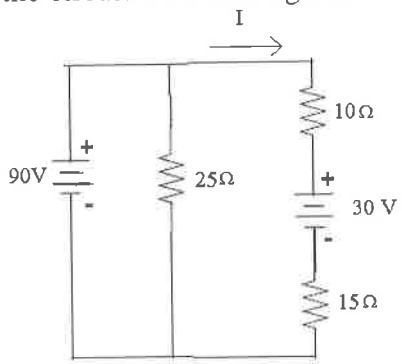
Time: 3 hours **Max. Marks: 75**

Answer any five questions

All questions carry equal marks

1.a) Draw the circuit diagram for series connection of resistors and give the detailed analysis.

b) Find the current 'I' in the circuit shown in figure. [8+7]



2.a) What is a Generator? Explain the principle of operation of DC generator in detail.

b) A 220 V DC series motor is running at a speed of 1500 rpm and draws 50A. Calculate at what speed the motor will run when developing $3/4^{th}$ of the torque. Total resistance of armature and field is 0.2Ω. Assume that the magnetic circuit is unsaturated. [8+7]

3.a) What are the types of losses in transformer? Explain in detail.

b) A single phase 200V/50V, 40 Hz transformer has a maximum core flux density of 1T and effective cross sectional area of 0.025 m^2. Determine the number of secondary turns. [8+7]

4.a) Define regulation in alternators. How it can be calculated.

b) What are the conditions to be satisfied for the production of torque in induction motors? Explain [8+7]

5.a) What are the instruments that available to measure electric current? Explain their classification.

b) What are the merits and demerits of permanent magnet moving coil instruments? Explain. [8+7]

6.a) Explain various applications of PN Junction diodes.

b) The supply voltage of a single phase half wave rectifier with resistive load of 50Ω is 230V, 50 Hz. Assuming a voltage drop of 1V across the diode when it is turned ON, determine the RMS load voltage and RMS load current [5+10]

7.a) Explain in detail about the working of a PNP transistor.
b) Draw the structure and operation of an SCR. [8+7]

8.a) Explain the structure of Cathode Ray Tube in detail.
b) How voltage magnitude and phase is measured using CRO? Explain. [7+8]

---ooOoo---

R09

Code No: 53009

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
ELECTRONIC DEVICES AND CIRCUITS
(Common to EEE, ECE, CSE, EIE, IT, MCT, ETM)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

1.a) Explain how the PN junction diode V-I characteristics are dependent on temperature.
b) Explain about Avalanche and Zener Breakdowns in PN junction diode.
c) Explain Load Line Analysis of PN junction diode. [5+5+5]

2.a) Explain the operation of full wave rectifier and derive the expression for efficiency.
b) Explain how Zener diode work as a voltage regulator?
c) Compare L-Section Filter and π- Section Filter. [5+5+5]

3.a) Explain the regions of operation of the BJT.
b) Derive the relation between α, β and γ.
c) The reverse leakage current of the transistor when in CB configuration is 0.5μA while it is 12μA when the same transistor is connected in CE configuration. Determine α, β. [5+5+5]

4.a) What is Biasing? Explain the need of it. List out different types of biasing methods.
b) Derive the operating point using AC and DC load lines. [8+7]

5.a) Draw the circuit diagram of CE amplifier using hybrid parameters and derive the expression for A_I, A_V, R_i, R_O.
b) Compare CE,CC and CB configurations. [8+7]

6.a) Derive the relation between μ, g_m and r_d.
b) Describe the construction and working principle of Enhancement mode and depletion mode MOSFET and draw its characteristics. [7+8]

7.a) Describe the operation of common drain amplifier and derive the equation for voltage gain.
b) With neat diagram explain the construction, working characteristics of UJT. Give its equivalent circuit. [7+8]

8.a) What is tunneling phenomena? Explain the principle of operation of tunnel diode with its characteristics.
b) Explain the operation of photo diode and draw its characteristics. [8+7]

---ooOoo---

R07

Code No: X0424

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ELECTRICAL TECHNOLOGY

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 80**

Answer any five questions
All questions carry equal marks

1.a) Derive an expression for the emf generated in a d.c. generator.
b) An 8 pole lap wound dc generator has 960 conductors, a flux of 40 milliwebers and is driven at 400 rpm. Find induced emf? [8+8]

2.a) Explain the principle of operation of DC motor.
b) 15A 240 V series motor takes a 40 A and gives its rated output at 1500 rpm. Its resistance is 0.3Ω. Find what resistance must be added to obtain rated torque. (i)at starting (ii) at 1000 rpm. [8+8]

3.a) "Transformer is a constant flux device". Justify the statement.
b) A 50 KVA, 3300/230V single phase transformer has a primary resistance and reactance of 3.45 and 5.40 ohms respectively. The secondary resistance and reactance are 0.0085 and 0.014 ohms respectively. Determine the Equivalent impedance referred to both primary and secondary. [8+8]

4.a) Explain various losses in transformer.
b) A 220/440 V, 10 KVA, 50 Hz single-phase transformer has at full-load, a copper loss of 120 W. If it has an efficiency of 98% at full-load and unity p.f determine the iron losses. What would be the efficiency at half full-load, and 0.8 p.f lagging? [8+8]

5.a) Explain the principle of operation of a 3 phase induction motor.
b) A 3-phase, 6-pole, 50 Hz induction motor develops 4 kW including friction and windage losses at 950 rpm. If the stator loss is 250 W. Find the slip of the induction motor. [8+8]

6.a) Derive an expression for the winding factor of an alternator.
b) Explain the principle of operation of a 3 phase alternator. [8+8]

7. Write notes on the following:
a) AC Servomotor
b) Stepper Motors. [8+8]

8. Explain the construction and operation of Permanent Magnet Moving Coil instruments with a neat diagram. [16]

---ooOoo---

3.a) With an example explain about Kirchoff's laws.

b) Using Nodal analysis, find the voltage 'V' in the circuit below shown in figure 2. [5+5]

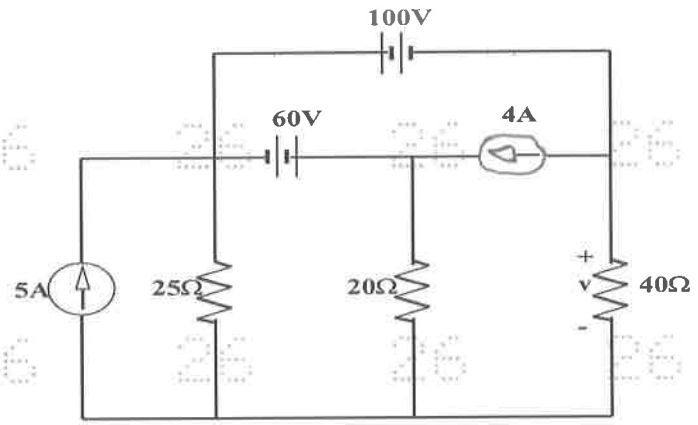


Figure: 2

4.a) Derive the expression for the average value and form factor of a sinusoidal waveform.

b) In the circuit shown below in figure 3, if the power consumed by the 5Ω resistor is 20 W, Find the power factor and reactive power of the circuit w = 100 rad/sec. [5+5]

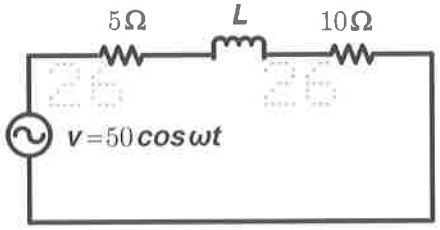


Figure: 3

OR

5.a) Derive the relationships for real and reactive powers in a series RL circuit with sinusoidal excitation.

b) Find the RMS voltage of the signal below in figure 4. [5+5]

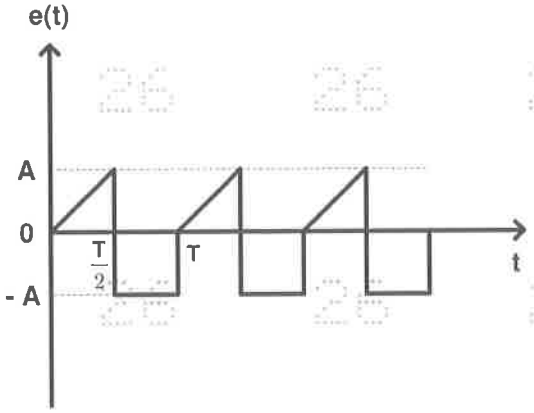


Figure: 4

Code No: 123BN

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART - A (25 Marks)

1.a) Give the truth table for the propositional formula
$(P \leftrightarrow \sim Q) \rightarrow (P \wedge Q)$ [2]

b) Write the sentence "It is not true that all roads lead to Rome" in the symbolic form. [3]

c) Define lattice. [2]

d) What is a monoid? [3]

e) How many words of three distinct letters can be formed from CAKE? [2]

f) Give the disjunctive rule for counting problem. [3]

g) What is the closed form expression of the sequence $a_n = 9.5^n, n \geq 0$? [2]

h) Find the coefficient of x^9 in $(1 + x^3 + x^8)^{10}$. [3]

i) What are the advantages of adjacency matrix representation? [2]

j) Define a spanning tree. [3]

PART - B (50 Marks)

2.a) Obtain the principal disjunctive normal form of the following formula
$P \vee (\neg P \rightarrow (Q \vee (\neg Q \rightarrow R)))$.

b) Verify whether the proposition $((P \vee \neg q) \rightarrow r) \leftrightarrow s \vee \neg(((P \vee \neg q) \rightarrow r) \leftrightarrow s)$. [5+5]

OR

3.a) Show that $(\forall x)(p(x) \wedge Q(x)) \rightleftarrows ((\forall x)(p(x) \wedge (\forall x)(Q(x))$ is a logically valid statement.

b) Show the following using the automatic theorem.
i) $P \Rightarrow (\neg P \rightarrow Q)$ ii) $P \wedge \neg P \wedge Q \Rightarrow R$ [5+5]

4.a) Show that the functions $f : R \rightarrow (1, \infty)$ and $g : (1, \infty) \rightarrow R$ defined by $f(x) = 3^{2x} + 1$, $g(x) = \frac{1}{2}\log_3(x - 1)$ are inverses.

b) Prove that the transitive closure R^+ of a relation R on a set A is the smallest transitive relation on A containing R. [5+5]

OR

5.a) Let G is a group, $a \in G$. If 0(a)=n and m/n then prove that $0(a^m) = \frac{n}{m}$.

b) Let S is a semi group. If for all $x, y \in s$, $x^2 y = yx^2$ prove that S is an abelian group. [5+5]

6.a) How many ways are there to distribute 12 different books among 15 people if no person is to receive more than one book?

b) How many different outcomes are possible from tossing 12 similar dice? [5+5]

OR

7.a) Find the mid-term of $\left(2x - \frac{1}{3x}\right)^{10}$.

b) Find the term which contains x^{11} and y^4 in the expansion of $(2x^3 + 3xy^2 + Z^2)^6$. [5+5]

8.a) Solve $a_{n+2} - 6a_{n+1} + 9a_n = 3.2^n + 7.3^n \; for \; n \geq 0 \; Where \; a_0 = 1, \; a_1 = 4$.

b) Solve the following recurrence relation by substitution

$a_n = a_{n-1} + 3n^2 + 3n + 1 \; Where \; a_0 = 1$. [5+5]

OR

9.a) Solve the recurrence relation $a_{n+2}^2 - 5a_{n+1}^2 + 6a_n^2 = 7n \; for \; n \leq 0, \; given \; a_0 = a_1$.

b) Find a general expression for a_n using generating functions

$a_n - 7a_{n-1} + 16a_{n-2} - 12a_{n-3} = 0, \; n \geq 3$. [5+5]

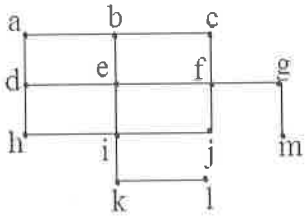
10.a) Let G be the non directed graph of order 9 such that each vertex has degree 5 or 6. Prove that atleast 5 vertices have degree 6 or atleast 6 vertices have degree 5.

b) Determine the number of edges in:

i) K_n ii) $K_{m,n}$ iii) P_n. [5+5]

OR

11.a) Using depth first search method, determine the spanning tree T for the following graph with e as the root of T.



b) Give an example graph which is Hamiltonian but not Eulerian. [5+5]

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Code No: 123BJ

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
STRENGTH OF MATERIALS-I
(Common to CE, CEE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Define Longitudinal strain and Poission's ratio. [2]
b) A circular bar of diameter 50mm is subjected to a tensile force of 120kN. Find longitudinal strain and lateral strain, Take 'E'= 200Gpa and 1/m = 0.3. [3]
c) Define point of contra flexure. [2]
d) Draw SFD and BMD for a Cantilever beam of span 3m subjected to point load of 50kN at its free end. [3]
e) Sketch the Bending stress and Shear stress distribution across the depth of a circular section. [2]
f) List out the assumptions made in the derivation of bending equation. [3]
g) Define maximum principal stress theory. [2]
h) Define principal planes and principal stresses. [3]
i) Define Conjugate beam. [2]
j) Calculate slope and deflection of a cantilever beam span 'L' subjected to load 'W' at free end, Use moment area method. [3]

PART-B

(50 Marks)

2.a) A steel bar 300mm long and 30mm×30mm cross section, is subjected to a tensile force of 150kn in the direction of its length. Determine the change in volume. Take 'E' = 200 Gpa and 1/m = 0.3.
b) A hammer is having a mass of 10 kg falls from a height of 1.5 m on a 50 mm cube iron block before coming to rest. Find the amount by which the block will be compressed and the instantaneous stress induced in it. Also find the velocity with which the hammer will strike the block. Take 'E' = 200Gpa. [5+5]

OR

3.a) Rails of 20 m length were laid on the track when the temperature was 20^0C. A gap of 1.6 mm was kept between two consecutive rails. At what max temperature the rails will remain stress free? If the temperature is raised further by 15^0C, what will be the magnitude and nature of stresses induced in the rails?
b) A composite bar of length 700 mm is made up of an aluminium of length 400 mm and steel bar of length 300 mm. The cross sectional areas of Aluminium and steel bars are of 100 mm × 100 mm and 50 mm × 50 mm respectively. Assuming that the bars are prevented from buckling sideways, calculate the compressive force P to be applied to the composite bar that will cause the total length of the bar decease by 0.25 mm. Take modulus of elasticity of Aluminium and steel as 70 GPa and 200 Gpa respectively. [5+5]

4.a) Derive the relation between rate of loading, Shear force and Bending moment.
b) Draw S. F. D and B. M. D for the cantilever beam loaded as shown in figure 1. [5+5]

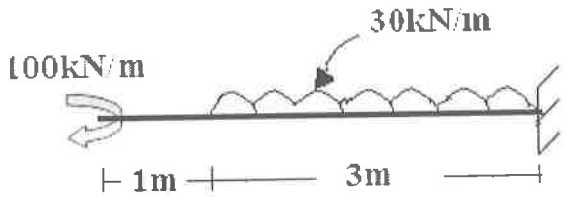

Figure: 1

OR

5. Draw S. F. D and B. M. D for the beam shown in figure 2. [10]

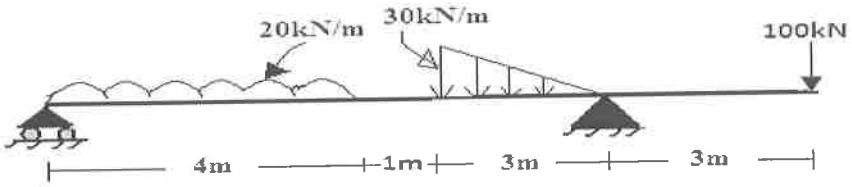

Figure: 2

6. Design the cross section for a beam acted upon by a bending moment of 80kN-m. If width of beam is 230 mm, calculate depth. Take stress f = 10 Mpa. [10]

OR

7. An I beam 300 mm deep and 100 mm wide has equal flanges of 10 mm thick top flange and 8mm thick bottom flange is subjected to a shearing force of 200 kN. Draw the shear stress distribution across the depth. Obtain what percentage of shearing force is carried by the web? [10]

8. An element in a plane is subjected to normal stresses p_1 = 150 Mpa, p_2 = 50 Mpa in two mutually perpendicular directions accompanied by a shear stress q = 40 Mpa. Determine the stresses acting on an element rotated through an angle by 40^0 clockwise. Also determine the principal stresses and the planes on which they act. [10]

OR

9. Discuss in detail about various theories of failures. [10]

10. A simply supported beam 8 m long carries concentrated loads of 40 kN each at a distance 2 m from the ends. Calculate:
a) Maximum slope and deflection for the beam, and
b) Slope and deflection under each load.
Take: EI = 1.2×10^4 kN.m^2. [5+5]

OR

11. Determine the slopes at the ends and deflection at the mid span section of a beam loaded shown in figure 3 using Conjugate beam method. Take elastic modulus as 'E'. [10]

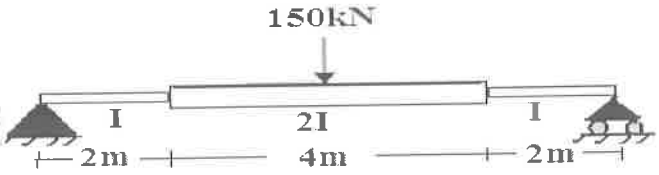

Figure: 3

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R15

Code No: 123BW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ELECTRICAL CIRCUITS

(Common to EEE, ECE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

1.a)	Define capacitance. What is V-I relation of capacitance?	[2]
b)	What are the properties of super mesh?	[3]
c)	Define RMS value.	[2]
d)	What is the significance of power factor?	[3]
e)	What is resonance?	[2]
f)	What are the circuit variables of a magnetic circuit?	[3]
g)	Define graph.	[2]
h)	Draw a connected graph and explain.	[3]
i)	Define Norton's current.	[2]
j)	What are the limitations of superposition theorem?	[3]

PART-B

(50 Marks)

2.a) Give the detailed classification of independent sources.

b) Using Mesh analysis, find the voltage across 5Ω resistor in the circuit below shown in figure 1. [5+5]

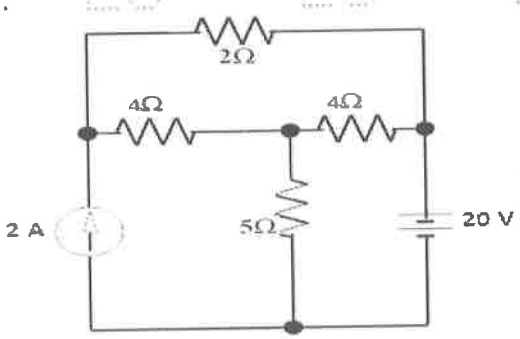

Figure: 1

OR

3.a) With an example explain about Kirchoff's laws.

b) Using Nodal analysis, find the voltage 'V' in the circuit below shown in figure 2. [5+5]

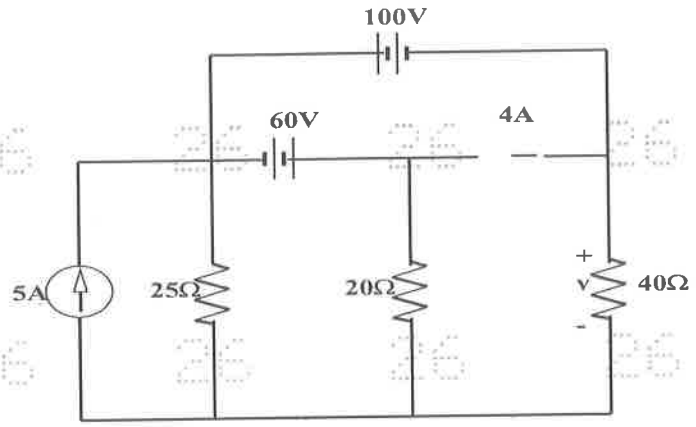

Figure: 2

4.a) Derive the expression for the average value and form factor of a sinusoidal waveform.

b) In the circuit shown below in figure 3, if the power consumed by the 5Ω resistor is 20 W, Find the power factor and reactive power of the circuit w = 100 rad/sec. [5+5]

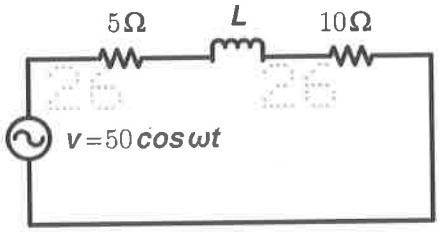

Figure: 3

OR

5.a) Derive the relationships for real and reactive powers in a series RL circuit with sinusoidal excitation.

b) Find the RMS voltage of the signal below in figure 4. [5+5]

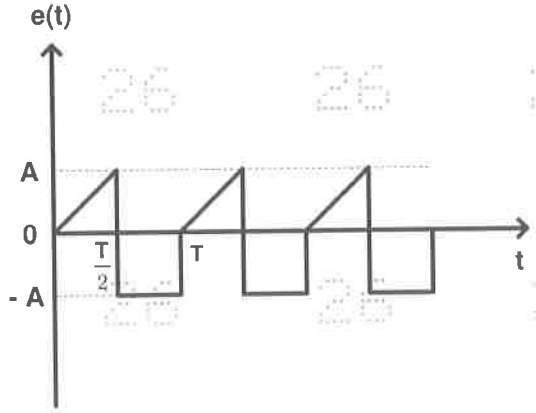

Figure: 4

6.a) Draw the impedance locus diagram of a parallel RC circuit and explain.
b) For the magnetic current shown in figure 5, find the current 'I' in the coil needed to produce a flux of 5.5 mWb in the air gap. The magnetic circuit has a uniform cross sectional area of 5 cm^2. Assume the relative permeability of the magnetic material as 3523, neglect leakage and fringing effect. [5+5]

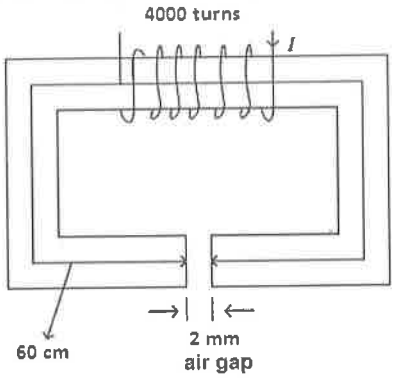

Figure: 5

OR

7.a) Explain in detail about Faraday's law of electromagnetic induction.
b) In a series circuit of L=10mH and C=0.01μF and R=50Ω. Calculate the resonant frequency and also the impedance at the resonant frequency. [5+5]

8.a) What is loop method? Explain the analysis of networks with this method in detail.
b) For the graph shown in figure 6, determine the number of branches, sub graphs, trees and draw them. [5+5]

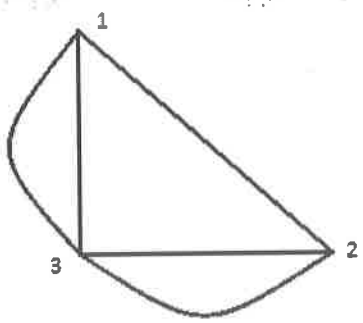

Figure: 6

OR

9.a) Define Duality. Explain with the help of an example.
b) With the help of an example, explain the procedure of formulating the Basic tie set matrix. [5+5]

10.a) With the help of an example, explain about Compensation theorem.
b) Using Superposition theorem, find the current flows in 2Ω resistor in the circuit shown in figure 7. [5+5]

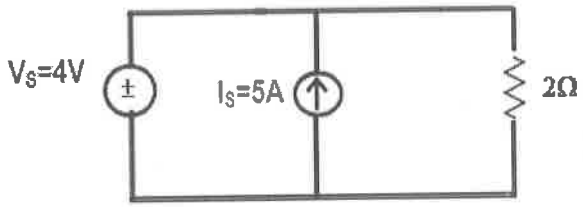

Figure: 7

OR

11.a) With the help of an example, explain about Millman's theorem.
b) Using Thevenin's theorem, find the voltage 'V' in the circuit shown in figure 8. [5+5]

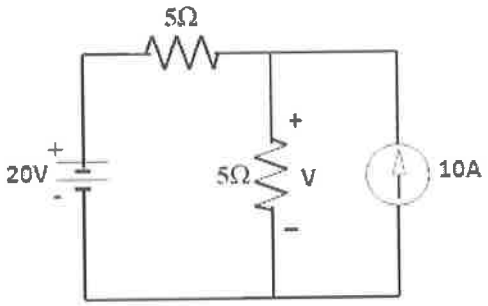

Figure: 8

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Code No: 113AN **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
PROBABILITY AND STATISTICS
(Common to ME, CSE, IT, MCT, AME, MIE, MSNT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) If $f(x) = K\, e^{-|x|}$ is p.d.f in $-\infty < x < \infty$, find K. [2]

b) If X is a poisson variate such that $p(X = 1) = 24\, p(X = 3)$, find μ. [3]

c) Write the formulae for the two regression lines. [2]

d) If the joint probability density function is $f(x, y) = \frac{x + y}{K}$, $x = 1, 2$, $y = 1, 2$ find K. [3]

e) A sample of 200 items is taken from a population whose standard deviation is 15. Find the standard error of means. [2]

f) In a random sample of 200 packages shipped by air freight 52 had some damage. Find the maximum error with 95% confidence of proportions. [3]

g) Define steady state. [2]

h) Consider a self service store with one cashier. Assume Poisson arrivals and exponential service time. Suppose that 10 customers arrive on the average of every 30 minutes and the cashier can serve in 2 minutes. Find the traffic intensity. [3]

i) Define recurrent state of Marcov Chain. [2]

j) If $\begin{bmatrix} 0.5 & x & 0 \\ 0.2 & 0 & x+y \\ z & 0.4 & 0.1 \end{bmatrix}$ is a transmission probability matrix, then find the values of x, y and z. [3]

PART- B

(50 Marks)

2.a)

x	1	2	3	4	5	6	7	8	9
p(x)	k	3k	5k	7k	9k	11k	13k	15k	17k

Then Find:
i) K
ii) The Mean
iii) The variance.

b) A die is thrown 8 times. If getting a 2 or 4 is a success, find the probability of getting
i) 4 successes ii) $P(x \leq 3)$ iii) $P(x \geq 2)$. [5+5]

OR

3.a) Assume that 60% of the students passed. Find the probability that among 12:
i) Exactly 8 passed. ii) At least 4 passed.

b) If x is a poisson variate such that 3P(x=1)=3 P(x=2). Find:
i) μ ii) $P(x \leq 2)$. [5+5]

4. Calculate the coefficient of correlation between the two variables x and y. [10]

X	55	56	58	59	60	60	62
Y	35	38	38	39	44	43	44

OR

5. The joint probability density function is given by $f(x,y) = \begin{cases} 10xy^2, & 0 < x < y < 1 \\ 0, & elsewhere \end{cases}$

a) Marginal probability density function for X
b) Marginal probability density function for Y. [5+5]

6. Bricks made in 2 kilns have graded as I, II and III. The production of Bricks in a particular period was as follows. Determine whether the manager of kiln A justified in claiming that he produces Bricks of a higher quality that of the other one. [10]

kiln	Grade I	Grade II	Grade III
Kiln A	24	43	13
Kiln B	31	57	32

OR

7.a) A Random sample of 300 items is taken from a population whose standard deviation is 18. The mean of the sample is 82 construct 95% confidence interval for the mean.

b) A sample of 900 members has a mean 3.4 cms and S.D 2.81 cms another sample of 500 members has a mean 4.2 cms and S.D 2.1 cms Test the difference between the means. [5+5]

8. Define the terms:
a) Expected queue length
b) Waiting time
c) Busy period and Mean arrival rate. [3+3+4]

OR

9. A maintenance service facility has poisson arrival rates, negative exponential service times and operates and first come first served queue dispelling, breakdown occur on an average of three per day with a range of zero to eight. The maintenance can service on an average six machines per day with a range zero to seven. Find:
a) Utilization factor of the service facility.
b) Mean time in the system
c) Expected number of units in the system. [3+3+4]

10. In a presidential election at the end of June 40% of the voters registered for liberal, 45% for conservative and 15% for independent. Over one month, of the people those who registered for liberal 80% were retained, 15% changed to conservative and 5% to independent. Of the people those who registered for conservative 70% were retained, 20% changed to liberal and 10% to independent. Of the people those who registered for independent. 60% were retained, 20% changed to liberal and 20% to conservative.
a) Write transition probability matrix
b) Find the % of the voters in each category at the end July
c) At the end August. [4+3+3]

OR

11. A training process is considered as a two state marcov chain. If it rains it is considered as 0, if not 1. The transit in probability matrix of the marcov chain is $\begin{bmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{bmatrix}$. Find the probability that it will rain after three days, assuming that the initial probabilities are 0.4 and 0.6. [10]

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R13

Code No: 113AW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

SIGNALS AND SYSTEMS

(Common to ECE, EIE, BME)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Write about discrete time exponential signals. [2]

b) Determine the complex Fourier series representation of the signal $x(t) = \cos\left(2t + \frac{\pi}{4}\right)$. [3]

c) Find the Fourier transform of signum function. [2]

d) Explain the effect of under sampling. [3]

e) Define transfer function and L.T.I system. [2]

f) Justify why ideal LPF cannot be realized. [3]

g) Define auto correlation and cross correlation. [2]

h) State and Prove Parseval's Theorem. [3]

i) Derive the relation between Laplace transform and Fourier transform of signal. [2]

j) Find the z-transform of the following signal and sketch its ROC.
$x[n] = -a^n u[-n-1]$. [3]

PART-B

(50 Marks)

2.a) Derive the expression for mean square error when functions is approximated in set of mutually orthogonal functions.

b) Discuss the concept of Impulse function. Explain how signum function is expressed in terms of unit step function. [5+5]

OR

3.a) Expand following function f(t) by trigonometric Fourier series over the interval (0,1). In this interval f(t) is expressed as f(t) = At.

b) Prove that discrete magnitude spectrum is symmetrical about vertical axis whereas phase spectrum anti-symmetrical about vertical axis. [5+5]

4.a) Find the Fourier transform of a gate pulse of unit height, unit width and Centered at t = 0.

b) State and prove following properties of Fourier transform
i) Time shifting.
ii) Differentiation in time domain. [5+5]

OR

5.a) State and prove sampling theorem for band limited signals using analytical approach.

b) Give the introduction to band pass sampling. [5+5]

6.a) Obtain the conditions for the distortion less transmission through a system. And also define signal bandwidth and system bandwidth.

b) The transfer function of an LTI system is $H(\omega)$ is $\frac{16}{4+j\omega}$. Find the response y(t) for an input $x(t) = u(t)$. [5+5]

OR

7.a) Determine the impulse response of the system defined by the difference equation: $y[n] + y[n-1] - 2y[n-2] = x[n-1] + 2x[n-2]$.

b) Sketch the frequency response of ideal LPF, HPF and BPF. [5+5]

8.a) State and prove any two properties of Auto Correlation Function.

b) Explain the concept of filtering and how is it useful in the extraction of signal from noise. [5+5]

OR

9.a) State and prove Convolution property of Fourier transform.

b) Explain about graphical procedure to perform convolution. [5+5]

10.a) Find Laplace transforms and sketches their ROC of

i) $x(t) = e^{-b|t|}$ for both b>0 and b<0.

ii) $x(t) = te^{-at}u(t)$ for a>0.

b) Find the Inverse Laplace transform of $X(s) = \frac{5s+13}{s(s^2+4s+13)}, Re(s) > 0$. [5+5]

OR

11.a) Find the z-transform and sketch their ROC of:

$$x[n] = \begin{cases} a^n & 0 \le n \le N-1, \quad a > 0 \\ 0 & otherwise \end{cases}$$

b) State and prove initial value theorem of z-transform and final value theorem.

c) Find the inverse z-transform of $X(z) = \log\left(\frac{1}{1-az^{-1}}\right), |z| > |a|$. [4+2+4]

---ooOoo---

Code No: 113BX

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
FLUID MECHANICS AND HYDRAULIC MACHINERY
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A **(25 Marks)**

1.a)	Why U-tube manometer is preferred to piezometer?	[2]
b)	Distinguish between stream line and path line.	[3]
c)	Distinguish between Hydraulic gradient line and Total energy line.	[2]
d)	Write the assumptions to derive the Bernoulli's equation?	[3]
e)	Define Impulse momentum equation?	[2]
f)	What do you mean by catchment area?	[3]
g)	Why draft tube is used only in reaction turbine why not in impulse turbines?	[2]
h)	What is the use of surge tank? Explain.	[3]
i)	Write different parameters required for model testing of a centrifugal pump.	[2]
j)	What is a pump and for what purpose centrifugal pump is used? Explain.	[3]

PART – B **(50 Marks)**

2.a) Explain briefly what is meant by viscosity of a liquid. How does it manifest and in what units it is measured?

b) A plate 0.035 mm distant from a fixed plate, moves at 110 cm/s and requires a force of 2.85 N per unit area to maintain this speed. Determine the fluid viscosity between the plates. [5+5]

OR

3.a) What is vapour pressure? How can water boil at room temperature? And discuss its significance?

b) A piston of 55 mm diameter rotates concentrically inside a cylinder 62 mm diameter. Both the piston and the cylinder are 95 mm long. Find the tangential velocity of the piston if the space between the cylinder and piston is filled with oil of viscosity (0.28 N-S/m^2) and the torque of 0.0135 N-m is applied. [5+5]

4.a) Derive an expression for the loss of head due to sudden enlargement of a pipe. List all the assumptions made in derivation.

b) An orifice meter with orifice diameter 18 cm is inserted in a pipe of 34 cm diameter. The pressure difference measured by a mercury oil differential manometer on the two sides of the orifice meter gives a reading of 55 cm of Hg. Find the rate of flow of oil of specific gravity 0.88 when the co-efficient of discharge of the orifice meter is 0.61. [5+5]

OR

5.a) Derive Euler's equation of motion along a streamline and hence derive Bernoulli's equation.

b) In a 43^0 bend a rectangular air duct of 1.5 m^2 cross-sectional area is gradually reduced to 0.44 m^2 cross sectional area. Find the magnitude and direction of the force required to hold the duct in position, if the velocity of flow at the 1 m^2 section is 12 m/s and pressure is 2.856 N/cm^2. Take density of air as 1.35 kg/m^3. [5+5]

6.a) Derive the equation for force exerted by a jet striking a stationary Hemispherical vane at the centre.

b) List out the various types of hydro electric power plants and explain pumped storage plants in detail. [5+5]

OR

7.a) Distinguish between Base load power plant and a Peak load power plant in detail.

b) A jet of water 56 mm in diameter issues with a velocity of 9.825 m/sec and impinges normally on a stationary flat plate which moves in forward motion. Find the force exerted by the jet on the plate and the work done. [5+5]

8.a) What is meant by cavitation? What is Thomas cavitation factor? What is the significance of it?

b) A Francis turbine runner having a diameter of 3.15 m operates at 192.5 r.p.m., under 54 m head and develops 20175 kW at an efficiency of 85%. Find the other characteristics if this turbine is operated under 71 m head. [5+5]

OR

9.a) In the case of a pelton wheel, two hemi spherical cups are joined together and water is directed at the junction. Explain with neat diagram, what are the advantages of this arrangement.

b) Design a single jet Pelton wheel to develop a power of 850 KW under a head of 400 m while running at 700 rpm. Assume Ku = 0.43, Cv = 0.975 and overall efficiency = 84%. Calculate the jet diameter, wheel diameter and number of buckets. Give a fully dimensional sketch of a bucket. [5+5]

10.a) Explain working principle of multistage centrifugal pump with a neat sketch.

b) A centrifugal pump is required to lift water against a total head of 40 m at the rate of 50 litres per second. Find the power of the pump, if the overall efficiency is 62%. [5+5]

OR

11.a) How does a centrifugal pump impart pressure energy to the fluid? Indicate the mechanism involved?

b) The internal and external diameters of the impeller of a centrifugal pumps are 200 mm and 400 mm respectively. The pump is running at 1200 r.p.m. The vane angles of the impeller at inlet and outlet are 20^0 and 30^0 respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water. [5+5]

--ooOoo--

Code No: 113AA **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

MATHEMATICS – II

(Common to CE, CHEM, AE, MMT, PTE, CEE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Find $\nabla.(x^2 i + 2yj + zk)$ [2]

b) Evaluate $\int_C (x - 2y)dx + xdy$ where C is $x^2 + y^2 = 1$ by Green's Theorem. [3]

c) $f(x) = \begin{cases} 0, -\pi \le x \le 0 \\ x, 0 \le x \le \pi \end{cases}$ then find a_1. [2]

d) Write Euler's formulae to expand f(x) in [-4, 4] as a Fourier series. [3]

e) Write the two normal equations to fit the curve $y = ae^{bx}$ for the given data (x, y). [2]

f) Evaluate $\mu^2 y_0$. [3]

g) If 3rd iteration of root of $x^3 + x^2 - 4 = 0$ is 2.5815 then find 4th iteration by successive approximation method. [2]

h) Derive the iteration formula to find the cube root of a number N by Newton Raphson method. [3]

i) Write formulae to evaluate $\int_a^{a+nh} y dx$ by simpson' 1/3rd rule and 3/8th rule. [2]

j) If $y' = x - y^2$ and y(0) = 1, then find $y^{(1)}(x)$ by Picards method. [3]

PART- B

(50 Marks)

2.a) Evaluate $\nabla^2 \log r$ where $r = \sqrt{x^2 + y^2 + z^2}$.

b) Evaluate $\int \bar{F} d\bar{r}$ along the straight line joining the points (0, 0, 0) to (1, 2, 4). [5+5]

OR

3. Verify stokes theorem for $F = (x^2 + y^2)i - 2xy\, i$ taken around the rectangle bounded by the lines $x = \pm a, y = 0, y = b$. [10]

4.a) Expand $\pi x - x^2$ as a half range cosine and sine series in the range $0 \le x \le \pi$.

b) Using Fourier integral, prove that

$$e^{-ax} - e^{-bx} = \frac{2(b^2 - a^2)}{\pi} \int_0^\infty \frac{\lambda \sin \lambda x \, d\lambda}{(\lambda^2 + a^2)(\lambda^2 + b^2)} \quad a, b > 0$$ [5+5]

OR

5. Find Fourier cosine transform of $e^{-a^2x^2}$ and hence find cosine transform of $xe^{-a^2x^2}$. [10]

6. Find y(32), if y(10)=35.3, y(15)=32, y(20)=29.2, y(25)=26.1, y(30)=23.2, y(35)=20.5. Using Gauss's forward interpolation formula. [10]

OR

7. Solve the difference equation. $y_{n+2} - 5y_{n+1} + 6y_n = 4^n$. [10]

8. a) Interpret Newton Raphson method geometrically.
   b) Find a real root of $\cos x - x^2 - x = 0$ using Newton Raphson method. [5+5]

OR

9. Solve the system of equations $x + y + z = 1$, $3x + y - 3z = 5$, $x - 2y - 5z = 10$ by writing the coefficient matrix as a product of a lower triangular and an upper triangular matrices. [10]

10. The velocity V of a particle at a distance S from a point on its path is given by the following table.

$S(ft)$	0	10	20	30	40	50	60
$V_{(ft/s)}$	47	58	64	65	61	52	38

Estimate the time taken to travel 60 ft using:

a) Simpson's $\frac{1}{3}rd$ rule, b) Simpson's $\frac{3}{8}th$ rule. [5+5]

OR

11. Given $\frac{dy}{dx} = x + \sin y$ and y(0)=1 compute y(0.2) and y(0.4) with h=0.2 using Euler's modified method. [10]

---ooOoo---

Code No: 53022

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSE, IT)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

1.a) Construct the truth table for the following statement $(P \rightarrow Q) \vee (\neg P \rightarrow R)$.
b) Show that the following statements are logically equivalent without using truth table. $(P \rightarrow R) \wedge (Q \rightarrow R) \Leftrightarrow (P \vee Q) \rightarrow R$. [7+8]

2.a) How does an indirect proof technique differ from a direct proof?
b) Using predicate logic, prove the validity of the following argument. "Every husband argues with his wife. 'X' is a husband. Therefore, 'X' argues with his wife". [5+10]

3.a) Let X = {ball, bed, dog, let, egg} and R is a relation defined on X as R= {(x, y)| x and y contains some common letter}. Show that R is compatibility relation and also find maximum compatibility blocks for R.
b) Draw the Hasse diagram for the relation R = {(x, y) |x divides y} on X= {2, 3, 6, 12, 24, 36}. [8+7]

4.a) Consider the algebraic system (Q, *), where Q is the set of rational numbers and * is a multiplication operation defined by: $a * b = a + b - ab \ \forall \ a, b \in Q$. Determine whether (Q, +) is a group.
b) Show that the identity element in a group is unique. [8+7]

5.a) Find the sum of all 4 digit numbers that can be obtained by using the digits 2,3,5 and 7(without repetition).
b) In how many ways can we choose a black square and white square on a 8×8 chessboard? [8+7]

6. Solve the following recurrence relation using generating function $a_n - 6a_{n-1} = 0$ for $n \geq 1$, and $a_0 = 1$. [15]

7.a) Write the rules for constructing Hamiltonian paths and cycles.
b) Explain the difference between Hamiltonian graphs and Euler graphs. [7+8]

8.a) Prove that every connected graph has at least one spanning tree.
b) Prove that the complete graph of 5 vertices is nonplanar. [8+7]

---ooOoo---

Code No: 53020 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ELECTRIC CIRCUITS

(Common to ECE, ETM)

Time: 3 hours **Max. Marks: 75**

Answer any five questions

All questions carry equal marks

- - -

1.a) Explain in detail the volt-ampere relationship of R, L and C elements for ramp and triangular input signals with neat diagrams.

b) Describe the source transformation technique with suitable examples. [10+5]

2.a) Find the current supplied by 10 V battery by using Star-Delta transformation for the following network shown in figure 1.

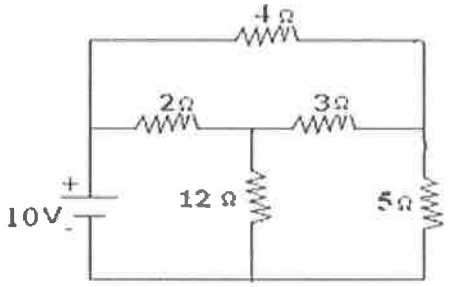

Figure: 1

b) By using loop analysis find the current flowing through 5 ohms resistor as shown in figure 2. [7+8]

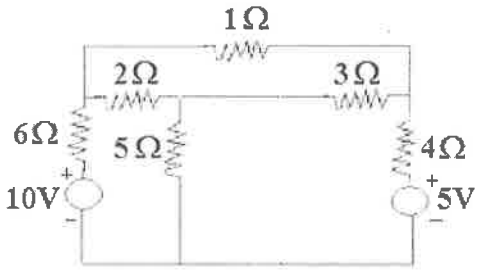

Figure: 2

3.a) The impedances of a parallel circuit are $Z_1=(6+j8)\ \Omega$ and $Z_2=(8-j6)\ \Omega$. If the applied voltage is 120V, Find:

i) Current and power factor of each branch

ii) Overall current and power factor of the circuit

iii) Power Consumed by each impedance

iv) Draw the phasor diagram for overall impedance.

b) Find form factor for a triangular waveform shown in figure 3. [8+7]

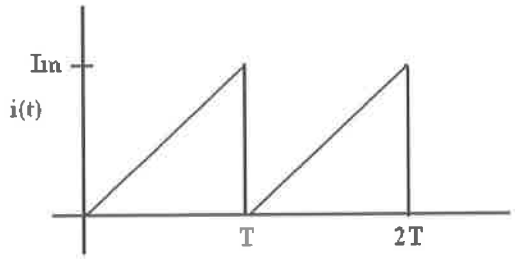

Figure: 3

4.a) Obtain the locus diagram for parallel combination of R_L-L and R_C-C with variable L.

b) Given a series RLC circuit with R = 10 ohms, L = 1 mH and C = 1μF connected across a sinusoidal source of 20 V with variable frequency. Find:
i) The resonant frequency
ii) Q factor of the circuit at resonant frequency
iii) Half power frequencies. [8+7]

5.a) Derive coefficient of coupling for two mutually coupled coils.

b) A mild steel ring has a mean circumference of 600 mm and a uniform cross-sectional area of 350 mm^2. Calculate the MMF required producing a flux of 600 μWb when an air gap of 1mm length is now cut in ring. Given relative permeability of mild steel is 1200. [7+8]

6.a) Define and explain the following terms:
i) branch ii) twig iii) path iv) cutest v) tieset.

b) Find the branch currents as shown in following figure 4 by using the concept of tie-set matrix. [7+8]

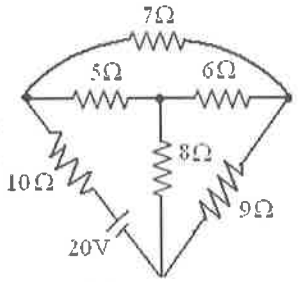

Figure: 4

7.a) Verify the Reciprocity theorem for the figure 5:

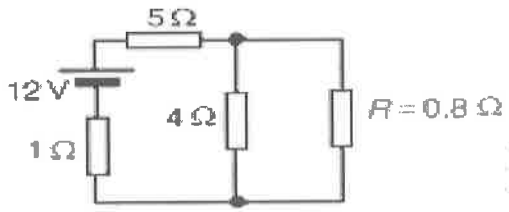

Figure: 5

b) State and Explain Norton's theorem with an example. [7+8]

8.a) By using Thevenin's theorem find the current flowing through AB terminals across (5+j5) ohms impedance as shown in figure.6.

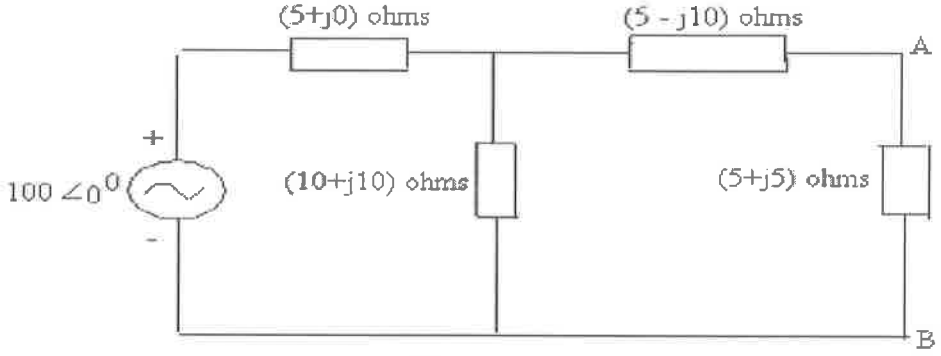

Figure: 6

b) State and explain Compensation theorem for AC network by taking any one example. [10+5]

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R09

Code No: 53016

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, November/December - 2016
MECHANICS OF SOLIDS
(Common to ME, MCT, MMT, AE, AME, MSNT)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

- - -

1.a) A piece of material is subjected to two perpendicular stresses as follows: i) Tensile stresses of 100 MPa and 60 MPa ii) Tensile stress of the 100 MPa and compressive stress of 60 MPa iii) Compressive stress of 100MPa and 60MPa. Determine normal and tangential stress on a plane inclined at 30^0 to the plane of 100 MPa stress. Also find the resultant and its inclination with the normal stress.

b) Draw the stress strain diagram for brittle material and discuss the salient points. [8+7]

2.a) A beam of length L carries a uniformly distributed load 'q' per unit run on its whole length. It has one support at its left end and the other support is at a distance 'a' from the other end. Find the value of 'a' so that the maximum bending moment for the beam is as small as possible. Find also the maximum bending for this position. Also plot the shear force and bending moment diagram for the whole beam.

b) What is the importance of shear force and bending moment diagrams of the beams? Explain. [8+7]

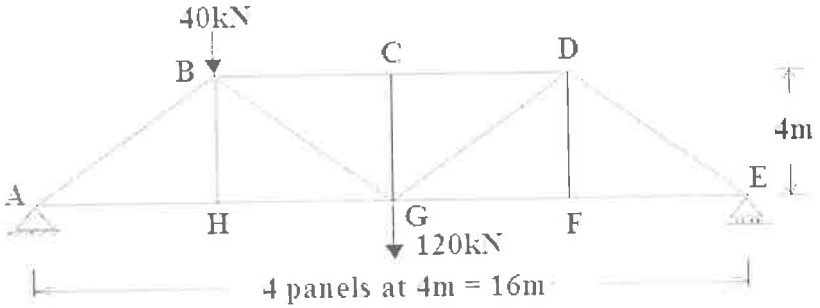
3.a) A wooden beam is 8.0 cm wide and 12 cm deep with a semi-circular groove of 2 cm radius planned out in the center of each side. Calculate the maximum stress in the section when simply supported on a span of 3.0 m, loaded with a concentrated load of 450 N at a distance of 1.0 m from the one end and a UDL of 500 N/m run over the entire span.

b) Derive equation for maximum bending stress developed in the circular shaft. [8+7]

4.a) What is the shear stress distribution in I cross section and discuss the importance of shear stress?

b) A beam of square cross-section is used as a beam with one diagonal horizontal. Obtain the magnitude and location of maximum shear stress in the beam. Draw the variation of shear stress across the section. [7+8]

5. Find forces in members BC, HG, BG and DG of the truss shown in figure below. [15]



6.a) A cantilever beam of length 7 m, carries a point load 60 kN at a distance of 5 m from the fixed end. Find the deflection and slope under the point load and also at the free end. Take $E = 2.1\times10^5$ MPa and $I = 89 \times 10^6$ mm^4.

b) What are the assumptions made to find the deflections and slopes in the beam? Explain in detail. [8+7]

7.a) State the assumptions made in the analysis of thin cylindrical shells.

b) A shell 5 m long, 1.4 m in diameter is subjected to an internal pressure of 1.4 MPa. If the thickness of the shell is 10 mm, find the circumferential and longitudinal stresses. Find also maximum shear stress and the changes in the dimensions of the shell. Take $E = 2.07\times10^5$ N/mm^2 and Poisson's ratio = 0.3. [7+8]

8.a) A cylindrical compressed air drum is 2 m in diameter with plates 12.5 mm thick. The efficiencies of the longitudinal (η_L) and circumferential (η_c) joints are 85% and 45% respectively. If the tensile stress in the plating is to be limited to 100 MPa, find the maximum safe air pressure.

b) Show that the volumetric strain of cylindrical shell is the sum of longitudinal strain and twice that of hoop strain. [8+7]

---ooOoo---

R09

Code No: 53003

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

STRENGTH OF MATERIALS-I

(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

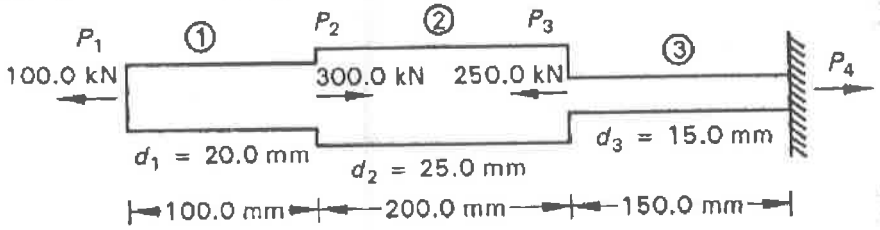
Answer any five questions

All questions carry equal marks

\- - -

1.a) What are Elastic Constants? Derive the relation between them.

b) Find the total elongation for the bar shown in Figure 1. What stresses will develop in three Different sections? What should be the length of the portion (1) to have total deformation as zero. Assume $E_{Cu}=1 \times 10^5$ N/mm^2. [5+10]



(a) Given bar

Figure: 1

2.a) Define proof resilience and modulus of Resilience and explain with the help of stress strain curve.

b) A weight of 3 kN falls 70 mm on to a collar fixed to a steel bar of 20 mm in diameter and 6m long. Determine the maximum stress induced in the bar and extension of the bar. Modulus of Elasticity of steel in 205 GPa. [5+10]

3.a) Derive the relation between Load, Shear Force and Bending Moment.

b) Draw neatly the Shear force and bending moment for the cantilever beam shown in figure 2. [5+10]

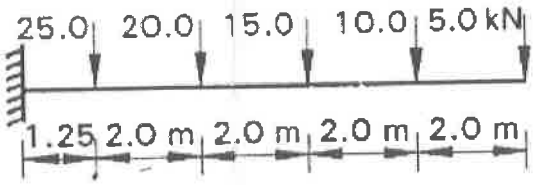


Figure: 2

4.a) Write the assumptions in simple bending.

b) The I- girder shown in figure 3 is of 10 m long simply supported and carries a U.D.L of 30kN/m (inclusive of self weight). Find the maximum stress in the material due to bending. Also draw the stress distribution across the cross section. [4+11]

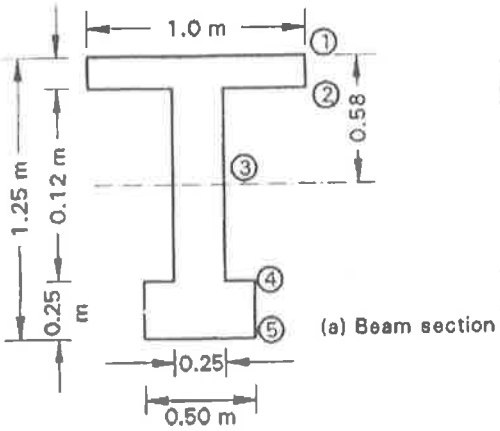


Figure: 3

5.a) Derive an expression for shear stress distribution across the cross section.

b) The T-Beam shown in figure 4 is subjected to a shear force of 240 kN. Sketch the shear stress distribution over the depth of the section. [6+9]

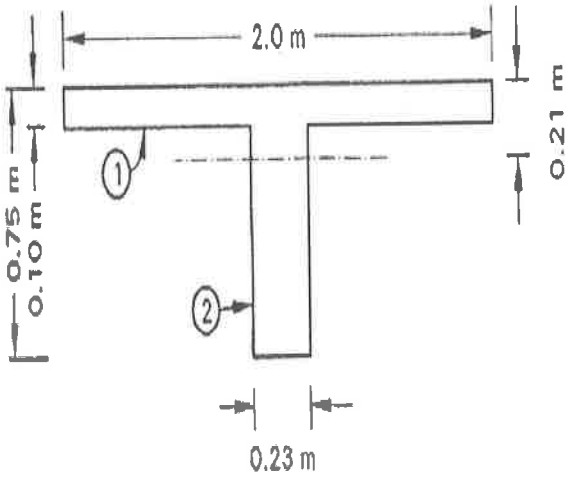


Figure: 4

6.a) State and prove Moment area theorems.

b) A Simply supported beam of 12.5m length carries two point loads as shown in Figure 5. Find the deflection under each load and slopes at supports. Take 'EI' as constant through out the length of the beam. [5+10]

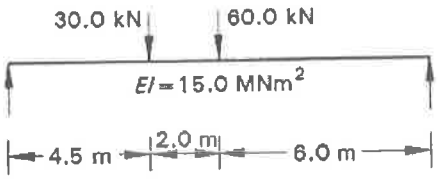


Figure: 5

7. a) Derive the formula for longitudinal and circumferential stresses in Thin cylinders.

b) A 10 m long thin cylindrical shell 1.5 m in diameter and 14 mm thick. It is subjected to an internal pressure of 5 MPa. Calculate the stresses induced in the cylinder. Determine the change in diameter, change in length and change in volume of the shell. E=200 GPa and Poisson's ratio=0.3. [4+11]

8. A cylinder of 220 mm dimeter and 60 mm thickness is subjected to an internal pressure of 60 Mpa. Determine the stress distribution and compare with thin cylinder theory. Plot the variation of radial and circumferential stresses. Find the change in thickness of the cylinder. Take Poisson's ratio = 0.25 and E=200 GPa. [15]

---ooOoo---

Code No: 223AE

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, November/December-2016
ANATOMY PHYSIOLOGY AND PATHOPHYSIOLOGY

Time: 3hours **Max.Marks:75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A **(25 Marks)**

1.a)	What is EEG and mention its applications.	[2]
b)	Write a note on Epilepsy	[3]
c)	Mention the causative organism and clinical symptoms of TB	[2]
d)	Write a note on acute renal failure	[3]
e)	Mention the hormones secreted by posterior pituitary	[2]
f)	Write a note on disorders which occur due to growth hormone excess	[3]
g)	Define coitus and fertilization	[2]
h)	Briefly explain oogenesis	[3]
i)	Mention the various mediators of inflammation	[2]
j)	Write a note on cellular adaptations	[3]

PART-B **(50 Marks)**

2. Mention different parts of the brain and write their functions. Explain the neurochemical transmission in CNS. [10]

OR

3. Compare and contrast the anatomical and functional features of the sympathetic and parasympathetic systems. [10]

4. With a labelled diagram explain the anatomy of kidney and write a note on the role of kidneys in acid-base balance. [10]

OR

5. Define tidal volume and vital capacity. Explain the mechanism and regulation of respiration. [10]

6. With a labelled diagram explain the anatomy of pituitary. Classify pituitary hormones and mention their physiological role. [10]

OR

7. Explain the anatomy of pancreas and explain the physiological role of hormones secreted by endocrine portion of pancreas. [10]

8. Explain the process of sexual differentiation and write a note on parturition. [10]

OR

9. With a labelled diagram explain the various parts of female reproductive system and explain the physiological functions of estrogen and progesterone. [10]

10. Classify the causes of cellular injury and explain the process of apoptosis and necrosis. [10]

OR

11. Define acute and chronic inflammation and explain the process of cellular inflammation and repair. [10]

--ooOoo--

R15

Code No: 123CT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
DIGITAL LOGIC DESIGN
(Computer Science and Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Explain duality theorem with example. [2]
b) Convert following hexadecimal number to decimal.
i) $F28_{16}$ ii) $BC2_{16}$. [3]
c) Implement Ex-NOR gate using only NAND gates. [2]
d) Obtain the prime implicants for given Boolean expression using K-map.
$f(A, B, C) = \sum(1, 3, 6, 7)$. [3]
e) What is code converter? [2]
f) Explain the analysis procedure for combinational circuit. [3]
g) Explain clear and preset inputs. [2]
h) What is race around condition? [3]
i) Explain the role of Cache Memory in sequential circuits. [2]
j) Compare ROM and RAM. [3]

PART-B

(50 Marks)

2.a) Using 2's complement perform $(42)_{10} - (68)_{10}$.
b) Implement the following Boolean function with NOR-NOR logic
$F(A,B,C) = \pi M\ (0,2,4,5,6)$. [5+5]

OR

3.a) What is the specialty of unit-distance code? State where they are used.
b) Give the Boolean expressions used for following gates
i) AND ii) NOR iii) EX-OR iv) OR v) EX-NOR. [5+5]

4. Reduce the following functions using K-map techniques.
a) $f(A, B, C, D, E) = \sum m\ (1, 4, 8, 10, 11, 20, 22, 24, 25, 26) + d\ (0, 12, 16, 17)$
b) $f(A, B, C, D) = \pi\ M\ (4, 5, 6, 7, 8, 12, 13) + d\ (1, 15)$. [5+5]

OR

5.a) Using K-map obtain the minimal sum of products and the minimal product of sums from of the function $f(a,b,c,d) = \sum m\ (1, 2, 3, 5, 6, 7, 8, 13)$.
b) Explain about essential prime implicants. [5+5]

6. Design the full adder circuit using decoder and de-multiplexer. [10]

OR

7.a) Write a short note on priority encoder.
b) What is decoder? [5+5]

8.a) Compare combinational circuits and sequential circuits. [5+5]

b) Explain the clocked JK flip-flop with truth table.

OR

9. Draw and explain the working of following flip-flops: [5+5]

a) RS b) D.

10.a) Draw and explain the block diagram of PLA. [5+5]

b) Explain address and data bus in digital electronics.

OR

11. Implement the following function using a PROM.

a) $F(A, B, C, D) = \sum m(1, 9, 12, 15)$

b) $G(A, B, C, D) = \sum m(0, 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15)$. [5+5]

---oo0oo---

R15

Code No: 123BY

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ELECTROMAGNETIC FIELDS

(Electrical and Electronics Engineering)

Time: 3 Hours | Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a)	Write the properties of potential function.	[2]
b)	What is Maxwell's first law?	[3]
c)	Define electric dipole.	[2]
d)	Define Convection and conduction current densities.	[3]
e)	Define Magnetic field intensity.	[2]
f)	Write the applications of Ampere's circuital law.	[3]
g)	Write the vector Poisson's equation.	[2]
h)	What are the applications of permanent magnets?	[3]
i)	Define time varying fields.	[2]
j)	How dynamically induced EMF is produced?	[3]

PART-B

(50 Marks)

2.a) State and prove Gauss's law as applied to an electric field and determine the field due to an infinite line charge.

b) Derive Poisson's and Laplace equations starting from point form of Gauss Law. [5+5]

OR

3.a) Show that the electric filed intensity at any point inside a hollow charged Spherical conductor is zero.

b) Three point charges each 5 nC are located on the x-axis at points: -1, 0 and + 1 m in free space. (i) Find E at x=5. (ii) Determine the value and location of the equivalent single point charge that would produce the same field at very large distance. [5+5]

4.a) Establish the electrostatic boundary conditions for the tangential components of electric field and electric displacement at the boundary of two non dielectrics.

b) The relative permittivity of dielectric in a parallel plate capacitor varies linearly from 4 to 8. If the distance of separation of plates is 1 cm and area of cross-section of plates is 12 cm^2, find the capacitance. Derive the formula used. [5+5]

OR

5.a) A spherical capacitor with inner sphere of radius 1.5 cm and outer sphere of radius 3.8 cm has an homogeneous dielectric of $\varepsilon = 10\ \varepsilon_0$. Calculate the capacitance of the capacitor. Derive the formula used.

b) Prove that the derivative of the energy stored in an electrostatic field with respect to volume is ½ D.E, where D and E electric flux density and electric field intensity respectively. [5+5]

6.a) State and explain Biot-Savart's law and derive the expression for the magnetic field at a point due to an infinitely long conductor carrying current.

b) What are the limitations of Amperes current law? How this law can be modified to time varying field? [5+5]

OR

7.a) Derive Maxwell's second equation div (B)=0.

b) Derive magnetic field intensity due to a square current carrying element. [5+5]

8.a) Derive the Neumann's formulae for the calculation of self and mutual inductances.

b) Explain the concept of vector magnetic potentials. [5+5]

OR

9.a) Determine the inductance of a toroid.

b) A rectangular coil of area 10 cm^2 carrying a current of 50 A lies on plane $2x + 6y - 3z = 7$ such that the magnetic moment of the coil is directed away from the origin. Calculate its magnetic moment. [5+5]

10.a) Explain concept of displacement current and obtain an expression for the displacement current density.

b) Explain in detail about modification of Maxwell's equations for time varying fields. [5+5]

OR

11.a) Explain Faraday's laws of electromagnetic induction and derive the expression for induced EMF.

b) Derive Maxwell's equations in integral form for time varying Fields. [5+5]

---ooOoo---

Code No: 123BU

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, November/December - 2016
SWITCHING THEORY AND LOGIC DESIGN
(Common to ECE, EIE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What are the different illegal states of BCD and XS-3? [2]
b) State and prove the included factor theorem. [3]
c) What is the prime implicant chart? [2]
d) Draw the full subtractor using X-OR and AOI gates. [3]
e) Define the Propagation delay time. [2]
f) Draw the conversion table of SR flipflop to JK flipflop. [3]
g) Define the ring counter. [2]
h) What are the applications of Shift register? [3]
i) What are the capabilities of FSM? [2]
j) Draw the state box and Decision box diagrams of ASM Charts. [3]

PART-B

(50 Marks)

2.a) Convert the gray number 10110101 into:
i) Decimal ii) Octal iii) Hex
b) Perform the subtraction in BCD using 9's complement method for 592.6-887.9. [5+5]

OR

3.a) Derive the Boolean expression for a two input Ex-OR gate to realize with the two input NAND gates without using complemented variables and draw the circuit.
b) Expand (A+D')(A+C')(A'+B)(A'+B+C) into maxterms and minterms. [5+5]

4.a) Using the QM method, obtain the simplified expression for:
F=Σm (4,5,6,7,8,9,)+d(10,11,12,13,14,15).
b) Give the limitations of K-mapping method. [5+5]

OR

5.a) Design the 8:1 MUX for the given Boolean Expression f=Σm(1,3,4,11,12,13,14,15).
b) Design a combinational circuit to detect the decimal numbers 0,2,4,6 and 8 in a 4-bit XS-3 code input. [5+5]

6.a) Explain the generation of narrow spikes in the edge triggered flip-flops.
b) Draw and explain the operation of the Master Slave SR flip-flops with block diagram. [5+5]

OR

7.a) Derive the characteristic equation of JK flip-flop from the Excitation table.
b) Explain the Race around condition in flip-flops in detail. [5+5]

8.a) Design a Ring counter using shift register.
b) Define state, state diagram. Draw state diagram taking any one as an example. [5+5]

OR

9.a) Design a counter circuit for a mod-asynchronous counter using JK flip-flops.
b) Design a 3-bit up/down counter which counts up when the control signal M=1 and counts down when M=0. [5+5]

10. Draw the merger graph and obtain the set of Maximal compatibles for the incompletely specified sequential machine for given state table. [10]

PS	NS,Z	
	I1	I2
A	E,0	B,0
B	F,0	A,0
C	E,--	C,0
D	F,1	D,0
E	C,1	B,0
F	D,--	B,0

OR

11.a) Draw and explain the data path subsystem for weighing machine.
b) Draw the State diagram, state table and ASM chart for a D flip-flop. [5+5]

---ooOoo---

R15

Code No: 123BK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December-2016
FLUID MECHANICS
(Common to CE, CEE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART - A **(25 Marks)**

1.a) What is vapour pressure? Explain. [2]
b) List out different fluid properties along with their significance. [3]
c) What do you mean by 1-D,2-D,and 3-D flows? [2]
d) Distinguish fluid Statics, Kinematics and Dynamics. [3]
e) Distinguish between notch and weir. [2]
f) Explain about Navier-Stokes equation. [3]
g) What is Vonkarman momentum integral? [2]
h) Explain about boundary layer in transition. [3]
i) Explain Reynolds number. [2]
j) Compare velocity profiles for laminar and turbulent flow in pipes. [3]

PART - B **(50 Marks)**

2.a) Enunciate Newton's law of viscosity. Explain the importance of viscosity in fluid motion. What is the effect of temperature on viscosity of water and that of air?
b) An oil of viscosity 5 poise is used for lubrication between a shaft and sleeve. The diameter of shaft is 0.5 m and it rotates at 200 rpm. Calculate the power lost in the oil for a sleeve length of 100 mm. The thickness of the oil film is 1.0 mm. [5+5]

OR

3.a) Derive an expression for the depth of centre of pressure of an inclined surface immersed in a liquid.
b) Find the total pressure and the centre of pressure on a vertical gate of the size 4 m × 6 m with 4 m edge coincides with the water surface. Assume one side of gate is filled with water, while on the other side of air. [5+5]

4.a) Define the following:
i) Steady flow,
ii) Non-uniform flow,
iii) Laminar flow, and
iv) Two-dimensional flow.
b) The water is flowing through a taper pipe of length 50 m having diameters 40 cm at the upper end and 20 cm at the lower end, at the rate of 60 litres/s. The pipe has a slope of 1 in 40. Find the pressure at the lower end if the pressure at the higher level is 24.525 N/cm^2. [5+5]

OR

5.a) Define stream line, path line and streak line. Derive mathematical expressions for each of these lines.

b) A 75 cm diameter uniform pipe bend turns the directions of flow of gasoline of sp.gr. 0.79 through an angle of 120^0 in the horizontal plane. The constant pressure and velocity through the bend are 90 KPa and 3 m/s respectively. Find the magnitude and direction of the force to be exerted on the bend to achieve the directional change. [5+5]

6.a) Integrate three-dimensional Euler's equations for steady flow condition and prove that each one of them yields Bernoulli's equation.

b) A pipe of diameter 200 mm. conveys a discharge of 2250 litres of water per minute and has a pressure of 15.70 kPa at a certain section. Find the total energy head with respect to a datum of 5 m below the pipe. [5+5]

OR

7.a) Differentiate between:
i) Bernoullis equation and Eulers equation
ii)Velocity head and Pressure head
iii) Energy equation and momentum equation.

b) The centre line of a pipe conveying water is horizontal. The sectional areas at sections 1-1 and 2-2 are 5 m^2 and 2 m^2 respectively. The pressure intensity and velocity at section 1-1 are 39.25 kPa and 1.2 m/sec respectively. Calculate the velocity and pressure at section 2-2. Ignore losses. [5+5]

8.a) What conditions should be satisfied for separation of boundary layer? Discuss briefly the methods that can be used to prevent separation.

b) How will you determine whether a boundary layer flow is attached flow or detached flow or on the verge of separation? [5+5]

OR

9.a) Describe pressure drag and friction drag.

b) What is meant by boundary layer? Explain with a neat sketch, development of boundary layer along a flat plate held parallel to uniform flow. Point out the salient features. [2+8]

10.a) Show that the loss of head due to sudden expansion in pipe line is a function of velocity head.

b) The rate of flow of water through a horizontal pipe is 0.3 m^3/s. The diameter of the pipe is suddenly enlarged from 250 mm to 500 mm. The pressure intensity in the smaller pipe is 13.734 N/cm^2. Determine: (i) loss of head due to sudden enlargement, (ii) pressure intensity in the large pipe and (iii) power lost due to enlargement. [5+5]

OR

11.a) Explain the terms: (i) Pipes in parallel (ii) Equivalent pipe and (iii) Equivalent size of the pipe.

b) Three pipes of lengths 800 m, 600 m and 300 m and of diameter 400 mm, 300 mm and 200 mm respectively are connected in series. The ends of the compound pipe is connected to two tanks, whose water surface levels are maintained at a difference of 15 m. Determine the rate of flow of water through the pipes if f = 0.005. What will be diameter of a single pipe of length 1700 m and f = 0.005, which replaces the three pipes. [5+5]

--ooOoo--

R13

Code No: 113AU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
ELECTRONIC DEVICES AND CIRCUITS
(Common to EEE, ECE, CSE, EIE, IT, MCT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Draw the symbol and V-I characteristics of Tunnel diode. [2]
b) Differentiate Avalanche breakdown and Zener breakdown. [3]
c) Draw the circuit diagram of center tapped Full wave rectifier. [2]
d) Define ripple factor, rectification efficiency, form factor. [3]
e) What is Early Effect? [2]
f) Define α,β and γ and mention their relations. [3]
g) Draw the circuit of voltage divider bias and also its thevenin equivalent circuit. [2]
h) Assuming R_C=R_B= 1 KΩ, V_{CEsat}=0.2 V and β=40, find the minimum base current required to drive the transistor to saturation shown in figure 1. [3]

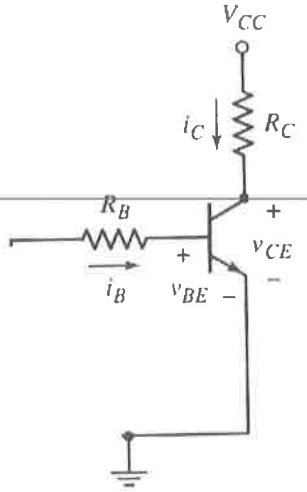


Figure: 1

i) Draw the symbols of EMOSFET and DMOSFET. [2]
j) In brief explain how FET is used as a Voltage Variable Resistor. [3]

PART-B

(50 Marks)

2. Explain about various current components in a forward biased and reverse biased PN junction diode. [10]

OR

3. Obtain the expressions for:
a) Transition capacitance and b) Diffusion Capacitance. [5+5]

4.a) Elucidate the operation of a fullwave rectifier with π- Section Filters.

b) In a fullwave rectifier using an LC filter L=15 H, C=50μF and R_L=100 Ω. Calculate V_{dc} for an input of V = 20 sin(200πt) by choosing R_f=R_{ch}=70Ω. [7+3]

OR

5. Why there is a need of regulation? Also explain how voltage regulation is obtained using Zener diode. [10]

6. Explain the operation of UJT, also its VI characteristics and its applications. [10]

OR

7.a) Define various h parameters.

b) Justify how transistor can be used as an amplifier. [5+5]

8.a) Define various compensation techniques.

b) For the circuit shown in figure 2 if R_c=10K Ω, R_E= 1.5 K Ω, R_1=39 K Ω, R_2=2.9 K Ω and β=100.

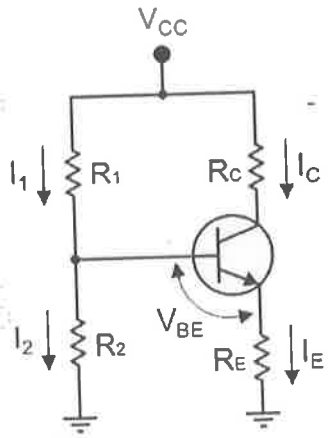


Figure: 2

Calculate V_{CE} and I_C. ... [4+6]

OR

9.a) Define Operating point and explain the concept of DC load line, AC load line.

b) In the circuit shown in figure 3, R_1 = 60 Ω, R_E=500Ω, V_{CC} = 3 V, the silicon npn transistor has a very high value of β. What is the required value of R_2 to produce I_C = 1 mA. [5+5]

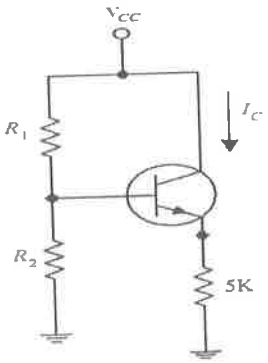


Figure: 3

10. With the help of neat diagram explain the operation of FET Common Source Amplifier. [10]

OR

11. Explain the analysis of JFET Small Signal Model. [10]

---ooOoo---

R13

Code No: 113AP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CE, ME, AME, PTE, MSNT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

1.a) State Kirchoff's laws. [2]
b) What are the disadvantages of moving coil instruments? [3]
c) What are the functions of commutator and brushes in a DC machine? [2]
d) List out few applications of d.c shunt motor and compound motor. [3]
e) Define transformation ratio of transformer. Write the expression. [2]
f) On what factors does hysteresis loss of a transformer depends upon? [3]
g) What are the advantages of Bridge rectifier when compared to half wave rectifier? [2]
h) What are the advantages of SCR over PN junction diode? [3]
i) What is the function of electron gun? [2]
j) Why is phosphor used in CRT? [3]

PART- B

(50 Marks)

2.a) Find the current supplied by 10 V battery by using star-delta transformation for the following network shown in figure 1.

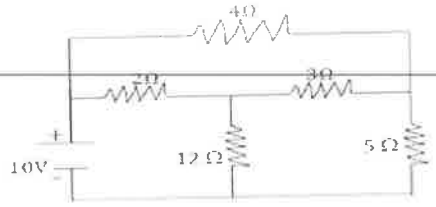


Figure: 1

b) What are passive and active elements? Explain the volt-current relationship of passive elements with examples. [5+5]

OR

3.a) Obtain the equivalent resistance between A and B terminals as shown in figure 2.

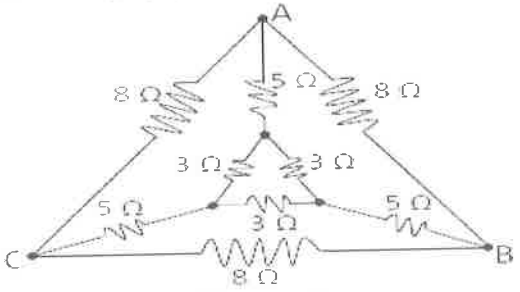


Figure: 2

b) Discuss the principle of operation of moving iron instrument. [5+5]

4.a) Derive the EMF equation of DC generator.
b) Explain about the different types of DC motors. [6+4]

OR

5.a) Discuss in detail the working of Three point starter used in a d.c motor.
b) Derive torque equation of a d.c motor. [5+5]

6.a) Derive the emf equation of a transformer.
b) Discuss about the principle of operation of alternators. [5+5]

OR

7.a) Discuss about the various losses that occur in a transformer.
b) Discuss how regulation can be calculated using synchronous impedance method. [5+5]

8.a) Draw the forward bias and reverse bias characteristics of PN junction diode and explain.
b) Discuss the working of PNP and NPN transistors. [4+6]

OR

9. Draw the circuit diagram and explain the working of half wave and full wave bridge rectifier and derive the expression for average output current and rectification efficiency. [10]

10. Discuss the principle of working of CRO by explaining the function of every component in the block diagram. [10]

OR

11.a) Derive the expression for electric field deflection sensitivity of CRT.
b) Discuss the various applications of CRO. [6+4]

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R09

Code No: 53005

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

- - -

1.a) Discuss the important properties of fluids along with their units and practical significance.

b) Determine the intensity of shear of an oil having viscosity = 1.85 poise and is used for lubrication in the clearance between a 18 cm diameter shaft and its journal bearing. The clearance is 1.6 mm and shaft rotates at 190 r.p.m. [8+7]

2.a) Explain the procedure for finding hydrostatic forces on curved surface.

b) Determine the total pressure and centre of pressure on an isoceles triangular plate of base 6m and altitude 5.75 m when the plate is immersed vertically in an oil of specific gravity 0.72. The base of plate is 1.5 m below the free surface of water. [8+7]

3.a) Define the following types of flow
i) Steady or Unsteady flow.
ii) Uniform or Non-Uniform flow.
iii) Laminar or Turbulent flow.
iv) Rotational or Irrotational flow.

b) The velocity components in a two-dimensional flow field for an incompressible fluid are expressed as u = x - 6y. Obtain expressions for stream function and velocity potential. [7+8]

4.a) Derive Euler's equation of motion along a streamline and hence derive Bernoulli's equation.

b) The diameter of a pipe bend is 0.3 m at inlet and 0.15 m at outlet and the flow is turned through 120^0 in a vertical plane. The axis at inlet is horizontal and the centre of the outlet section is 1.5 m below the centre of the inlet section. The total volume of fluid contained in the bend is 0.085 m^3. Neglecting friction, calculate the magnitude and direction of the force exerted on the bend by the water flowing through it at 225 lit/s when the inlet pressure is 137.34 kN /m^2. [8+7]

5.a) Differentiate between laminar boundary layer and turbulent boundary layer. What is laminar sub layer?

b) Find the displacement thickness, the momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $u/U = 2(y/\delta) - \left(\frac{y}{\delta}\right)^2$. [8+7]

6.a) Explain Reynolds Experiment and Discuss the importance of Reynolds number.
b) Mention the characteristics of laminar and turbulent flows in a pipe. [7+8]

7.a) Show that the loss of head due to sudden expansion in pipe line is a function of velocity head.
b) Explain different laws of fluid friction and derive an expression for friction losses using Darcy's equation. [7+8]

8.a) What is a pitot-tube? How will you determine the velocity at any point with the help of pitot-tube?
b) Derive equation of discharge for orifice meter with a neat sketch. [8+7]

--ooOoo--

R09

Code No: 53013

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

ENVIRONMENTAL STUDIES

(Common to ME, ECE, CHEM, ETM, MIE, AE)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1. Define and classify food chains and describe any two Nutrient cycles with neat sketch. [15]

2. Explain the impacts of Big dams and Mining on environment and people. [15]

3. What are the threats of biodiversity and explain its conservation methods? [15]

4. What are the impacts of nuclear radiation and explain the control techniques for particulate and gaseous air pollutants? [15]

5. What is Kyoto protocol and explain the methods to check Global warming and Ozone layer depletion? [15]

6. Write about Environmental Management Plan and explain methods of baseline data acquisition. [15]

7. Explain the functions of Environmental protection Act and Water pollution Cess Act. [15]

8.a) Explain the concept of Green Building with advantages.
b) How can we achieve Sustainable development from Unsustainable development? [5+10]

---ooOoo---

R07

Code No: X0221

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
MATHEMATICS-III
(Common to EEE, ECE, ECOMPE)

Time: 3 hours **Max. Marks: 80**

Answer any five questions
All questions carry equal marks

1.a) Show that $J_0^2 + 2(J_1^2 + J_2^2 + J_3^2 + \cdots) = 1$.

b) Prove that $\left[J_{\frac{1}{2}}(x)\right]^2 + \left[J_{-\frac{1}{2}}(x)\right]^2 = \frac{2}{\pi x}$. [8+8]

2.a) Show that $f(z) = P_n(z) = a_0 + a_1 z + a_2 z^2 + a_3 z^3 + \ldots + a_n z^n$ is continuous everywhere.

b) Find the analytic function $f(z) = u + iw$, where $u = e^x(x \cos y - y \sin y)$. [8+8]

3.a) Find all the roots of $\sin z = 2$.

b) Find the real and imaginary parts of $log\{1+\cos 2\theta + i\sin 2\theta\}$. [8+8]

4. Verify Cauchy's theorem for the function $f(z) = 3z^2 + iz - 4$ if c is the perimeter of the square with vertices at $1 \pm i$, $-1 \pm i$. [16]

5.a) State and prove Laurent series.

b) Determine and classify the singularities of $\frac{1}{(2\sin z - 1)^2}$. [8+8]

6. Evaluate $\int_0^{2\pi} \frac{\sin^2\theta}{a+b\cos\theta} d\theta$; (a>b>0). [16]

7.a) State and prove Argument theorem.

b) If $f(z) = z^5 - 3iz^2 + 2z - 1 + i$, evaluate $\oint_c \frac{f'(z)}{f(z)} dz$ where c encloses all the zeros of $f(z)$. [8+8]

8.a) Show that every bilinear transformation maps the circles in the z-plane onto the circles in the w-plane.

b) Determine the region of the w-plane into which the first quadrant of z-plane is mapped by the transformation $w = z^2$. [8+8]

---ooOoo---

R15

Code No: 223AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, November/December-2016
PHARMACEUTICAL UNIT OPERATIONS- I

Time: 3hours **Max.Marks:75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A **(25 Marks)**

1.a)	Define Reynolds number.	[2]
b)	Write the role of manometers in pharmacy.	[3]
c)	Write the role of filter aid in filtration process.	[2]
d)	Write difference between surface and depth filtration.	[3]
e)	Name the different types of crystals.	[2]
f)	Write the limitation of supersaturation theory.	[3]
g)	Define steam distillation.	[2]
h)	Write the principle of rectification.	[3]
i)	Write the safety precautions of chemical hazards.	[2]
j)	Write briefly about accidents records.	[3]

PART-B **(50 Marks)**

2.a) Write in detail about equipment used to determine humidity.
b) Write the basic equation used to determine fluid flow. [5+5]

OR

3. Define wet bulb theory and write the role of psychometric chart in pharmacy with example. [10]

4. Write the theory of filtration and enumerate various factors affecting rate of filtration. [10]

OR

5. Define centrifugation process and write the principle involved in centrifugation process with example. [10]

6. Write in detail about the Solubility curves and calculation of yields. [10]

OR

7. Write in detail about solubility curves with diagram. [10]

8. Write principle of rectification process. How Azeotropic distillation process works? [10]

OR

9. Define flash distillation and explain Raoult's law with derivation. [10]

10. Write in detail about the various electrical hazards with their safety steps. [10]

OR

11.a) Write a note on mechanical hazards.
b) Write in detail about Industrial dermatitis. [5+5]

--ooOoo--

R13

Code No: 213AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, November/December-2016
PHARMACEUTICAL UNIT OPERATIONS- I

Time: 3hours **Max.Marks:75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A **(25 Marks)**

1.a)	Define Reynolds number.	[2]
b)	Write the role of manometers in pharmacy.	[3]
c)	Write the role of filter aid in filtration process.	[2]
d)	Write difference between surface and depth filtration.	[3]
e)	Name the different types of crystals.	[2]
f)	Write the limitation of supersaturation theory.	[3]
g)	Define steam distillation.	[2]
h)	Write the principle of rectification.	[3]
i)	Write the safety precautions of chemical hazards.	[2]
j)	Write briefly about accidents records.	[3]

PART-B **(50 Marks)**

2.a) Write in detail about equipment used to determine humidity.
b) Write the basic equation used to determine fluid flow. [5+5]

OR

3. Define wet bulb theory and write the role of psychometric chart in pharmacy with example. [10]

4. Write the theory of filtration and enumerate various factors affecting rate of filtration. [10]

OR

5. Define centrifugation process and write the principle involved in centrifugation process with example. [10]

6. Write in detail about the Solubility curves and calculation of yields. [10]

OR

7. Write in detail about solubility curves with diagram. [10]

8. Write principle of rectification process. How Azeotropic distillation process works? [10]

OR

9. Define flash distillation and explain Raoult's law with derivation. [10]

10. Write in detail about the various electrical hazards with their safety steps. [10]

OR

11.a) Write a note on mechanical hazards.
b) Write in detail about Industrial dermatitis. [5+5]

--ooOoo--

R15

Code No: 123BT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

PROBABILITY THEORY AND STOCHASTIC PROCESSES

(Common to ECE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) A discrete random variable can be defined on a continuous sample space. State whether it is true or false. Give an example to support your claim. [2]

b) Write the conditions to be satisfied by a function to be a random variable. [3]

c) Write the properties of probability density function. [2]

d) Determine whether the following function is a valid probability distribution function or not? Write the properties used. $G_x(x) = \frac{x}{a}[u(x-a) - u(x-2a)]$. [3]

e) Write two properties of joint distribution function of random variables. [2]

f) State Central limit theorem. [3]

g) Give an example of a deterministic random process. [2]

h) Auto correlation function of a stationary random process is $R_{XX}(\tau) = 25 + \frac{4}{1+6\tau^2}$. Find its variance. [3]

i) Check whether the function below is a valid power density spectrum or not.

$\frac{\omega}{j\omega^6 + \omega^2 + 3}$. [2]

j) Autocorrelation function of a random process is given by $R_{XX}(\tau) = 3\delta(\tau)$. Find and sketch its power density spectrum. [3]

PART-B

(50 Marks)

2.a) State and prove Bayes Theorem.

b) Define the terms outcome, event, sample space, mutually exclusive events. Consider the experiment of rolling of two fair dice simultaneously and represent its sample space. Also give examples of terms mentioned above related to this experiment. [5+5]

OR

3.a) Discuss the relative frequency approach and axiomatic approach of probability.

b) In a box there are 100 resistors whose resistances and tolerances are as shown in the table below. Let A be the event of drawing a 47Ω resistor, B be the event of drawing a resistor with 5% tolerance, and C be the event of drawing a 100Ω resistor. Find P(A/B), P(A/C) and P(B/C). [5+5]

Resistance (Ω)	Tolerance 5%	10%	Total
22	10	14	24
47	28	16	44
100	24	8	32
Total	62	38	100

4.a) Find the mean of Binomial random variable.

b) In a sports event javelin throw distances are well approximated by a Gaussian distribution for which mean is 30m and standard deviation is 5m. In a qualifying round, contestants must throw farther than 27m to qualify. In the main event the record throw is 44m.

i) What is the probability of being disqualified in the first round?

ii) In the main event what is the probability the record will be broken? [5+5]

OR

5.a) Obtain the characteristic function of Poisson random variable.

b) X and Y are two statistically independent random variables related to W as W= X + Y. Obtain the probability density function of Y in terms of probability density functions of X and Y. [5+5]

6.a) Obtain the expression for conditional density $f_X(X/B)$ where event B is defined as $\{ y_a \leq Y \leq y_b \}$.

b) Write short notes on jointly Gaussian random variables. [5+5]

OR

7.a) Two random variables X and Y have joint characteristic function $\varphi_{XY}(\omega_1,\omega_2) = \exp(-2\omega_1^2 - 8\omega_2^2)$. Show that X and Y are uncorrelated zero mean random variables.

b) Two statistically independent random variables X and Y have mean values E[X] = 2 and E[Y] = 4. They have second moments $E[X^2] = 8$ and $E[Y^2] = 25$. Find Variance of W = 3X-Y. [5+5]

8.a) A random process is defined as $X(t) = A\cos(\omega_o t + \Theta)$, where Θ is a uniformly distributed random variable in the interval $(0, \pi/2)$. Check for its wide sense stationarity? A and ω_o are constants.

b) Classify random processes and explain. [6+4]

OR

9.a) Define autocorrelation function of a random process. Write its properties and prove any two of them.

b) Explain the concept of time average and ergodicity. Write the conditions for a random process to be ergodic in mean and autocorrelation. [5+5]

10.a) Derive the expression for power density spectrum of a random process.

b) Write the properties of power spectral density. [6+4]

OR

11.a) Prove $S_{YY}(\omega) = |H(\omega)|^2 S_{XX}(\omega)$. Where X(t) is input random process of an LTI system and Y(t) its output. $|H(\omega)|$ is the transfer function of the LTI system.

b) Define cross power density spectrum and write its properties. [5+5]

---oo0oo---

Code No: 123BP

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

DATA STRUCTURES

(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What is linked list? Write advantages of doubly linked list over singly linked list. [2]

b) What is recursion? Give the properties of a recursive definition of an algorithm. [3]

c) What is a stack? List the applications of stack. [2]

d) Show the detailed contents of stack to evaluate the given postfix expression. [3]
{1 2 3 + * 3 2 1 - + *}

e) Define a graph. List different graph traversal techniques. [2]

f) What are binary trees? Mention different types of binary trees with example. [3]

g) What is hashing? [2]

h) What is sorting? What is searching? [3]

i) Define AVL tree? Give example. [2]

j) What is B-tree of order m? Draw a B-tree of order 3. [3]

PART-B

(50 Marks)

2.a) What is amortized complexity? Explain different methods to arrive at amortized costs for operations.

b) Write a C program to implement insertion to the immediate left of the K^{th} node in singly linked list. [5+5]

OR

3. Given an ordered linked list whose node is represented by 'key' as information and 'next' as link field. Write a C program to implement deleting number of nodes (consecutive) whose 'key' values are greater than or equal to 'K_{min}' and less than 'K_{max}'. [10]

4.a) Write a C program to implement multiple stacks using single array.

b) Convert the infix expression a / b – c + d * e – a * c into postfix expression and trace that postfix expression for given data a = 6, b = 3, c = 1, d = 2, e = 4. [5+5]

OR

5. What is a circular queue? Implement insert and delete operations. [10]

6.a) Construct a binary tree having the following traversal sequences:
Preorder traversal: A B C D E F G H I
Inorder traversal: B C A E D G H F I

b) Implement Depth First Search (DFS) algorithm. [5+5]

OR

7.a) Define a Max Heap. Construct a max heap for the following:
{12, 15, 9, 8, 10, 18, 7, 20, 25}

b) What is a graph? Explain various representations of graphs. [5+5]

8.a) Write an algorithm for Heap sort.

b) Apply selection sort on the following elements:
{21, 11, 5, 78, 49, 54, 72, 88} [5+5]

OR

9. What is collision? Explain different collision resolution techniques with examples. [10]

10.a) Build an AVL tree with the following values:
{15, 20, 24, 10, 13, 7, 30, 36, 25, 42, 29}

b) Write Knuth-Morris-Pratt pattern matching algorithm. [5+5]

OR

11. Write short notes on:
a) Red-Black trees b) splay trees c) b-trees. [3+3+4]

---oo0oo---

Code No: 123BZ

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
ELECTRICAL MACHINES-I
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

1.a) Write the expression for the mechanical force developed by the magnetic field for a non-linear case. [2]
b) Why energy storing capacity of magnetic field is much larger than that of electric field. [3]
c) State the salient features of simplex winding. [2]
d) What is the action of commutator and brushes of a d.c machine. [3]
e) Define critical field and critical speed of a d.c Generator. [2]
f) Write the conditions necessary for the voltage build-up in a DC generator. [3]
g) A d.c shunt motor is connected to a 3-point starter. Explain what would happen if the field circuit becomes open circuit with the motor running at no-load. [2]
h) Draw the circuit model for Ward-Leonard system of speed control. [3]
i) State with reason whether field test on two identical dc series machines is regenerative method? [2]
j) Write the expressions for core losses and remedial measures to reduce them in a dc machine. [3]

PART-B

(50 Marks)

2.a) What is meant by singly-excited and doubly-excited electromechanical energy conversion? Give two examples for each.
b) The self and mutual inductances of the two exciting coils of a multiply-excited translator system are:
$L_{11} = L_{12} = 3.6/(1+2x)$
$L_{12} = L_{21} = 1.8/(1+2x)$
Calculate the time average force and coil currents at x=0.3m when both the coils are connected in parallel across a voltage source of 100cos314t. [5+5]

OR

3.a) With one example derive the co-energy of a multi excited magnetic field system.
b) What are the causes for irrecoverable energy loss when the flux in the magnetic circuit undergoes a cycle? [6+4]

4. Explain the effect of armature reaction in a DC shunt generator. How is its demagnetizing and cross-magnetizing ampere turns calculated? [10]

OR

5.a) Draw the sketches for different methods of excitation of DC generators and write the respective generated emf equations.

b) A d.c. machine has 8 poles, lap connected armature with 960 conductors and flux per pole is 40 mWb. It is driven at 400 r.pm. Calculate the generated e.m.f. If now lap connected armature is replaced by wave connected, calculate the speed at which it should be driven to generate 400V. [5+5]

6. Discuss the constructional details and working principle of 2-pole and 4-pole D.C machines. Also discuss the performance characteristics of d.c generators. [10]

OR

7.a) State the applications of various types of generators according to their characteristics.

b) Two DC shunt generators are connected in parallel to supply a load of 5000 A. Each machine has an armature resistance of 0.03 Ω and field resistance of 60 Ω but the emf of one machine is 600V and that of the other machine is 640 V. What power does each machine supply? [4+6]

8. What is the necessity of starter in a DC motor? Explain the working principle of 3-point starter with a neat sketch. Also explain about protective measures in the starter. [10]

OR

9.a) Enumerate the factors on which speed of a D.C motor depends. Explain briefly about speed control methods of a DC motor.

b) A d.c motor takes an armature current of 74 A when flux is 10mWb. It develops a torque of 120 N-m. If armature current is changed to 45 A keeping the flux constant, determine the new torque developed. With the same flux, if entire load on the motor is removed, armature current is observed to be 6.8 A. Determine the torque required to overcome stray losses. [5+5]

10. With the help of neat circuit diagram, explain Swinburne's test and derive the relations for efficiency (both for generator and motor) also state the merits and demerits of this method. [10]

OR

11. With the help of neat circuit diagram, explain Hopkinson's test and derive the relations for efficiency (both for generator and motor) also state the merits and demerits of this method. [10]

--ooOoo--

R15

Code No: 123AM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

SURVEYING

(Common to CE, CEE)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

1.a) State the principles of surveying. [2]
b) List out the tape corrections. [3]
c) Differentiate between simple levelling and compound levelling. [2]
d) Define: Contour, Horizontal equivalent and Contour gradient. [3]
e) State the limitations of Simpson's rule. [2]
f) List out the formulae for computing the volumes [3]
g) Define Transiting and swinging the telescope in theodolite surveying. [2]
h) List out the temporary adjustments of a theodolite. [3]
i) List out the methods for setting out simple curve by chain and tape. [2]
j) Differentiate between stadia and tangential methods of tacheometry. [3]

Part-B

(50 Marks)

2. Explain about classification of surveying. [10]

OR

3. The following were observed in a compass traverse. Correct for local attraction. [10]

Line	Fore bearing	Back bearing
AB	68^0 15′	248^0 15′
BC	148^0 45′	326^0 15′
CD	224^0 30′	46^0 00′
DE	217^0 15′	38^0 15′
EA	327^0 45′	147^0 45′

4. The following consecutive readings were taken with a dumpy level and 4 m levelling staff on a continuously sloping ground at 30 m intervals: 0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530 and 2.250 m. the R.L. of a starting point was 80.750 m.
a) Carry out reduction of heights by the collimation method.
b) Determine the gradient of the line joining the first and last points. [5+5]

OR

5. List out the methods of contouring and explain any one method in detail. [10]

6. The following offsets were taken from a chain line to a hedge at regular intervals of 5.0 m: 2.72, 3.46, 5.23, 6.80, 4.86, 3.35, 3.00, 2.50, and 1.60 m. Determine the area included between the chain line and the hedge by using:
   a) Mid-ordinate rule
   b) Trapezoidal rule and
   c) Simpson's rule. [4+3+3]

OR

7. A road at the formation level is 6 m wide and has a side slope of 2:1. The road is to have a constant R.L. of 200 m. The ground is level across the centre line of the road. The following observations were made:

Chainage (m)	0	20	40	60	80	100
Surface level along centre line of road	204.6	203.0	200.8	201.6	202.0	200.2

Estimate the volume of earth work. [10]

8. List out the methods for measuring horizontal angle and explain any two methods in detail. [10]

OR

9. The observations were made on the top A of a flag AB on a hill from two instrument stations P and Q, 100 m apart, the stations P and Q being in the line with A. The angles of elevation of A at P and Q were $30^0\ 05'$ and $17^0\ 52'$ respectively. The staff reading upon the BM (RL = 311.29 m) were, respectively, 2.690 and 3.815 when the instrument was at P and Q, the telescope being horizontal. Determine the elevation of the foot B of the flag if AB is 3.5 m. [10]

10. The following are the distances of the staff position from the instrument and the corresponding staff intervals. Calculate the tacheometric constants. [10]

D (m)	20	50	100	120
S (m)	0.195	0.495	0.997	1.197

OR

11. The chainage of the intersection of two straights having the deflection angle of 50^0 is 1680.0 m. If the radius of the curve is 450 m, calculate the following:
   a) Tangent distance
   b) Length of the curve
   c) Length of the long chord and
   d) Apex distance. [10]

---ooOoo---

R13

Code No: 113AH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

MATHEMATICS-III

(Common to EEE, ECE, EIE, ETM, AGE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1 a) Find the particular integral of $x^2\frac{d^2y}{dx^2} - 4x\frac{dy}{dx} + 6y = \log x$. [2]

b) Find the indicial equation of $xy'' + 2y' + xy = 0$. [3]

c) Express $x^2 - x$ in terms of Legendre Polynomials. [2]

d) Prove that $\tan x = \frac{J_{1/2}(x)}{J_{-1/2}(x)}$. [3]

e) Find the analytic function whose real part is $-y$. [2]

f) Evaluate $\int_0^{2} (2x - iy)dz$ along $y = x$. [3]

g) Find the singularity $\frac{z - \sin z}{z^3}$. [2]

h) Define residue at a pole. [3]

i) Find the critical points of $w = z + \frac{1}{z}$. [2]

j) Find the fixed points of $\frac{z + 2i}{-2iz + 1}$. [3]

PART-B

(50 Marks)

2. Solve the differential equation in series. $\frac{d^2y}{dx^2} + x\frac{dy}{dx} - 4y = 0$ around $x = 0$. [10]

OR

3. Solve the differential equation in series. $2x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + (1 - x^2)y = 0$ around $x = 0$. [10]

4.a) Prove that $\frac{d}{dx}\left(J_n^2 + J_{n+1}^2\right) = 2\left(\frac{n}{x}J_n^2 - \frac{(n+1)}{x}J_{n+1}^2\right)$.

b) Express $x^2 - 3x + 4$ in terms of Legendre Polynomials. [5+5]

OR

5.a) Prove that $J_{3/2}(x) = \sqrt{\frac{2}{\pi x}}\left(\frac{\sin x}{x} - \cos x\right)$.

b) Prove that $\int_{-1}^{1} P_n(x)(1 - 2xz + z^2)^{-1/2}dx = \frac{2z^n}{(2n+1)}$. [5+5]

6.a) Show that for the function $f(z) = (xy)^{1/2}$, the C.R equations are satisfied at the origin but $f'(z)$ does not exist.

b) Evaluate $\int_C \frac{dz}{e^z (z-1)^3}$ where C is $|z|=2$. [5+5]

OR

7.a) Find the analytic function whose real part is $\left(r - \frac{1}{r}\right)\sin\theta$.

b) Evaluate $\int_C \frac{e^{\pi z} + z\sinh z}{(z - \pi i)^2} dz$ where C is $|z| = 4$. [5+5]

8. Evaluate $\int_0^{2\pi} \frac{d\theta}{2 + \cos\theta}$ using residue theorem. [10]

OR

9. Expand $\frac{1}{z^2 - 3z + 2}$, as Laurent series.

a) $|z| < 1$ b) $|z| > 2$ c) $1 < |z| < 2$. [3+3+4]

10.a) Find the image of the region between the lines y=0 and y=1/2 under the mapping $w=\frac{1}{z}$.

b) Under the transformation $w = \frac{z - i}{1 - iz}$ find the image of the circle $|z| = 1$. [5+5]

OR

11.a) Find the image of the region between the lines y=0 and $y = \pi/2$ under the mapping $w = e^z$.

b) Find the bilinear mapping which maps the points z = 1, -I, 2 into 0, 2, - i. [5+5]

---ooOoo---

R13

Code No: 113BR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

BASIC ELECTRICAL ENGINEERING

(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Sate Ohm's law with an example. [2]
b) Obtain the expression for maximum power transferred across load in DC circuits using maximum power transfer theorem. [3]
c) Write the value of form factor and peak factor for a sinusoidal waveform. [2]
d) Determine the impedance of series RLC circuit with R=5 Ω, L=2 mH and C=5 nF with an applied voltage of $v(t)=10\sin(314\omega t)$. [3]
e) What is meant by Regulation of a transformer? Write its importance. [2]
f) Distinguish between core type and shell type transformers. [3]
g) Give the expression for torque developed by 3-ϕ Induction motor. [2]
h) A 4-pole d.c generator having lap wound armature winding with 1020 conductors, What will be the EMF generated in the machine when driven at 1500 rpm and with a flux of 7 mWb. [3]
i) Define deflection torque in indicating instruments. [2]
j) Write any three advantages of MI instruments over PMMC instruments. [3]

PART-B

(50 Marks)

2.a) Explain the passive elements in brief.
b) Obtain the equivalent resistance between the terminals a and b as shown in figure 1. [5+5]

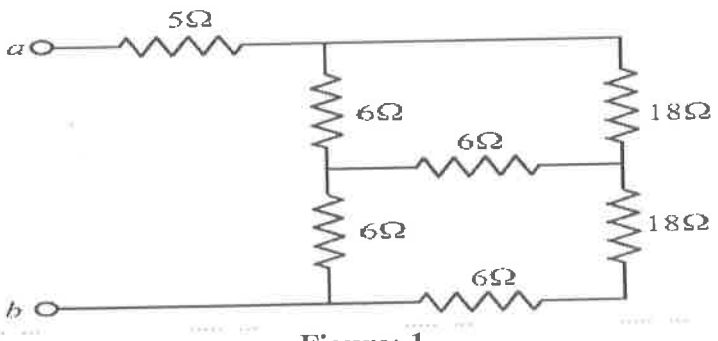

Figure: 1

OR

3.a) State and explain Thevenin's theorem. Also draw its equivalent circuit.
b) State and explain superposition theorem. [5+5]

4.a) Define the following:
i) Instantaneous value ii) Peak to peak value
iii) Maximum value iv) Average value.

b) Develop the phasor diagram for a series RC circuit with R=10 Ω and C=10 μF and excited with a 1-ϕ, 230 V ac supply. [5+5]

OR

5.a) Obtain the impedance of pure inductive circuit. Also write its phasor relations.

b) Determine the RMS value for the following voltage waveform shown in figure.2. [4+6]

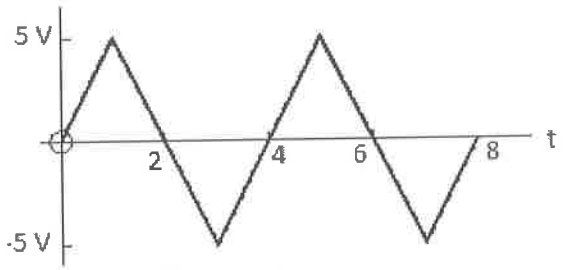

Figure: 2

6.a) Explain various losses in a 1-ϕ Transformer.

b) Obtain the condition for maximum efficiency in a 1-ϕ Transformer. [4+6]

OR

7. Discuss the principle of operation of a single phase transformer and derive its EMF equation. [10]

8.a) Write the classification of DC generators.

b) Derive the expression for torque developed in a DC motor. [5+5]

OR

9.a) Explain how rotating magnetic field (RMF) is produced in a 3-ϕ Induction motor.

b) Define the following:
i) Slip ii) Slip frequency iii) Synchronous speed.
iv) Rotor Speed v) Relative speed. [6+4]

10. Explain the principle of operation of Attraction type Moving Iron instrument with a neat sketch. Also write its applications. [10]

OR

11.a) Discuss the various types of controlling torques in Measuring instruments.

b) Explain the working principle of PMMC instrument. [5+5]

---ooOoo---

R13

Code No: 113AQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

METALLURGY AND MATERIALS SCIENCE

(Common to ME, MCT, AME)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a)	Name different types of bonds in solids.	[2]
b)	What are intermediate alloy phases?	[3]
c)	Define Gibb's phase rule.	[2]
d)	What are electron compounds? Write their properties.	[3]
e)	What is the importance of Normalizing?	[2]
f)	Write about properties of alloy steels.	[3]
g)	Differentiate between cast iron and steel.	[2]
h)	What is brass? Give its properties.	[3]
i)	What are cermets? Give an example.	[2]
j)	Write the applications of composites.	[3]

PART-B

(50 Marks)

2.a)	Explain Hume Rothery rules.	
b)	Explain briefly different methods used to determine grain size.	[5+5]
	OR	
3.a)	Classify alloy steels. Explain why alloying is done to metals.	
b)	Derive Atomic packing factor for FCC crystals.	[5+5]
4.a)	Write briefly about methods used to construct phase diagrams.	
b)	Draw and explain a phase diagram showing eutectic reaction.	[5+5]
	OR	
5.a)	What is Allotropy? Explain Eutectoid transformation with example.	
b)	Write about Equilibrium cooling and heating of alloys.	[5+5]
6.a)	Write about the effect of alloying elements on Fe-Fe_3C phase diagram.	
b)	Explain tempering process with cooling curve.	[5+5]
	OR	
7.a)	Write about the importance and applications of TTT diagrams.	
b)	What is hardening? Explain different hardening processes.	[5+5]

8.a) Write about structure and properties of Grey cast irons.
b) Briefly describe the properties of aluminium and its alloys. [5+5]

OR

9.a) Differentiate between white cast iron and malleable cast iron.
b) Describe properties of Titanium and its alloys. [5+5]

10.a) Classify composites. Enumerate the merits of particle reinforced composites over fiber reinforced composites.
b) Write about the properties and applications of polymers. [5+5]

OR

11.a) Write about the different manufacturing methods of composites.
b) Define and explain cermets. [5+5]

---ooOoo---

R13

Code No: 113BV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common to CE, CEE)

Time: 3 Hours Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

1.a)	What is 'derived Demand'?	[2]
b)	How is Price elasticity demand classified?	[3]
c)	Distinguish between 'Isocosts' and 'Isoquants'.	[2]
d)	Give any four examples on External economies of Scale.	[3]
e)	What do you understand by 'Opportunity cost'?	[2]
f)	What are the characteristics of Monopolistic competition?	[3]
g)	Explain the concept of Sealed bid pricing.	[2]
h)	What do you understand by 'ploughing back of profits'?	[3]
i)	What is a contra-entry? Give an example.	[2]
j)	How is EPS computed?	[3]

PART-B

(50 Marks)

2. Explain the Law of demand and point out its assumptions and exceptions. Supplement your answer with necessary diagrams. [10]

OR

3.a) What is Demand Forecasting?
b) Examine the 'Trend Projection' method and 'Collective Opinion' method of demand forecasting. [5+5]

4.a) Explain the nature and managerial uses of Production function.
b) What is the managerial significance of 'Expansion path'? [6+4]

OR

5.a) What is Break-Even Point?
b) Given fixed expenses at Rs. 7,260, selling price as Rs. 5 and variable cost as Rs. 3, calculate break-even point in terms of physical units of a bicycle component. [5+5]

6.a) What are the features of Perfect Competition? How is price determined under perfect competition?

b) How is 'short run period' is different from 'long run period' in economic terms? [6+4]

OR

7. What is Marginal cost pricing? Discuss the advantages and limitations of Marginal cost pricing. [10]

8. What is Capital? Differentiate between Fixed Capital and Working Capital. Briefly explain factors influencing the total capital required by an organization. [10]

OR

9. Describe briefly the various sources available for mobilizing long term finance. [10]

10. What is Double-Entry system of book keeping? Write about its principles and advantages. [10]

OR

11. Define Ratio Analysis. State the method and significance of calculating various solvency ratios. [10]

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R09

Code No: 53004

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

SURVEYING

(Common to CE, PTE)

Time: 3 hours **Max. Marks: 75**

Answer any five questions

All questions carry equal marks

1.a) What do you understand by main station, subsidiary station, base line and tie line?

b) Give in a tabular form, the differences between prismatic compass and surveyor's compass. [7+8]

2.a) The following angles were observed in clockwise direction in an open traverse:
$\angle ABC=124^0 15'$; $\angle BCD=156^0 30'$; $\angle CDE=102^0 0'$; $\angle DEF=95^0 15'$;
$\angle EFG=215^0 45'$.
Magnetic bearing of the line AB was $215^0 30'$, what would be the bearing of line FG.

b) What is an azimuth? What is the difference between the azimuth and the bearing of a survey line? [8+7]

3.a) Describe briefly the temporary adjustments of a dumpy level.

b) Describe with the help of sketches, the characteristics of contours. [7+8]

4.a) Write short notes on the Mass-Haul diagram.

b) The following offsets were taken from a chain line to a hedge.

Distance (m)	0	5	12	18	24	36	48	60	72	81	90
Offset (m)	3.8	3.3	2.4	1.8	0.9	1.5	1.8	2.2	3.0	3.3	3.6

Calculate the area enclosed between the chain-line, the hedge and the end-offsets by (i) Simpson's rule and (ii) Trapezoidal rule. [7+8]

5.a) Describe two different methods to determine the height of an inaccessible spire with respect to a given benchmark, using a theodolite. Indicate the calculations required in each method.

b) In a trigonometrical measurement of the difference in level of two stations P and Q 10480m apart, the following data were obtained. With the instrument at P, the angle of elevation of Q, was $0^0 15'$; with the instrument at Q, the angle of depression of P was $3'33''$; the height of the instrument at P was 1.42 m; the height of the instrument at Q was 1.45 m, height of the signal at P was 3.95m and the height of signal at Q was 3.92 m. Find the difference in level between P and Q and the curvature and refraction correction. Take R sin $1'' = 30.88$m. [5+10]

6.a) Derive an expression for the vertical distance by a tacheometer when the staff is vertical and the line of sight is inclined.

b) Two distances of 20 m and 100 m were accurately measured out and the intercepts of the staff between the outer stadia webs were 0.19 m at the former distance and 0.99 m at the later. Calculate the tacheometric constants. [8+7]

7.a) What are the methods of setting out simple curves? Explain Rankine's method of tangential angles for setting out curves.

b) Two tangents intersect at an angle of 150^0. If they are to be connected by a 10^0 curve, Calculate various elements of curve that is:
i) Length of curve ii) Apex distance iii) Tangent length iv) Radius of curve. [8+7]

8.a) Write a short note on the applications of GIS.

b) Explain how do we find distance between two inaccessible points using Total station. [7+8]

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R09

Code No: 53017

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

THERMODYNAMICS

(Common to ME, AE, AME)

Time: 3 hours **Max. Marks: 75**

Answer any five questions

All questions carry equal marks

\- - -

1.a) What is the concept of continuum? How density and pressure are defined using this concept.

b) Consider in a particular Celsius scale, assigned the value of 0^0C to steam point and 100^0C to ice point.

i) Using ideal gas as the thermometer medium set up a relationship between 0^0C and pressure for a constant volume thermometer. Proceed to derive the correlation between the two Celsius scales. At what temperature are the two scales are numerically equal?

ii) What is the numerical value of absolute zero for the particular scale? What is 200K in ^{0}C? [7+8]

2.a) For a polytropic process, derive the following relation:

$Q_{1\text{-}2} = \frac{\gamma - n}{\gamma - 1} \times$ polytropic work transfer and $Q_{1\text{-}2} = \frac{\gamma - n}{n - 1} \times$ adiabitic work transfer.

b) 1kg of gas expands reversibly according to linear law from 4.2 bar to 1.4 bar. The initial and final volumes are $0.004m^3$ and $0.02m^3$, respectively. The gas is then cooled at constant pressure and finally compressed isothermally back to its initial state of 4.2 bar and $0.004m^3$. Calculate the work done in each process stating its direction. Sketch the cycle on a p-v diagram. [7+8]

3.a) Prove that the Kelvin Plank and Clausius statement of the second law of thermodynamics are equivalent to each other.

b) Three Carnot engines C_1, C_2 and C_3 operate in series between two heat reservoirs, which are at temperatures of 1000K and 400K. Calculate the temperature of the intermediate reservoir if the amount of work produced by these engines in the proportion of 5:4:3. [7+8]

4.a) Draw a saturation curve on a T-s diagram and mention the different states of water on it.

b) A cylinder of 50-litre capacity contains oxygen at 18^0C and at a pressure of 10MPa. Calculate:

i) the mass of oxygen in the cylinder,

ii) the molar volume

iii) the density of oxygen.

The molecular mass of oxygen 32kg/kmol. [7+8]

5.a) What are the salient features of work transfer?

b) A gas initially at a pressure of 510 kPa and a volume of 142 liters undergoes a process and has a final pressure of 170 kPa and a volume of 275 liters. During the process, the enthalpy decreases by 65kJ. Take C_v= 0.718 kJ/kg. K. Determine:
i) change in internal energy,
ii) specific heat at constant pressure, and
iii) specific gas constant. [7+8]

6.a) What is an adiabatic saturation? When does the wet bulb temperature equal the saturation temperature?

b) At steady state, 100m^3/min of dry air at 32^{0}C and 1 bar is mixed adiabatically with a stream of oxygen (O_2) at 127^{0}C and 1 bar to form a mixed stream at 47^{0}C and 1 bar. The kinetic and potential energy effects are negligible. Determine:
i) Mass flow rates of dry air and oxygen in kg/min
ii) The mole of fraction of dry air and oxygen in the existing mixture and
iii) Time rate of entropy production, in kJ/K.min. [7+8]

7.a) Discuss the deviation of Stirling and Ericsson cycles from Carnot cycle.

b) A high-speed oil engine operating on a dual combustion cycle has a pressure of 1 bar and a temperature of 50^{0}C before compression. Air is then compressed isentropically to 1/15th of its original volume. The maximum pressure is twice the pressure at the end of isentropic compression. If the cut-off ratio is 2, determine the temperature at the end of each process and a deal efficiency of the cycle. Take Υ=1.4. [7+8]

8.a) What are the causes of irreversibilities in an actual refrigeration cycle? Explain with the help of a T-s diagram.

b) A refrigerator used R-12 as a working fluid and it operates on an ideal vapour compression cycle. The temperature of refrigerant in the evaporator is -20^{0}C and in the condenser is 40^{0}C. The refrigerant is circulated at the rate of 0.03 kg/s. Determine the coefficient of performance and capacity of refrigeration plant in the TR. [7+8]

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R09

Code No: 53019

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

PROBABILITY THEORY AND STOCHASTIC PROCESSES

(Common to ECE, ETM)

Time: 3 hours **Max. Marks: 75**

Answer any five questions

All questions carry equal marks

1.a) What is random signal? How the probability concept can be used to analyze the random signal?

b) Show that the conditional probability satisfies the three axioms of probability.

c) Let A and B are events in sample space 'S'. Show that if A and B are independent Events then $\bar{A}B$, $A\bar{B}$ and $\bar{A}\bar{B}$ are independent. [5+5+5]

2.a) Define 'Q' and error function? Explain how these functions are used to evaluate the Channel noise in communication systems.

b) Find the probability of getting head in random experiment of tossing three coins. Find, plot and obtain the expression for both PDF and CDF? [7+8]

3.a) Explain the equivalent electrical parameters of all statistical parameters.

b) Find average value, dc power, ac power, rms value and total power of random Variable 'X' whose PDF is given by $f_x(x) = 1.5e^{-3|x|}$. [7+8]

4.a) If 'X' and 'Y' are two independent normal Gaussian variables then prove that PDF of random variable Z = X+Y is also Gaussian.

b) Find the joint PDF of two random variables 'X' and 'Y' whose joint CDF is given by $F_{XY}(x,y) = \begin{cases} \left(1-e^{-x^2}\right)\left(1-e^{-y^2}\right) & x \geq 0 \text{ and } y \geq 0 \\ 0; & Else\ where \end{cases}$

And also find the probability P{(1 < X ≤ 2) and (2 ≤ Y < 3)}. [7+8]

5.a) Find the expression for joint PDF between two Gaussian random variables.

b) Two Gaussian random variables X_1 and X_2 with variance 9 and 4 respectively and covariance -3 are transformed to new random variables $Y_1 = -X_1+X_2$ and $Y_2 = -2X_2-3X_2$. Find the variances of Y_1, Y_2 and covariance. [7+8]

6.a) What is random process? Explain the statistical parameters of random process.

b) Auto Correlation Function of WSS random process is given by $R_{XX}(\tau) = e^{-a|\tau|}$; a > 0. X(t) amplitude modulates the carrier $\cos(\omega_0 t+\phi)$ such that Y(t) = X(t) $\cos(\omega_0 t+\phi)$, where ϕ is uniformly distributed between $(-\pi,+\pi)$. Find the ACF of Y(t)? [7+8]

7.a) State and prove any 'THREE' properties of Power Spectral Density.

b) Find PSD of ACF $R_{XX}(\tau) = \begin{cases} A\left[1-\frac{|\tau|}{T}\right]; & -T \leq \tau \leq +T \\ 0; & Else\ where \end{cases}$ [7+8]

8 a) Explain what is thermal noise and derive the expression for it.
b) Explain the in phase and quadrature phase of band pass noise and its properties.
[7+8]

---ooOoo---

R07

Code No: X0423

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

SIGNALS AND SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 80**

Answer any five questions
All questions carry equal marks

- - -

1.a) Define various elementary continuous-time signals. Indicate them graphically.
b) Find the even and odd components of the following signal
i) $x(t) = e^{j2t}$ ii) $x(t) = u(t)$. [8+8]

2.a) State the properties of the Fourier series.
b) Find the complex exponential Fourier series representation of the following signals:
i) $x(t) = 4 \cos 2\omega_0 t$ ii) $x(t) = \sin(2t + \pi/4)$. [8+8]

3.a) Discuss the merits and limitations of Fourier transform.
b) Using Fourier transform, find the convolution of the signals
$x_1(t) = e^{-2t} u(t)$ and $x_2(t) = e^{-3t} u(t)$. [8+8]

4.a) Obtain the conditions for distortionless transmission through a system and also draw them.
b) Let the system function of an LTI system be $1/(j\omega + 3)$. What is the output of the system $y(t)$ for an input $(0.5)^t u(t)$? [8+8]

5.a) Write the properties of convolution.
b) Find the convolution of the following signals by graphical method.
$x_1(t) = u(t + 1)$ and $x_2(t) = u(t - 2)$ [6+10]

6.a) Explain how Band pass signals are sampled.
b) Discuss Natural and Flat-top sampling of low pass signals. [8+8]

7.a) Distinguish between unilateral and bilateral Laplace transforms.
b) What is ROC? Discuss the ROCs of various classes of signals. [6+10]

8.a) State and prove the Parseval's relation.
b) Find the Z-transform of:
i) $x(t) = a^n \sin(n\pi) u(n)$. ii) $x(t) = u(n) - u(n-4)$. [8+8]

---ooOoo---

R15

Code No: 223AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, November/December-2016
PHARMACEUTICAL ORGANIC CHEMISTRY - II

Time: 3hours **Max.Marks:75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(25 Marks)**

1.a) Give the general characteristics of heterocyclic compounds. [2]
b) Explain in brief about the Electrophilic attack on aromatic five-membered heterocyclics pyrrole, with mechanism. [3]
c) Give the reactions for Nitration of Isoxazoles and Pyrazoles. [2]
d) Give the synthesis of oxazole by Robinson-Gabriel Synthesis. [3]
e) What is mean by plane polarized light? Explain how plane polarized light will be used in determining the stereochemistry of a compound. [2]
f) Write brief note on chirality with suitable examples. [3]
g) What are Polynuclear aromatic hydrocarbons? Explain. [2]
h) Give the Definitions of nucleic Acids, nucleotides, nucleosides. [3]
i) What is Beckmann rearrangement? [2]
j) Describe briefly about Wittig reaction. [3]

PART- B **(50 Marks)**

2.a) What is indole? Give its resonating structures.
b) Explain how indole is prepared by various methods. [5+5]

OR

3.a) Explain that pyridines are Isoelectronic with and analogous to benzene. Give the general characters of pyridines.
b) Give the details of Hantzsch synthesis for the preparation of pyridines with suitable mechanism. [5+5]

4.a) What is pyrimidine? Give its structure and describe how it is been prepared.
b) Give the reactions of pyrimidine molecules with one example each. [5+5]

OR

5.a) Describe the general methods of the preparation of Benzimidazoles.
b) Explain the reaction of thiazoles by giving one example of each from electrophilic and nucleohilic reaction. [5+5]

6.a) Give details of Cahn-Ingold-Prelog system of notating the chiral molecules.
b) Give brief account of physical and chemical properties of stereoisosmers. [5+5]

OR

7.a) Write about Absolute *configuration* (*D/L*) nomenclature with suitable projection formulae.
b) Explain how the racemic mixtures are resolved by using resolution techniques. Give suitable example. [5+5]

8.a) Describe in detail about a brief account on structure of DNA.
b) Give the structure and aromatic character of naphthalene. [5+5]

OR

9.a) Write about the naphthacene resonance structures, electron density and reactivity.
b) Give the Chemical structures of uric acid and explain about it. [5+5]

10.a) What is Mannich reaction? Explain with mechanism.
b) Give in detail the applications of Mannich reaction. [5+5]

OR

11.a) Illustrate the mechanism of Lossen rearrangement.
b) Give the important uses Lossen rearrangement in pharmaceutical chemistry. [5+5]

--ooOoo--

R09

Code No: R9205

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year I Semester Examinations, November/December-2016

ANATOMY PHYSIOLOGY AND PATHOPHYSIOLOGY

Time: 3hours **Max.Marks:75**

Answer any five questions

All questions carry equal marks

1.a) Describe the various cranial nerves and its functions.
b) Write the functions of cerebellum. [10+5]

2.a) Compare and contrast the structural characteristics and functions of parasympathetic and sympathetic nervous system.
b) Write a short note on adrenergic and cholinergic receptors. [10+5]

3. Explain the gross anatomy of urinary system and add a note on micturition. [15]

4.a) Enumerate Spermatogenesis with the help of a well labeled diagram?
b) Define: parturition, fertilization. [10+5]

5. Describe the anatomy of liver and explain its functions in detail? [15]

6. Describe the microscopic structure of thyroid gland and explain the synthesis, storage and release of thyroid hormone. [15]

7.a) Enumerate the mechanism involved in respiration.
b) Write a short note on Lung volume and capacity. [10+5]

8.a) Define: Apoptosis, Hyperplasia.
b) What are the causes of inflammation? Explain in detail the various vascular changes involved in acute inflammation. [5+10]

--ooOoo--

R15

Code No: 123AH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

MATHEMATICS-III

(Common to EEE, ECE, EIE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Solve $(x^2D^2+xD-4)y=0$. [2]

b) Find the particular solution of $4x^2\left(\frac{d^2y}{dx^2}\right)+8x\left(\frac{dy}{dx}\right)+y=\frac{4}{\sqrt{x}}$. [3]

c) Express x^2-1 in terms of $P_n(x)$. [2]

d) Express J_2 in terms of J_0 and J_1. [3]

e) Show that $f(z) = z|z|$ is not analytic anywhere. [2]

f) Find the harmonic conjugate of $u = 2xy + 3y$. [3]

g) Expand $\frac{1}{(z+1)}$, when $z>1$. [2]

h) Find the co-efficient of z^3 in the expansion of $\frac{1}{z^2(1-z)}$. [3]

i) Evaluate the residue of $\frac{e^z}{z^2(z^2+9)}$ at $z=0$. [2]

j) Find the image of $c < y < d$ under the transformation $w = e^z$. [3]

PART-B

(50 Marks)

2. Solve in series $3x^2\left(\frac{d^2y}{dx^2}\right)+x\left(\frac{dy}{dx}\right)+y=x$. [10]

OR

3. Solve $(1+x)^2\left(\frac{d^2y}{dx^2}\right)+(1+x)\left(\frac{dy}{dx}\right)+y=4\cos\log(1+x)$. [10]

4.a) Prove that $\text{Cos}(x\text{Cos}\theta) = J_0 - 2J_2\text{Cos}2\theta + 2J_4\text{Cos}4\theta$-----

b) Prove that $\sin(x\cos\theta) = 2J_3\cos 3\theta + 2J_5\cos 5\theta - - -$. [5+5]

OR

5. Show that $\int_{-1}^{1} P_m(x)P_n(x)dx = \begin{cases} 0 & \text{if } m \neq n \\ \frac{2}{2n+1} & \text{if } m = n \end{cases}$. [10]

6.a) Find the analytic function whose real part is $\left(r - \frac{1}{r}\right)\sin\theta$.

b) Evaluate $\int_c x^2 y\,dx + (x^2 - y^2)\,dy$ form (0,0) to (1,3) along $y=x^2$. [5+5]

OR

7. If $F(a) = \int_c \frac{(3z^2 + 7z + 1)}{(z-a)}dz$ using cauchy's integral formula where C is $|z| = 2$.

Find F(1), F(3) $F''(1\text{-}i)$. [10]

8. Expand $\frac{z}{(z+1)(z-3)}$ where (a) $c: |z| > 3$ (b) $c: |z| < 1$. [10]

OR

9. Expand $f(z) = \frac{z+3}{z(z^2 - z - 2)}$ in power of z

(a) $c: 0 < |z| < 1$ (b) $c: 1 < |z| < 2$ (c) $c: |z| > 2$. [10]

10.a) Prove that under the transformation w=1/z, the image of the lines y= x-1 and y=0 are the circle $u^2 + v^2 - u - v = 0$ and the line v=0, respectively.

b) Find the bilinear transformation which maps the points (-1,∞,1) to (-1,-2,i). [5+5]

OR

11.a) Find the image of the triangle with vertices i,1+i and 1 in Z-plane under the transformation w=3z+4-2i. [5+5]

b) Show that the transformation $w = \frac{5 - 4z}{4z - 2}$ transforms the circle $|z| = 1$ into a circle of radius unity in w-plane and find the centre of the circle. [5+5]

---ooOoo---

R15

Code No: 123BR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

BASIC ELECTRICAL ENGINEERING

(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a)	State the Superposition theorem.	[2]
b)	Distinguish between potential difference and electromotive force.	[3]
c)	Define Periodic function and Cycle.	[2]
d)	What is the significance of form factor and peak factor?	[3]
e)	What is the purpose of using core in a transformer?	[2]
f)	Define the regulation of transformer.	[3]
g)	List the basic requirements to produce e.m.f.	[2]
h)	What are the various losses in a D.C. Motor?	[3]
i)	What are the various classifications of instruments?	[2]
j)	What are the various types of Ammeters and voltmeters?	[3]

PART-B

(50 Marks)

2.a) Explain the Kirchhoff's laws.

b) By using star-delta transformation for the following figure 1. Find the current 'I' supplied by the battery? [5+5]

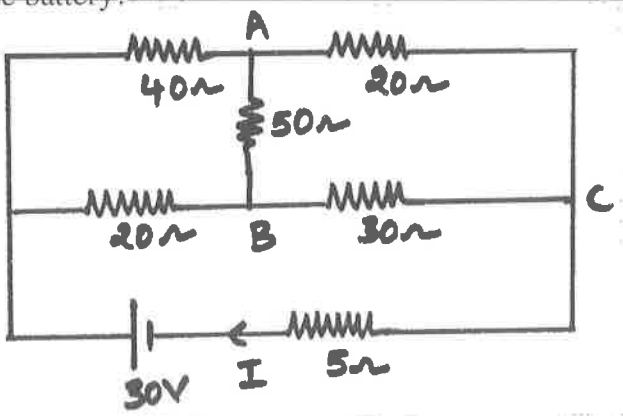

Figure: 1

OR

3. Using method of superposition, determine the current through the 5kΩ resistors for the circuit in figure 2. [10]

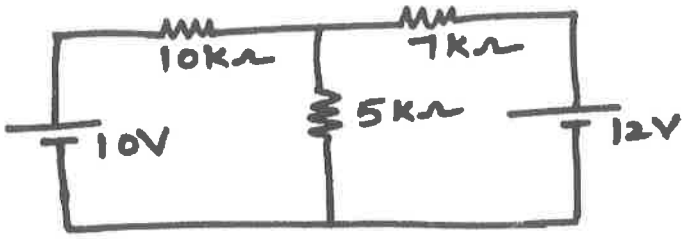

Figure: 2

4.a) Explain the concept of Average value and RMS value.

b) An alternating current varying sinusoidally, with a frequency of 50Hz, has an rms value of 20A. Write down the equation for the instantaneous value and find this value at (i) 0.0025s, (ii) 0.0125s after passing through a positive maximum value. At what time, measured from a positive maximum value, will instantaneous current be 14.14A? [5+5]

OR

5.a) In an a.c. circuit, $v = 200 \text{ Sin } (\omega t+30^0)$ V, $i = 15 \text{ Sin } (\omega t-30^0)$ A. Find reactive power.

b) In a series RC circuit, the values of R = 100 Ω and C = 25 μF. A sinusoidal voltage of 50 MHz is applied and the maximum voltage across the capacitance is 2.5V. Find the maximum voltage across the series combination and also determine the apparent power. [5+5]

6.a) Explain the transformer on no-load with phasor diagram.

b) A 50Hz single phase transformer has 6600V/400V. Having e.m.f per turn is 10V and the maximum flux density in the core is 1.6 Tesla. Find the:

i) Suitable number of primary and secondary turns

ii) Cross sectional area of the core. [5+5]

OR

7. A 25 kVA, 2200/220V, 50Hz single phase transformer obtained the following test results.

OC test (L.V.side) = 220V, 1.2A, 100 w

SC test (H.V.side) = 100V, 7 A, 310w

Calculate the parameters of the equivalent circuit of transformer referred to L.V. side and draw the equivalent circuit. [10]

8. Explain the constructional details of a D.C. Generator with neat sketches. [10]

OR

9.a) Derive the torque equation of induction motor.

b) A three-phase induction motor runs at 1440 rpm at full load when supplied power from 50 Hz, 3-phase line. Calculate i) slip at full load ii) frequency of rotor voltage iii) speed of rotor at a slip of 10%. [5+5]

10. Describe the moving coil permanent magnet instrument with neat circuit diagram. [10]

OR

11. Explain the essential requirements of indicating instruments with necessary diagrams. [10]

---oo0oo---

Code No: 123BV

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to CE, CEE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1. Write brief notes on the following:
   a) Nature of Managerial Economics. [2]
   b) Factors governing Demand forecasting. [3]
   c) Isoquants. [2]
   d) Break-Even Point. [3]
   e) Monopolistic competition. [2]
   f) Sole Proprietor. [3]
   g)Working capital cycle. [2]
   h) Shares. [3]
   i) Journal. [2]
   j)Trial Balance. [3]

PART-B

(50 Marks)

2.a) Define Demand. What are the determinants of demand?
b) Describe the types of Elasticity of demand. [5+5]

OR

3.a) Explain the importance of Managerial Economics.
b) What are the exceptions to the theory of law of demand? [5+5]

4.a) Explain Cobb-Douglas Production function.
b) Differentiate between Fixed Cost and Variable Cost. Give suitable examples. [5+5]

OR

5.a) What do you understand by Returns to scale? Discuss.
b) Calculate the BEP in units and Rupees using the following details:

Selling price per unit	Rs.100
Variable cost per unit	Rs. 60
Fixed costs	Rs. 20,000
Actual Sales	Rs. 2,00,000.

[5+5]

6.a) Illustrate any four methods of Pricing.
b) Explain the salient features of a Joint Stock Company. [5+5]

OR

7.a) State the conditions in which Penetration and Skimming pricing strategies can be followed.

b) Examine the merits and demerits of Sole Proprietorship form of business organization. [5+5]

8.a) Explain the meaning of Capital. What factors influence the volume of long term capital of business?

b) Enumerate any five methods of raising long term finance for a business enterprise. [5+5]

OR

9.a) In what respect Modern capital budgeting techniques are superior to Conventional techniques?

b) Identify the merits and demerits of Payback period technique of capital budgeting. [5+5]

10.a) Every "debit" must have its corresponding "credit". Explain.

b) How do you validate the various items given in a trial balance? [5+5]

OR

11. From the following Trial balance of Giri Traders, prepare final accounts for the year ended 31.12.2013. [10]

Particulars	Debit Rs.	Credit Rs.
Capital		30000
Cash	5000	
Purchases	19000	
Purchase Returns		500
Sales		20000
Wages	1000	
Salaries	800	
Factory Insurance	200	
Rent	650	
Carriage	150	
Office Expenses	200	
Carriage Outwards	200	
Machinery	8000	
Furniture	6000	
Discount allowed	250	
Discount received		1500
Goodwill	3550	
Opening stock	1500	
Debtors	8500	
Creditors		3000
Total	**55000**	**55000**

Adjustments:

Value of Closing Stock Rs. 2200

Outstanding Salaries Rs. 200

Prepaid Rent Rs. 150.

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R13

Code No: 113AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December-2016

THERMODYNAMICS

(Common to AE, AME, ME, MSNT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART - A (25 Marks)

1. a) Define control volume and control surface. [2]
b) The pressure in a constant gas thermometer is measured as 32 mm of Hg above atmospheric pressure at triple point. Determine the temperature in ^{0}C, when the pressure is 76 mm of Hg above atmospheric pressure. The barometer reads 752 mm of Hg. [3]
c) Define and explain the flow work. [2]
d) Calculate the percent error in C_v that would result if $Cp = Cv$ is assumed for liquid water at 1 atm and 27^{0}C. [3]
e) Define the pure substance. [2]
f) Calculate specific enthalpy, specific volume and density of 1 kg of steam at a pressure of 1.9 MPa, having a dryness fraction 0.85. [3]
g) What are mass fraction and mole faction? [2]
h) A volumetric analysis of a gaseous mixture gives the following results:
CO_2= 12.0% O_2=4.0%
N_2=82.0% CO=2.0%
Determine the analysis of gas mixture on the mass basis, the molecular weight and gas constant on the mass basis for the mixture. Assume ideal gas behavior. [3]
i) Compare Otto, Diesel and Dual cycles for given compression ratio. [2]
j) A refrigerator has a working temperature in the evaporation and condenser coils of -30^{0}C and 30^{0}C, respectively. What is the maximum possible COP of the refrigerator? [3]

PART - B (50 Marks)

2.a) Define thermodynamic property, state, path process and cycle.
b) The temperature scale of a certain thermometer is given by the t = A l n +B. where A and B are constants and P is the thermometric property of the fluid of the thermometer. At ice point and steam point, if the thermometer property is found to be 1.5 and 7.5 respectively, what will be temperature corresponding to the thermometric property of 3.5 on Celsius scale? [5+5]

OR

3.a) Differentiate between closed system and open system.
b) A spherical balloon contains 5 kg of air at 200 kPa and 500 K. The balloon material is such that the pressure inside is always proportional to the square of the diameter. Determine the work done when the volume of the balloon doubles as a result of heat transfer. [5+5]

4.a) Prove that $dS = \frac{\delta Q}{T}$ for a reversible process and show that the entropy is a property of a system.

b) Steam initially at 1.5 MPa and 300^0C expands reversibly and adiabatically in a steam turbine to 40^0C. Determine the
i) Condition of steam after expansion,
ii) Work done by the turbine per kg of steam. [5+5]

OR

5.a) Sketch the thermodynamic mnemonic diagram and explain its use to obtain Gibbsian equations and Maxwell relations.

b) One kg of ice at -20^0C is exposed to the atmosphere which is at 20^0C. The ice melts and comes into thermal equilibrium with the atmosphere. Calculate the entropy increase of the universe. Take C_p of ice as 2.093 kJ/kg.K and latent heat of the fusion of ice as 334.5 KJ/kg. [5+5]

6.a) Explain why food cooks faster in a pressure cooker than in conventional cooking?

b) Find the internal energy of 1 kg steam at a pressure of 10 bar, when the condition of steam is
i) Wet with a dryness fraction of 0.85,
ii) Dry and saturated, and
iii) Superheated, the degree of superheat being 50^0C.
The specific heat of superheat steam at constant pressure is 2.01 kJ/kg. K. [5+5]

OR

7.a) Explain the procedure of obtaining dryness fraction of steam by a throttling calorimeter.

b) A room of 1000 m^3 volume, contains air at 1 bar and 300 K. in the room, there is balloon which contains air at 300 K. suddenly, the balloon bursts. Before any air can escape through the doors or windows, the pressure in the room becomes 1.3 bar, while its temperature is still 300 K. if the volume of balloon was 50 m^3, find:
i) Mass of air originally in the room (outside the balloon),
ii) Initial pressure in bar of air in the balloon, and
iii) Final mass of air in the room. [5+5]

8.a) Express Dalton's law of partial pressures. Does this law hold exactly for ideal gas mixtures?

b) A vessel of volume 0.4 m^3 contains 0.45 g of carbon monoxide and 1 kg air, at 15^0C. Calculate the particle pressure of each constituents and the total pressure in the vessel. The air contains 23.3 % oxygen and 76.7% nitrogen by mass. Take the molar masses of carbon monoxide, oxygen and nitrogen as 28, 32 and 28 kg/k mol, respectively. [5+5]

OR

9.a) Prove that the specific humidity is given by

$w = 0.322 \frac{p_v}{p - p_v}$ Where p_v = partial pressure of water vapour.

P= total pressure of air.

b) Air enters a window air conditioner at 1 atm, 30^0C and 80% RH at rate of 10 m^3/min and it leaves at saturated at 14^0C. a part of moisture, which condenses during the process is also removed at 14^0C. Determine the rate of heat and moisture removal from air. [5+5]

10.a) Define (i) work ratio (ii) swept volume, (iii) charge , (iv) thermal efficiency.

b) A four-stroke, four-cylinder petrol engine of 250-mm bore and 375-mm stroke words on Otto cycle. The clearance volume is 0.01052 m^3. The initial pressure and temperature are 1 bar and 47^0C. If the maximum pressure is limited to 25 bar, find the following:

i) The air standard efficiency of the cycle,

ii) The mean effective pressure. [5+5]

OR

11.a) Why is the reversed Carnot cycle executed within a saturation curve and not a realistic model for refrigerator cycles?

b) Air enters the compressor of an ideal Brayton refrigeration cycle at 1 atm and 270 K with a volumetric flow rate of 1.5 m^3/s. if the compressor pressure ratio is 3 and the turbine inlet temperature is 300K, determine:

i) the net power input

ii) the refrigeration capacity and

iii) coefficient of performance. [5+5]

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Code No: 113BP

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
DATA STRUCTURES
(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a)	Write about Recursive Algorithms.	[2]
b)	Write brief note on Omega Notation.	[3]
c)	Write the Queue ADT.	[2]
d)	Write the steps for evaluating the postfix expression.	[3]
e)	Write about Multi Graph with an example.	[2]
f)	Define Threaded Binary Tree.	[3]
g)	Define Sorting and list the Sorting Methods.	[2]
h)	What is Division Hash Function?	[3]
i)	Write about Red-Black tree.	[2]
j)	Write about Binary Search Tree.	[3]

PART-B

(50 Marks)

2.a)	Explain Theta notation with example.	
b)	Explain about Circular linked lists.	[5+5]
	OR	
3.a)	Explain Big O Notation with an example.	
b)	List and explain about Double Linked List operations.	[5+5]
4.a)	Write about Stack using Array with an example.	
b)	Discuss about the various representations of a queue.	[5+5]
	OR	
5.a)	Write a C Program to covert infix expression to postfix expression.	
b)	What is ADT? Write the ADT for Stack Operations.	[5+5]
6.a)	Write a C Program to implement BFS.	
b)	Explain Binary Tree with an example.	[5+5]
	OR	
7.a)	Explain Adjacency matrix Graph Representation method.	
b)	Explain about MinHeap operations with an example.	[5+5]

8.a) Write a C Program for Insertion Sort.
b) Explain Separate Chaining in Hashing. [5+5]

OR

9.a) Explain Selection Sort with an example.
b) Explain about Collision Resolution Methods in Hashing. [5+5]

10.a) Explain about Splay Tree with an example.
b) Discuss about AVL Tree Rotations. [5+5]

OR

11.a) Explain about B-Tree of order m with an example.
b) Write a program to implement KMP algorithm. [5+5]

---ooOoo---

Code No: 113AM

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
SURVEYING
(Common to CE, CEE, AGE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What are the different types of chains? [2]
b) Mention different types of scales used in surveying and give the significance of each. [3]
c) What do you mean by a contour? [2]
d) Mention different types of temporary adjustments. [3]
e) What is a field note book? [2]
f) Draw different types of embankment. [3]
g) Mention different types of traversing. [2]
h) List out the permanent adjustments in theodolite? [3]
i) Differentiate simple and compound curves. [2]
j) Mention three segments of GPS. [3]

PART-B

(50 Marks)

2. Explain the different methods of plane table surveying with neat diagram. [10]

OR

3. Explain the working principle of EDM with suitable diagram. [10]

4. Define levelling and discuss different types of levelling in detail. [10]

OR

5. What are the different methods of contour surveying and plotting? Discuss in detail. [10]

6. How to calculate area of regular and irregular boundaries? Explain. [10]

OR

7. Discuss the different methods of estimating capacity of a reservoir in detail. [10]

8. What is the working principle of electronic theodolite? Explain. [10]

OR

9. Explain repetition and reiteration methods in detail with neat sketches. [10]

10. Mention the different components of GPS and explain each of them. [10]

OR

11. Give the classification of EDM and explain the phase correction in EDM. [10]

---oo0oo---

Code No: 113BZ

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
ELECTRICAL MACHINES-I
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What is energy balance equation? Explain. [2]
b) Give the expression for force/torque developed in a multi excited magnetic field system. [3]
c) Write short notes on Armature reaction in a dc machine. [2]
d) What are the uses of laminated core in a d.c machine? [3]
e) Why does saturation curve starts from some value higher than zero? [2]
f) What is meant by OCC of a generator? [3]
g) How does a dc motor differentiate from a dc generator in construction? [2]
h) What is the significance of back emf in a dc motor. [3]
i) What is meant by energy loss in a dc motor? Explain. [2]
j) How does various losses occurring in a dc machine vary with the load? [3]

PART-B

(50 Marks)

2.a) For singly excited magnetic system derive the expression for mechanical force and mechanical work done. Make suitable assumptions.
b) What are the advantages of analyzing energy conversion device by field energy concept? [5+5]

OR

3.a) Define and explain the concept of transformer emf and motional emf in a dc machines.
b) Describe relationship between energy and co-energy in a magnetic field system. [5+5]

4.a) What is meant by commutation process in a dc machines? How is voltage commutation achieved in dc machines?
b) Derive the expression for EMF generated in DC generator. [5+5]

OR

5.a) Explain the constructional features of d.c machine with a neat sketch.
b) Differentiate lap, wave winding and also draw the model for each case. [5+5]

6.a) Draw and explain model no load curve for self excited DC generator.
b) How to find critical resistance of a DC shunt generator? Explain in detail. [5+5]

OR

7.a) Explain external and internal characteristics of DC shunt generator.
b) Explain the conditions to be fulfilled for parallel operation of d.c series motors. Explain the procedure of parallel operation. [5+5]

8.a) Explain the principle of operation of DC motor. Derive its torque expression.
b) Explain various methods of speed control of DC series motor. [5+5]

OR

9.a) Determine developed torque and shaft torque of a 220-V 4-pole, d.c series motor with 800 conductors wave-connected supplying a load of 8.2 KW by taking 45 A from mains. The flux per pole is 25mWb and its armature circuit resistance is 0.6 Ω.
b) Explain the working principle and constructional details of 4 point starter. [5+5]

10.a) Explain the brake test to be conducted on a DC shunt motor. How do you estimate the efficiency of the motor?
b) Explain the procedure of conducting swinburne's test in a laboratory. [5+5]

OR

11.a) Write the merits and demerits of Retardation test.
b) A 200V shunt motor develops an output of 17.158 kW when taking 20.2kW. The field resistance is 50 Ω and armature resistance 0.06Ω. What is the efficiency and power input when the output is 7.46 kW? [5+5]

---ooOoo---

Code No: 113BT **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
PROBABILITY THEORY AND STOCHASTIC PROCESSES
(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Distinguish discrete and continuous random variables. [2]
b) Using Venn diagrams prove the DeMorgan's law: $\overline{A \cup B} = \overline{A} \cap \overline{B}$. [3]
c) Discuss about Chebyshev inequality. [2]
d) Discuss the monotonic transformations for a continuous random variable. [3]
e) Define mean and variance. [2]
f) Explain marginal distribution function. [3]
g) Discuss the classification of processes. [2]
h) State the properties of Auto correlation function. [3]
i) Give the properties of power density spectrum. [2]
j) Discuss the relationship between PSD and ACF. [3]

PART-B

(50 Marks)

2.a) Explain the Axious of Probability.
b) Discuss some of Random variables and central limit theorem. [5+5]

OR

3.a) Explain the following:
i) Independent events ii) Total probability.
b) In a group of external number of men and women 10% men and 45% women are unemployed. What is the probability that a person selected at random is employed? [5+5]

4.a) What are the properties of power spectral density and prove any four properties?
b) Prove that Poisson distribution is limiting case of binomial distribution. [5+5]

OR

5.a) Derive the relation between moment generating function and moments.
b) Explain the Gaussian density function. [5+5]

6.a) Two statistically independent random variables X and Y have respective densities $f_x(x)=5e^{-5x}u(x)$, $f_y(y)=2e^{-2y}u(y)$. Find the density of the sum W=X+Y.
b) Write all the properties of joint distribution function. [5+5]

OR

7.a) Let x be random variable with E(x)=2 and var (x)=3 verify that random variable x and the random variable y=-4x+8 are orthogonal.
b) Explain the conditional distribution and density interval conditioning. [5+5]

8.a) Define Exgodic Process, Explain the difference between Exgodic process and stationary process.

b) Given the random process:

$x(t) = A \sin(\omega_0 t + \theta)$ Where A and w_0 are constants are 'θ' is a Random variable uniformly distributed on the interval $(-\pi,\pi)$. Define a new random process $y(t)= x^2(t)$ and find the auto correction function of y(t). [5+5]

OR

9.a) Derive the relation between the auto correlation and power spectral density of a periodic wave form.

b) Write short notes on "power density spectrum". [5+5]

10.a) What is cross power density spectrum? State its properties.

b) If the Auto Correlation Function of a WSS process is $R(\tau)=K^{-e\tau}$, find its PSD. [5+5]

OR

11.a) Derive the relation between input and output ACF of an LTI system with impulse response h(t).

b) Prove that the cross power spectrum and cross correlation function of Random process form a Fourier transform pair. [5+5]

---ooOoo---

R09

Code No: 53007

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
MATHEMATICS-III
(Common to EEE, ECE, ETM, EIE, AGE)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

1.a) Using Beta and Gamma function, evaluate the integral $\int_{-1}^{1}(1-x^2)^n dx$ where n is a positive integer.

b) If n>-1, prove that $\int_0^x x^{-n}J_{n+1}(x)\,dx = \frac{1}{2^n\Gamma(n+1)} - x^{-n}J_n(x)$. [8+7]

2.a) Prove that $P_n' - P_{n-2}' = (2n-1)P_{n-1}$.

b) Prove that $T_{n+1}(x) - 2xT_n(x) + T_{n-1}(x) = 0$. [7+8]

3.a) If $A + iB = \tan^{-1}(x+iy)$, prove that $B = \frac{1}{4}\log\frac{x^2+(1+y)^2}{x^2+(1-y)^2}$.

b) If $f(z) = u + iv$ is an analytic function in a region R, prove that the curves form $u(x, y) = c_1$, $v(x, y) = c_2$ two orthogonal families. [7+8]

4. Evaluate the integral $\int_c \sqrt{z}dz$ where c: $z = z(t) = e^{it}$, $0 \le t \le 2\pi$. [15]

5.a) If $f(z)$ has a pole at $z = a$ then prove that $\lim_{z\to a} f(z) = \infty$.

b) Let a be an isolated singularity of $f(z)$ and if $|f(z)|$ is bounded on some neighborhood of a, then, Prove that a is a removable singularity. [7+8]

6. Evaluate $\int_{-\infty}^{\infty}\frac{z^2-z+2}{z^4+10z^2+9}dz$. [15]

7. Find the bilinear transform which maps the points $z = 0, -i, -1$ into the points $w = i, 1, 0$. Find the image of the line y = mx under this transformation. [15]

8.a) Define the following:
i) A circuit
ii) Connected graph
iii) Hamiltonian path.

b) Prove that number of edges in a bipartite graph with n vertices is at most $(n^2/4)$. [8+7]

---ooOoo---

R07

Code No: X0421

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
PROBABILITY THEORY AND STOCHASTIC PROCESSES
(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 80**

Answer any five questions
All questions carry equal marks

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1.a) Define probability based on set theory and distinguish between the Joint and conditional probability with an example.
b) If a three digit decimal number is chosen at random, find the probability that exactly K digits are greater than equal to 5, for $0 \leq K \leq 3$. [8+8]

2.a) Discuss the Gaussian and Rayleigh density functions and their distributions with their plots.
b) Prove that the characteristic function and probability density function form a Fourier transform pair. [8+8]

3.a) Describe the concept of a transformation of a random variable X with its properties.
b) Let X be a random variable defined, Find E [3X] and E[X^2] given the density function as $f_x(x) = \begin{cases} (\pi/16)\cos(\pi x/8); & -4 \leq x \leq 4 \\ 0; & elsewhere \end{cases}$. [8+8]

4.a) Mention about the auto correlation and cross correlation function and describe their properties in brief.
b) Define conditional distribution and density function of two random variables X and Y. [8+8]

5.a) Discuss about the Joint Central Moments, and the Joint Characteristic Functions in detail.
b) Find the PSD of a random process z(t) = X(t)+y(t), where x(t) and y(t) are zero mean, individual random process. [8+8]

6. Discuss in detail:
a) Mean-Ergodic Processes.
b) Second order and Wide-Sense Stationary Random Process. [8+8]

7.a) Derive the relationship between Power Spectrum and Autocorrelation Function.
b) The auto correlation function of a random process X(t) is $R_{XX}(\tau) = 3+2\exp(-4\tau^2)$. Calculate the power spectrum and average power of X(t). [8+8]

8.a) Describe the different noise sources and write about Effective Noise Temperature and Average Noise Figures.
b) Write short notes on:
(i) Flicker noise (ii) Johnson's noise. [8+8]

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