R13

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

5 × 5 Marks = 25

1.a) Explain the physical properties fluids.   [2]
 b) Determine the minimum size of glass tube that can be used to measure water level, if the capillary rise in the tube is not to exceed 0.25cm. Take surface tension of water in contact with air as 0.0075 kg/m.   [3]
 c) Explain the stream, streak and path lines.   [2]
 d) What is meant by one dimensional, two-dimensional, three-dimensional flows?   [3]
 e) Distinguish between laminar and turbulent flow.   [2]
 f) How is head loss in commercial pipes determined?   [3]
 g) What is the water hammer concept and how do you avoid the water hammer problem?
                                                                                                              [2]
 h) What is meant by scroll casing and draft tube?   [3]
 i) Explain with neat sketches, the working of a single stage centrifugal pump.   [2]
 j) Why reciprocating pump is called positive displacement pump?   [3]

PART – B

5 ×10 Marks = 50

2.a) Explain the how vaccum pressure can be measured with the help of a U-tube manometer.
 b) Describe the different types of manometers with the help of neat sketches.   [5+5]
OR
3. A U-tube containing mercury has its right limb open to atmosphere. The left limb is full of water and is connected to a pipe containing water under pressure, the centre of which is in level with the free surface of mercury. Find the pressure of the water in the pipe above atmosphere, if the difference of level of mercury in the limbs is 5.08cm.   [10]

4. In a steady flow two points A and B are 0.5m apart on a straight streamline. If the velocity of flow varies linearly between A and B what is the acceleration at each point if the velocity at A is 2m/s and the velocity at B is 6m/s?   [10]
OR
5. Derive Bernoulli's equation from fundamentals along with assumptions used in that.
                                                                                                              [10]

6. What is the compound pipe? How would you determine the equivalent size of a compound pipe? [10]

OR

7.a) Explain the terms hydraulic gradient and total energy line with a neat diagram.
 b) Explain the concept of pipes connected in series and parallel. [5+5]

8. A model turbine has a runner of diameter 0.61m. It develops 50kW under a head of 30m at speed of 4000 r.p.m. Compute N_s, and N_u for this model. It is required to build a similar turbine. To develop 155kW under a head of 36m, calculate the required diameter. [10]

OR

9. A Kaplan turbine produces 44000kW under a head of 25m with an overall efficiency of 90%. Taking the valve of speed ratio K_u as 1.6, flow ratio ψ as 0.5 and the hub diameter as 0.35 times the outer diameter, find the diameter and speed of the turbine. [10]

10.a) Explain the function of air vessels in a reciprocating pump.
 b) Discuss the condition under which cavitation and negative slip occur and state why air vessels are used in reciprocating pumps. [5+5]

OR

11.a) Classify centrifugal pumps.
 b) Explain the working of centrifugal pump along with a neat sketch. [5+5]

---ooOoo---

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
OPERATING SYSTEMS
(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) Define system call. [2]
 b) Differentiate between multi programming and multi processing. [3]
 c) What is critical section problem? [2]
 d) How are processes managed in LINUX? [3]
 e) Differentiate between logical virtual and physical address. [2]
 f) Explain directory structure. [3]
 g) Give different RAID levels. [2]
 h) Discuss about swap space management. [3]
 i) Differentiate between unsafe state and dead lock state. [2]
 j) How access rights are revoked? [3]

PART - B
(50 Marks)

2.a) Briefly explain typical functions of an Operating System Kernel.
 b) What resources are used when a thread is created? How do they differ from those used when a process is created? [5+5]

OR

3.a) What are the different types of operating systems? Explain them in detail.
 b) What are the main characteristics of Real Time Operating System? [5+5]

4. Discuss readers/writers problem and give solution by using semaphores where readers have priority. [10]

OR

5. Construct the Gantt chart for a) Shortest job first b) Round Robin with q=3 c) Round robin with q=4 d) shortest remaining time first scheduling algorithms for the following. [10]

Process	P1	P2	P3	P4	P5
Arrival time	0	0	2	1	3
CPU Burst Time (in ms)	10	6	12	8	5

6. Explain how protection can be ensured using paging? [10]

OR

7.a) A process refers to 5 pages, A, B, C, D, and E in the order- A; B; C; D; A; B; E; A; B; C; D; E. If the page replacement algorithm is LRU, calculate the number of page faults with empty frames of size 4?

b) Explain the terms in Memory Partitioning with examples:
i) Fixed Partitioning   ii) Dynamic partitioning. [5+5]

8. Suppose the head of a moving head disk with 200 tracks, numbered 0 to 199, is currently serving a request at track 143 and has just finished a request at track 125.If the queue of requests is kept in FIFO order: 86, 147, 91, 177, 94, 150, 102, 175,130. What is the total head movement to satisfy these requests for the following disk scheduling algorithms?
(a) FCFS   (b) SCAN   (c) SSTF   (d) C- SCAN [10]

OR

9.a) What is a Directory? Write short note on Directory implementation.

b) Explain about linked allocation method of a file. [5+5]

10. A system has 3 devices D1, D2 and D3 and 3 processes P1, P2, and P3. P1 is holding D1 and waiting for D3. P2 is holding D2 and waiting for D1. P3 is holding D3 and waiting for D2.Draw resource allocation graph and wait-for graph. Is the system in deadlock state or not? Explain. [10]

OR

11.a) Explain about capability based systems.
b) Discuss about revocation of access rights. [5+5]

---ooOoo---

Code No: 115AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
ENGINEERING METROLOGY
(Mechanical 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) State the condition when the shaft based system is used for limits and fits. [2]
   b) On what factors the variation in size depends in any manufacturing process? [3]
   c) What is limit gauging? [2]
   d) What are the materials used for slip gauges? [3]
   e) What do you mean by Angle Dekkor? [2]
   f) What do you mean by interferometers? [3]
   g) What is meant by direction of Lay? [2]
   h) Distinguish between surface roughness and waviness? [3]
   i) What do you mean by error in screw threads? [2]
   j) Distinguish between geometrical tests and practical tests on machine tool? [3]

PART - B

(50 Marks)

2.a) Bring out the sailent features of British standard and ISO systems of limits and fits.
   b) Determine and sketch the limits of tolerance and allowance for a 42 mm shaft and hole pair designated as H8-g10. The basic size lies in the range of 30 – 50 mm. The multipliers for grades 8 and 10 are 25 and 64 respectively. The fundamental deviation for g shaft is ($-2.5\ D^{0.34}$) microns and standard tolerance unit is $0.45\sqrt[3]{D} + 0.001D$ in microns. [5+5]

OR

3.a) Define fit and describe various types of fits in brief?
   b) A 50 mm diameter shaft and bearing are to be assembled with a clearance fit. The tolerance and allowance are as under.
   Allowance = 0.035 mm
   Tolerance on hole = 0.025 m
   Tolerance of shaft = 0.017 mm
   Find the limits of size for the hole and shaft if
   a) Hole basis system is used
   b) Shaft basis system is used. [5+5]

4.a) What do you understand by Airy points. State the condition to achieve it?
 b) Indicate the minimum number of angle gauges required to obtain the following angle?
 i) $24^0 \, 3'$
 ii) $32^0 \, 29' \, 54''$
 iii) $110^0 \, 30'$
 The following standard angle gauges
 $[1^0 \, 3^0 \, 9^0 \, 27^0 \, \text{and} \, 41^0]$ $[1' \, 3' \, 9' \, 27']$ and $[3'' \, 6'' \, 18'' \, 30'']$ [5+5]

OR

5.a) What are the end standards? Explain with the example, the characteristics of end standards.
 b) State and explain the Taylor's principle of gauge design with neat sketch of Plug gauge and Snap gauges.   [5+5]

6.a) Explain flatness interferometer with neat sketch and write its applications.
 b) With a neat sketch explain the working principle of Auto Collimator.   [5+5]

OR

7.a) Explain how flatness errors of lapped surfaces are measured with an optical flat.
 b) Explicate the uses of interferometer in measuring flatness of surfaces.   [5+5]

8.a) Explain the construction and working of a Profilograph for surface roughness measurement.
 b) State the various factors affecting on surface texture in detail.   [5+5]

OR

9.a) Explain the construction and working of Taylor HobsonTaly surf for surface roughness measurement.
 b) State and explain the methods of measuring primary texture of a surface.   [5+5]

10.a) Name the various instruments required for performing the alignment tests on machine tool.
 b) Describe with sketches the applications of CMMs taking an example of a work piece.   [5+5]

OR

11.a) What is best size wire for effective diameter measurement. Derive a relationship for the best size wire in terms of its effective diameter.
 b) Describe with the help of a neat sketch the working principle of Solex Pneumatic Gauge.   [5+5]

---ooOoo---

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
CONTROL SYSTEMS ENGINEERING
(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)	Define transfer function. What are its limitations?	[2]
b)	Give classification of control systems.	[3]
c)	What is the difference between type and order of the system?	[2]
d)	What are the standard test signals	[3]
e)	What is the effect of adding poles to G(s) H(s) on the root loci?	[2]
f)	Write limitations of Routh's stability.	[3]
g)	Draw the pole zero location of lag compensator.	[2]
h)	Define phase margin and gain margin.	[3]
i)	Define Observability.	[2]
j)	Write Properties of State Transition Matrix.	[3]

PART - B
(50 Marks)

2.a)   Illustrate at least two applications of feedback control systems.
  b)   Determine the transfer function C(S)/R(S) for the following block diagram.   [5+5]
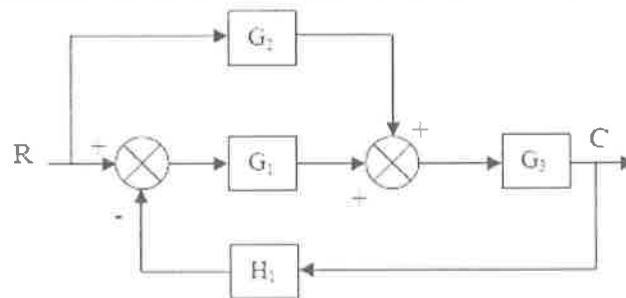
OR

3.a)   What is feedback? Explain the effects of feedback.
  b)   What are differences between block diagram reduction and signal flow graph reduction?   [5+5]

4.a)   Derive the time response of second order under damped system due to unit step input.
  b)   Why derivative controller is not used in control systems? What is the effect of PI controller on the system performance?   [5+5]

OR

5. Find the Error coefficients for step, ramp and parabolic inputs for unity feed-back system having the forward transfer function. [10]

$$G(s) = \frac{14(s+3)}{s(s+5)(s^2+2s+2)}$$

6. Sketch the root locus plot of a unity feedback system whose open loop T.F is [10]
$$G(s) = \frac{K(s^2-2s+2)}{(s+2)(s+3)(s+4)}.$$

OR

7. The characteristic equations of two systems are given below
   a) $S^4 + 21S^3 + 21S^2 + 36S + 20 = 0$
   b) $S^5 + 6S^4 + 3S^3 + 2S^2 + S + 1 = 0$

   Find whether the systems are stable or not using RH Criterion. [10]

8. The open loop transfer function of certain unity feedback control system is given by $G(S) = \frac{k}{s(s+4)(s+30)}$. It is desired to have the phase margin to be at least 33^0 and velocity error constant $K_V = 30 \text{ Sec}^{-1}$. Design a phase lag series compensator. [10]

OR

9. Sketch the Bode plot for the system $G(s) = \frac{25}{s(1+s)(1+0.1s)}$ Hence find gain cross over frequency and phase cross over frequency. [10]

10. Given $X(t) = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x1(t) \\ x2(t) \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$. Find the unit step response when, $X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ [10]

OR

11. a) Discuss the significance of State Space Analysis.
    b) Consider the matrix. Compute e^{At}. [5+5]

$$A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$$

---ooOoo---

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
PULSE AND DIGITAL CIRCUITS
(Electronics and Instrumentation 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)   Under which condition does High pass RC circuit acts as differentiator.   [2]
  b)   Define Rise time and derive the expression for low pass filter.   [3]
  c)   Define non-linear wave shaping.   [2]
  d)   Explain the application of clipper as voltage regulator   [3]
  e)   Explain in brief about Avalanche break down mechanism   [2]
  f)   Write short notes on reduction of pedestal in gate circuits.   [3]
  g)   Define quasi stable state.   [2]
  h)   State the basic operating principle of Time Base Generators.   [3]
  i)   Draw the circuit of AND logic using diodes.   [2]
  j)   Explain the Astable relaxation circuits.   [3]

PART - B

(50 Marks)

2.a)   A 10Hz symmetrical square wave whose peak-to-peak amplitude is 2V is impressed upon a high-pass RC circuit whose lower 3dB frequency is 5Hz. Calculate and sketch the output waveform for the first two cycles. What is the peak-to-peak output amplitude under steady state conditions?
  b)   Derive the transfer function of RL Low pass filter for step input.   [5+5]

OR

3.a)   Derive the expression for step response of series RLC Circuit with the help of neat diagram.
  b)   Explain the ringing circuit.   [7+3]

4.a)   With the help of neat diagram and waveform explain the working of Transistor Clipper.
  b)   Explain how a sine wave may be converted into a square wave using a clipping circuit.
                                                                                                                         [5+5]

OR

5.a)   State and prove the clamping circuit theorem. Explain about the effect of source resistance and diode resistance on clamper output.
  b)   Design a Diode clamper to restore a dc level of +5V to an input signal of peak-to-peak value of 15v. Assume the drop across the diode as 0.7v.   [5+5]

6.a) Explain with neat diagram unidirectional and bidirectional sampling gates.
b) What are the applications of sampling gates? [7+3]

OR

7.a) With the help of a neat diagram explain the operation of transistor as a switch?
b) Explain about Transistor switching times with relevant waveform. [5+5]

8.a) Explain clearly the operation of Bistable Multivibrator.
b) The fixed biased binary uses n-p-n silicon transistor with $V_{ce(sat)}=0.5V$, $V_{be(sat)}=1V$, $I_{cbo}=10nA$ at 25^0C and zero base-to-emitter voltage at cutoff. The circuit parameters are $V_{cc}=V_{bb}=6V$, $R_c=1.2K\Omega$, $R1=4.7K\Omega$, $R2=27K\Omega$. Find $h_{FE(min)}$ and steady state voltages and currents. [5+5]

OR

9.a) Explain the working of Astable Multivibrator with the help of a neat diagram.
b) Explain the Transistor Current Time Base Generators. [5+5]

10.a) Explain about frequency division in sweep circuits and Astable relaxation circuits.
b) Write short notes on Frequency division in Sweep Circuit. [6+4]

OR

11.a) Realize the Basic gates using diodes and transistors with the help of neat diagrams.
b) Realize NAND Gate using TTL Logic. [5+5]

---ooOoo---

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
GEOTECHNICAL ENGINEERING
(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) Explain the formation of soil. [2]
  b) Explain any two field tests to identify silts from clays. [3]
  c) What is adsorbed water? [2]
  d) What is Darcy's law and under what conditions it is valid. [3]
  e) What are the factors affecting contact pressure? [2]
  f) Differentiate between compaction and consolidation. [3]
  g) What is secondary consolidation? [2]
  h) What do you understand by normally consolidated, over consolidated and under consolidated clays. [3]
  i) What is the Mohr-Coulomb theory of failure? [2]
  j) State the limitations of direct shear test. [3]

PART - B

(50 Marks)

2. An oven dry soil sample of volume 300 cc weighs 450 g. If the specific gravity of solids is 2.65, what is the water content when the soil becomes fully saturated without any change in its volume? What will be the water content which will fully saturate the soil sample and also cause an increase in volume equal to 15% of the original dry volume? [10]

OR

3. Explain step by step procedure to classify soils as per I.S. Classification of soils. [10]

4. Derive an expression to determine coefficient of permeability of soil by laboratory falling head permeability test. [10]

OR

5. In a deposit of silty soil, the water table which was at originally at a depth of 1 m below ground level was lowered to 3m below ground level. The bulk and saturated unit weight of silty soil was $18kN/m^3$ and $20kN/m^3$ respectively. What is the change in effective pressure at a depth of 1.0m and 3.0m. [10]

6.a) Write the differences between standard and modified proctor compaction test.
 b) Briefly explain factors affecting compaction of soil. [5+5]

OR

7. Find the intensity of vertical pressure at a point 4m directly below a 20 kN point load acting at a horizontal ground surface. What will be the vertical pressure at a point 2 m horizontally away from the axis of loading but at the same depth of 4m and directly under the load at a depth of 3 m? [10]

8. A normally consolidated clay layer 2m thick is sandwiched between two sand layers. The average overburden stress at the middle of clay layer can be taken as $160kN/m^2$. Due to construction of a structure there is an increase in effective vertical stress of $40kN/m^2$ at the middle of clay layer. The liquid limit of clay layer is 60% and the initial void ratio is 0.9. Estimate the primary settlement. [10]

OR

9.a) Explain how you will determine void ratio of the sample by change in void ratio method. Also explain how do you find coefficient of volume change?
 b) Explain square root of time fitting method for determination of coefficient of consolidation. [5+5]

10. Differentiate between conventional failure envelope and modified failure envelope with the neat sketches. Define stress path, and draw typical stress paths (TSP, TSSP, ESP) for a drained test and undrained test on normally consolidatd clay, and on over-consolidated clay. [10]

OR

11.a) Discuss Skempton's pore pressure parameters.
 b) In a direct shear test the major and minor principal stresses were found to be 500 kN/m^2 and 300 kN/m^2, respectively. Determine the normal and shear stresses on a plane inclined at 30^0 to the major principal plane in a clock-wise direction. [5+5]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
POWER ELECTRONICS
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a) Draw the dynamic characteristics of SCR and explain.
  b) Explain the operation of Power MOSFET with the help of neat sketch.   [7+8]

2.a) Explain in detail about the different connections of SCRs.
  b) Define commutation. Explain various types of commutation circuits.   [7+8]

3.a) What is a freewheeling diode? Explain its purpose in detail.
  b) A single phase half wave converter is operated from a 110V, 60 Hz supply. If the load resistance is 5Ω and the delay angle is 60^0. Determine the efficiency and the form factor.   [7+8]

4.a) Explain in detail about the effect of source inductance on single phase fully controlled converters.
  b) A single phase fully controlled bridge converter operates from a 230V, 50 Hz single phase supply with a firing angle of 60^0. The load is 5Ω and 5 mH respectively. Calculate the average load current.   [8+7]

5.a) Draw the circuit diagram of a three pulse converter and explain the operation.
  b) A three phase fully controlled converter operates from a three phase 230V, 50 Hz supply and supplies a resistive load of 10Ω at a firing angle of 45^0. Find out the power supplied to the load.   [8+7]

6.a) Draw the circuit diagram of a single phase fully AC voltage controller with RL load and explain then operation.
  b) Explain the operation of a single phase midpoint type cyclo converter with resistive load with neat circuit diagram.   [7+8]

7.a) What is time ratio control? Discuss the principle in detail.
  b) Explain the principle of operation of Oscillation chopper.   [7+8]

8.a) With the help of neat sketch, explain the working principle of single phase inverter.
  b) Draw the circuit diagram of Mc Murray – Bedford inverter and explain its operation.   [7+8]

---ooOoo---

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
MACHINE TOOLS
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a) Explain briefly mechanics of chip formation.
 b) In an orthogonal cutting process, following data were observed; chip length of 80 mm was obtained with an uncut chip length of 200 mm and the rake angle used was 20^0 and depth of cut is 0.5mm. The horizontal and vertical components of cutting force were 2000 N and 200 N respectively. Determine the shear angle, friction angle and resultant cutting force. [7+8]

2.a) Why two sets of guide ways are required in lathe machine?
 b) Explain the relation between pitch on lead screw and pitch on the work piece, RPM and number of teeth on spindle gear and lead screw gear. [7+8]

3.a) Describe the operation of quick return motion in mechanical shaper.
 b) Explain the working principle of slotting and operations performed on it. [7+8]

4.a) How do you carry deep hole drilling? Discuss in detail.
 b) Calculate the power required to drill 20 mm diameter hole in Al plate at a feed of 0.22 mm/rev and at a drill speed 600 rpm. Determine also the volume of metal removed per unit energies. [7+8]

5.a) Differentiate between the compound indexing and differential indexing.
 b) A 120 mm diameter cutter having 10 teeth cuts steel at 40 m/min. The depth of cut is taken as 5 mm and the table feed rate is 150 mm/min. The width of the workpiece is 120 mm. Find the mean area of cross section of the chip in a slab milling operation. [7+8]

6.a) Write a short note on the Geometrical and Compositional specification of the grinding wheel.
 b) What are different types of cylindrical grinding machines? Explain any one of them with a suitable sketch. [7+8]

7.a) Bring out the differences between Lapping and Honing.
 b) Describe constructional features and functioning of broaching tools. [7+8]

8.a) Enumerate important considerations while designing jigs and fixtures.
 b) Explain with a sketch the principle of location of a cylinder on a Vee block. [7+8]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
DESIGN OF MACHINE ELEMENTS
(Automobile Engineering)

Time: 3 hours
Max. Marks: 75

Answer any five questions
All questions carry equal marks

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Illustrate your answers with NEAT sketches wherever necessary

1.a) A spindle slides freely in a bush. The basic size of the fit is 50×10^{-3} mm. If the tolerances quoted are $^{+62}_{0}$ for the holes and $^{-80}_{-180}$ for the shaft, find the upper limit and lower limit of the shaft and the minimum clearance.

   b) Compare the grain structure of a crankshaft manufactured by casting, forging, and machining processes. Which is better and why? [9+6]

2.a) How do you estimate the Endurance strength for an operating component? Explain the procedure.

   b) A 40 – mm diameter shaft is made of steel 50C4 (S_{ut} = 600 N/mm^2) and has a machined surface. The expected reliability is 99%. The theoretical stress concentration factor for the shape of shaft is 1.6 and the notch sensitivity factor is 0.9. Determine the endurance limit of the shaft. [7+8]

3.a) Explain, with sketches, the different types of failure of riveted joints.

   b) Design a lap joint to connect two plates each of width 100 mm, if the thickness of one plate is 12 mm and the other is 10 mm. The joint has to transfer a working load of 100 kN. The plates are of Fe 410 grade. Use M16 bolts grade 4.6, and draw the connection details. (For M16 bolts of grade 4.6, take d = 16 mm, d_o = 18 mm, and f_{ub} = 400 N/mm^2). [7+8]

4.a) Describe the design procedure of a square and flat keys.

   b) A hollow circular shaft of inner and outer diameters d_i and d_0 respectively is subjected to a torsional moment of M over a length l. If the permissible angle of twist is θ^0, prove that the shaft diameter is given by : $d_o = \left[\dfrac{584Ml}{G\theta\left\{1-\left(C\right)^4\right\}} \right]^{\frac{1}{4}}$ [8+7]

5. A concentric spring consists of two helical compression springs, one inside the other. The free length of the outer spring is 25 mm greater than the inner spring. The wire diameter and mean coil diameter of the inner spring are 8 and 64 mm respectively. Also, the wire diameter and mean coil diameter of the outer spring are 10 and 80 mm respectively. The number of active coils in the inner and outer springs are 10 and 15 respectively. Assume same material for the two springs. If the modulus of rigidity of spring material is 81.37 kN/mm^2, calculate the stiffness of spring when the deflection is (i) from 0 to 25 mm, and (ii) more than 25 mm. [15]

6.a) Distinguish between the static load carrying capacity and dynamic load carrying capacity of rolling contact bearings.
 b) Discuss the causes and remedies of bearing failure. [8+7]

7. Design a connecting rod for a high speed IC engine, using the following data:
Cylinder bore = 120 mm, Length of connecting rod = 300 mm, Maximum gas pressure = 3 MPa, Stroke length = 120 mm, Mass of reciprocating parts = 1.5 kg, Engine speed = 2250 rpm. Assume suitable data and state the assumptions made. [15]

8.a) Explain the design procedure for the thickness of a Piston Head according to the criteria of (i) Strength and (ii) Heat dissipation.
 b) The cylinder of a four – stroke diesel engine has the following specifications:
Brake power = 3 kW, Speed = 800 rpm, Indicated mean effective pressure = 0.3 MPa, Mechanical efficiency = 80%. Determine the bore and length of the cylinder liner. [8+7]

---oo0oo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
PRINCIPLES OF PROGRAMMING LANGUAGES
(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) Give the relative advantages of object oriented programming paradigm. [2]
 b) What are the fundamental features of imperative languages? [3]
 c) Write the difference between a C++ pointer and a Java Reference variable. [2]
 d) Mention the primary design issues specific to arrays. [3]
 e) What are the two fundamental design considerations for parameter-passing methods? [2]
 f) What is an overloaded subprogram? Give an example. [3]
 g) Give the two kind of abstractions in programming languages. [2]
 h) Describe the functionality of 'finally' clause of JAVA exception handling mechanism. [3]
 i) What are the differences between CONS, LIST and APPEND? [2]
 j) What are the features of Haskell? [3]

PART - B

(50 Marks)

2.a) Explain the criteria of success for a good programming language.
 b) Describe in your own words, the concept of orthogonality in programming language design. [5+5]

OR

3.a) Explain the syntax of 'case' statement in Pascal using BNF notation and syntax graphs.
 b) Explain the practical problems associated with the if-then-else statement. [5+5]

4.a) What is an associative array? Discuss its structure and implementation with an example.
 b) Give a detail note on guarded commands. [5+5]

OR

5.a) Explain mixed mode assignment statement with relevant example.
 b) What are the design issues of logically controlled loop statements? Explain briefly. [5+5]

6.a) Give a detailed note on pass-by-name and pass-by-reference parameter passing methods.
   b) Explain about generic sub-programs with examples. [5+5]

OR

7.a) Describe the shallow-access method of implementing dynamic scoping.
   b) What is the need of an activation record in implementing a subprogram? Explain with an example. [5+5]

8.a) Explain the exception handling mechanism in C++ with illustrative example.
   b) Write a note on Abstract Data Types in Ruby. [5+5]

OR

9.a) What is a semaphore? Explain its role in concurrency.
   b) Write a brief note on C# threads. [5+5]

10.a) Compare Functional programming languages and Imperative Languages.
   b) Describe the two common mathematical functional forms that are provided by scheme. [5+5]

OR

11. Explain various storage and control statements available in Python. [10]

---ooOoo---

Code No: 115AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING
(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) Explain about the different Limit states.   [2]
 b) Distinguish between Working stress and limit state method of design of RCC structures.   [3]
 c) Write about local bond and anchorage length.   [2]
 d) Explain how the shear reinforcement improves the strength of beam?   [3]
 e) State the differences between one way slab and two way slab.   [2]
 f) Write the code provisions for minimum reinforcement to be provided as primary and secondary reinforcement in R. C. slab.   [3]
 g) Differentiate between long and short column.   [2]
 h) Describe about the function of lateral ties in a RC column.   [3]
 i) Define punching shear.   [2]
 j) Write any two situations in which combined footings are preferred to isolated footings.   [3]

PART - B

(50 Marks)

2.a) Describe briefly about under-reinforced, balanced and over-reinforced sections.
 b) What do you mean by uncracked and cracked sections and how will you determine the moment of resistance of these section?   [5+5]

OR

3. Design the reinforcement for a T-beam for the following data:
  Effective span   :   9 m: Ends simply supported.
  Spacing of beams   :   3.5 m centre to centre.
  Thickness of slab   :   125 mm
  Width of web   :   230 mm
  Total depth   :   450 mm
  Live load on the floor   :   5 kN/m^2
  Floor finish load   :   1 kN/m^2
  The beam also supports a partition wall which transmits a load of 14 kN/m run.
  Use M 20 concrete and Fe 500 steel.
  Draw a suitable scale: The cross section and the longitudinal section of the beam.   [10]

4. A simply supported beam is 8m in span and carries a characteristic load of 50kN/m. If six numbers of 20 mm diameter bars are provided at the mid span and four numbers of these bars are continuous into the supports, check the development length at the supports. Adopt M 20 grade concrete and Fe 415 grade steel. [10]

OR

5. A beam of rectangular section 300 mm width and 450 mm effective depth is subjected to factored moment of 150 kN-m, factored shear force of 45 kN and factored twisting moment of 30kN-m. Determine the area of reinforcement to resist the above forces. Use M25 grade concrete and Fe 415 grade steel. [10]

6.a) Discuss the three basic methods using factor of safety to achieve safe workable structures?

b) Sketch edge and middle strips of a two way slab. [5+5]

OR

7. Design a R.C. slab for a room measuring 6 m × 8 m size. The slab is simply supported on all the four edges with corners held down, and carries a super-imposed load of 3.5 kN/m^2, inclusive of floor finishes. Use M 20 mix and Fe 415 steel. Draw the top plan and bottom plan of the designed slab. [10]

8. Design a reinforced concrete column, 400 mm square, to carry an ultimate load of 1500 kN at an eccentricity of 160 mm. Use M 20 grade concrete and Fe 415 grade steel. [10]

OR

9. Design a slender braced circular column under uni-axial bending with the following data:
Size of column: 300 × 300 mm
Concrete grade: M 20 and Steel grade: Fe 415
Effective length: 5 m and Unsupported length: 6 m
Factored load:1000 kN ,Factored moment: 50 kN-m at top, 30 kN-m at bottom.
The column is bent in single curvature. [10]

10. Design the footing for a reinforced concrete column 230 × 450 mm carrying an axial load of 1100 KN. The bearing capacity of the soil is 110 KN/m^2. Use M 20 concrete and Fe 415 steel. [10]

OR

11. Draw the shear force and bending moment diagrams and design the 20 mm diameter bars as top steel for maximum hogging moment for a RC rectangular combined footing using the following data:
Centre to centre distance between the columns is 5m. Each column is square in shape with 450 mm side. Each column carries an axial load at service state = 1200kN. The projection of footing parallel to the length beyond the axis of each column is 1.2m. The limiting bearing capacity of soil is 300kN/m^2.Use M25 grade and Fe 415 steel bars. [10]

---ooOoo---

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech III Year I Semester Examinations, March - 2017
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(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)   Define Accuracy.   [2]
  b)   What is meant by D'Arsonval Movement?   [3]
  c)   What is meant by Harmonic Distortion?   [2]
  d)   What is Sweep frequency generator?   [3]
  e)   What is the function of electron gun?   [2]
  f)   List the different control knobs available on the front panel of the CRO.   [3]
  g)   Define Gauge factor.   [2]
  h)   What is the purpose of Hotwire Anemometer?   [3]
  i)   List the advantages of Wheatstone bridge.   [2]
  j)   What is the method for the measurement of Liquid level?   [3]

PART - B
(50 Marks)

2.a)   Discuss briefly the different types of static errors of a measuring instrument.
  b)   Explain the working of a true RMS voltmeter with the help of a suitable block diagram.
                                                                                          [5+5]
OR
3.a)   Explain the working of Ramp type DVM.
  b)   Discuss the advantages of a digital voltmeter over an analog voltmeter.   [5+5]

4.a)   Discuss the working of spectrum analyzer with its basic circuit.
  b)   Explain the working of Power Analyzer with a neat diagram.   [5+5]
OR
5.a)   With a neat diagram explain the working of Pulse and Square wave generator.
  b)   Explain the working of Capacitance-Voltage meter.   [5+5]

6.a)   Briefly explain the different types of storage oscilloscopes.
  b)   What is the role of Time base generator? Explain.   [5+5]
OR
7.a)   What is sampling oscilloscope? Mention its advantages and disadvantages.
  b)   Explain how time and frequency is measured using CRO.   [5+5]

8.a) What are the factors to be considered for the selection of better transducer? Explain.
  b) Explain the principle and working of an LVDT.   [5+5]

OR

9.a) What is a transducer? Explain the working of Variable Capacitance transducer.
  b) A 100Ω strain guage with a guage factor of 1 is affixed to a metal bar. The bar is stretched and this causes a change in resistance of 0.001Ω. Find the change in length if the original length is 10cm.   [5+5]

10.a) With a neat diagram explain the working of Maxwell Bridge.
  b) Explain the methods for the measurement of temperature.   [5+5]

OR

11.a) What are the limitation of Wheat stone's bridge? Derive the balance equation of Kelvin's double bridge for unknown low resistance.
  b) Discuss the principle of working of Displacement meters.   [5+5]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to AME, EIE, IT, ME, MCT, 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) Which among the branches of economics looks closer to managerial economics? Why?
                                                                                            [2]
  b) Define income elasticity of demand.   [3]
  c) What is opportunity cost?   [2]
  d) What are semi variable costs? Give suitable examples.   [3]
  e) What is monopsony?   [2]
  f) What is transfer pricing?   [3]
  g) How do you calculate Payback period if annual cash flows are uneven?   [2]
  h) Why present value of future earnings is always lesser than future values?   [3]
  i) What are capital receipts? Give suitable examples.   [2]
  j) What do you understand by the term 'liquidity'?   [3]

PART - B

(50 Marks)

2.a) Draw up an imaginary demand schedule indicating quantity demanded for a specific type of 'ADIDAS sports shoes' at five different prices.
  b) What are the determinants of demand?   [5+5]

OR

3.a) Calculate the cross elasticity of demand given that the demand for coffee is 50 tonnes per month at a place when the price of tea is Rs 400 per kilogram and shoots up to 60 tonne when the price of tea goes up to Rs.500 per kilogram.
  b) Explain the moving average and the exponential smoothing methods of demand forecasting.   [5+5]

4.a) What is break- even price and quantity? What are the assumptions of breakeven analysis?
  b) What is production function with two variable inputs? Illustrate your answer with example.   [5+5]

OR

5.a) Show 'cost- output relationship' in the short run indicating the behavior of marginal cost, average total cost, average variable cost and average fixed cost.
  b) A company buys a small fabricated part from a supplier who charges Rs. 200 per piece. The quantity requirement for the part annually is 800 pieces. If the company has to make it, it has to invest Rs.8,00,000 on machinery and the variable costs in terms labour and other direct cost works out to Rs.40. Suggest whether the company should continue buying the parts or make it, on its own.   [5+5]

6.a) What is 'Prospectus' issued by a company? What are its contents?

b) What are the features of perfect competition?   [5+5]

OR

7.a) What are the obligations and liabilities of partners in a partnership?

b) What are the various methods of cost- based pricing?   [5+5]

8.a) What are the components of working capital? Represent the same in a diagram.

b) ABC Ltd. is considering investing in a project that costs Rs.50,00,000. The estimated salvage value is zero. The cash flow for the next 4 years is as follows:

year	cash flow in rupees
1	28,50,000
2	25,00,000
3	20,00,000
4	15,00,000

Determine Average Rate of Return.   [5+5]

OR

9.a) Given the values of Rs.5,00,000 for sales, Rs.2,40,000 for cost of goods sold and Rs.60,000 for inventory in a company, what is its inventory turnover?

b) Define NPV and give the formula to compute NPV.

c) What are the long term sources of finance? Explain them very briefly.   [3+2+5]

10.a) The following are the values of the current assets of a company:

Inventories   Rs. 45,00,000
Sundry debtors   40,00,000
Cash   8,50,000

To maintain a current ratio of 3:2 how much the company can have in current liabilities? Also calculate its acid-test ratio.

b) Define Operating ratio and EPS.   [5+5]

OR

11.   Journalize the following transaction and post them to ledger.

a) Ram invests Rs. 10,000 in cash on 01/10/16.
b) He bought goods worth Rs. from Shyam on 04/10/16
c) He bought a machine for Rs. 5,000 from Lakshman on account on 06/10/16.
d) He paid to Lakshman Rs. 2,000 on 07/10/16.
e) He sold goods to A on account Rs.4,000 on 08/10/16.
f) He sold goods for cash Rs. 3000 on 09/10/16.
g) He paid to Shyam Rs.1,000 on 10/10/16.
h) He received amount from A Rs. 2,000 on 11/10/16   [10]

---ooOoo---

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
GEOTECHNICAL ENGINEERING -I
(Civil Engineering)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

1.a)   Explain the characteristics of soil formation.
 b)   Derive the relation between dry density and wet density.   [7+8]

2.a)   Explain the procedure for soil hydrometer analysis to calculate the percent finer.
 b)   A cohesive soil is found to have a plasticity index of 45 and liquid limit of 75%. The
      natural water content of the clayey soil is 23%. Determine the liquidity index and
      consistency index of the soil.   [7+8]

3.a)   Explain factors affecting permeability.
 b)   Determine coefficient of permeability from a laboratory test conducted using constant
      head permeameter if the discharge of water collected in 9min is 320ml. The internal
      diameter of the permeameter is 10cm and length of the sample is 12cm. Take head
      causing flow as 50cm.   [6+9]

4.a)   Explain the importance of flownets with the suitable examples.
 b)   A clay layer is at a depth of 7m from the ground under a saturated sand layer. The water
      table is 2.5m below the ground level. If the density of saturated sand is $19kN/m^3$,
      determine the total, effective and neutral stresses on the top of the clay layer. Assume
      soil is dry above the water table.   [7+8]

5.a)   Explain about variations of vertical stress along the vertical plane and horizontal plane
      with the help of neat sketches.
 b)   A rectangular area 4m × 6m carries a concentrated load of 150kN at the ground level.
      Determine the vertical stress up to a depth of 6m from ground and radial distance of
      3m. Also draw the stress distribution diagram.   [7+8]

6.a)   Explain about mechanism of compaction.
 b)   Explain about factors effecting on soil properties.   [7+8]

7.a)   Explain about types of settlements in detail.
 b)   A clay sample of 20mm thick is tested for consolidation in the laboratory. The sample
      reached 45% consolidation in 32 minutes with double drainage condition. This sample
      was collected from the clay layer of 4m thick with single drainage condition. Estimate
      the time for clay layer to reach 70% consolidation.   [7+8]

8.a)   Explain the merits and demerits of laboratory direct shear test to determine shear
      strength of a soil.
 b)   Explain about shear strength of clays.   [8+7]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
ELECTRICAL MACHINES-III
(Electrical and Electronics Engineering)

Time: 3 hours
Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

1.a) Describe constructional details of a three phase alternator along with principle of operation of an alternator.
  b) Derive emf equation for an alternator. Explain clear the meaning of (i) distribution factor (ii) coil span factor. [7+8]

2.a) A 3 phase 16 pole synchronous generator has a resultant air gap flux of 0.06 Wb per pole. The flux is distributed sinusoidal over the pole. The stator has 2 slots per pole per phase and 4 conductors per slot are accommodated in two layers. The coil span is 150 electrical degrees. Calculate the phase and line induced voltages when the machine runs at 375 rpm
  b) Explain the phenomenon of armature reaction when an alternator is delivering a load current at (i) purely lagging pf (ii) unity pf (iii) purely leading pf. [7+8]

3.a) Discuss about the 'open circuit' and short circuit characteristics of a synchronous generator. What do you understand by the term short circuit ratio? Discuss how the short circuit ratio can be calculated from the two characteristic curves
  b) A three phase star connected synchronous generator is rated at 1.5 MVA, 11 KV. The armature effective resistance and synchronous reactance are 1.2ohm and 25 ohms respectively per phase. Calculate the percentage voltage regulation for a load of 1.45 MVA at (i) 0.8 p.f. lagging and (ii) 0.8 p.f. leading. [9+6]

4.a) An alternator is connected to the bus-bars and is supplying a load. What happen if its prime mover is suddenly shut down? Explain clearly.
  b) Two alternators A and B operate in parallel and supply a load of 10 MW at 0.8 p.f. lagging. i) By adjusting steam supply of A, its power output is adjusted to 6000 kW and by changing its excitation, its p.f. is adjusted to 0.92 lag. Find the p.f. of alternator B.
  ii) If steam supply of both machines is left unchanged, but excitation of B is reduced so that its p.f. becomes 0.92 lead, find new p.f. of A. [7+8]

5.a) Draw phasor diagram of 3-phase synchronous motor for lagging and leading pfs and explain salient points.
  b) How 3-phase synchronous motor can be operated as a synchronous condenser, explain its operation clearly. [8+7]

6.a) Explain different starting methods of synchronous motor.
  b) A star connected synchronous motor rated at 187 KVA, 2300 V, 47 A, 50Hz, 187.5rpm has a effective resistance of 1.5 ohm and synchronous reactance of 20 ohms per phase. Determine the internal power developed by the motor when it is operating at rated current and 0.8 power factor leading. [8+7]

7.a) Why single phase induction motor is not self starting? Describe the method of starting a the single phase induction motor.

b) The following test results were obtained in case of a 220V, single –phase induction motor:

No-load test : 220V,6.15A,348W

Locked rotor test : 126V,.15A, 577W

Stator winding resistance = 1.5Ω. Determine the approximate equivalent circuit parameters of single phase induction motor. [8+7]

8.a) Explain the principle of operation of universal motor through suitable circuit diagram.

b) Describe the working operation of stepper motor with relevant circuit diagrams. [7+8]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
DESIGN OF MECHINE MEMBERS-I
(Mechanical Engineering)

Time: 3 hours
Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a) What are the factors to be considered for the selection of materials for the design of machine elements? Discuss.

b) The load on a bolt consists of an axial pull of 10 kN together with a transverse shear force of 5 kN. Find the diameter of bolt required according to
i) Maximum principal stress theory
ii) Maximum shear stress theory
iii) Maximum principal strain theory
iv) Maximum strain energy theory
v) Maximum distortion energy theory
Take permissible tensile stress at elastic limit = 100 MPa and poisson's ratio = 0.3.
[7+8]

2.a) Illustrate how the stress concentration in a component can be reduced.

b) A machine component is subjected to a flexural stress which fluctuates between + 300 MN/m^2 and − 150 MN/m^2. Determine the value of minimum ultimate strength according to (i) Gerber relation (ii) Modified Goodman relation (iii) Soderberg relation. Take yield strength = 0.55, Ultimate strength, endurance strength = 0.5, Ultimate strength and factor of safety = 2. [7+8]

3.a) A bracket is welded to the side of a column and carries a vertical load P, as shown in the Figure 1. Evaluate P so that the maximum shear stress in the 10 mm fillet welds is 80 MPa.
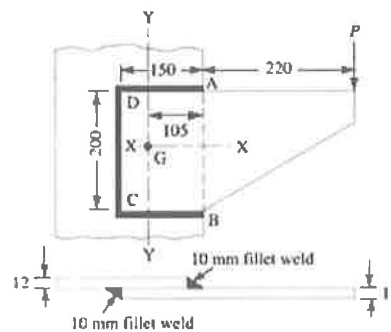
Figure 1

b) A steam boiler is to be designed for a working pressure of 2.5 N/mm^2 with its inside diameter 1.6 m. Give the design calculations for the longitudinal and circumferential joints for the following working stresses for steel plates and rivets:
In tension = 75 MPa; In shear = 60 MPa; In crushing = 125 MPa. Draw the joints to a suitable scale. [7+8]

4. Determine the size of the bolts and the thickness of the arm for the bracket as shown in Figure 2, if it carries a load of 40 kN at an angle of 60^0 to the vertical. The material of the bracket and the bolts is same for which the safe stresses can be assumed as 70, 50 and 105 MPa in tension, shear and compression respectively. [15]

All dimensions in mm.
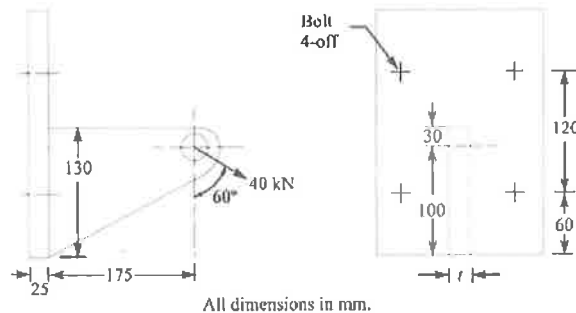
Figure 2

5.a) Draw a cotter joint to connect two mild steel rods for a pull of 30 kN. The maximum permissible stresses are 55 MPa in tension; 40 MPa in shear and 70 MPa in crushing. Draw a neat sketch of the joint designed.

b) How are the keys classified? Draw neat sketches of different types of keys and state their applications. [7+8]

6. A hoisting drum 0.5 m in diameter is keyed to a shaft which is supported in two bearings and driven through a 12 : 1 reduction ratio by an electric motor. Determine the power of the driving motor, if the maximum load of 8 kN is hoisted at a speed of 50 m/min and the efficiency of the drive is 80%. Also determine the torque on the drum shaft and the speed of the motor in r.p.m. Determine also the diameter of the shaft made of machinery steel, the working stresses of which are 115 MPa in tension and 50 MPa in shear. The drive gear whose diameter is 450 mm is mounted at the end of the shaft such that it overhangs the nearest bearing by 150 mm. The combined shock and fatigue factors for bending and torsion may be taken as 2 and 1.5 respectively. [15]

7. Design and draw a protective type of cast iron flange coupling for a steel shaft transmitting 15 kW at 200 r.p.m. and having an allowable shear stress of 40 MPa. The working stress in the bolts should not exceed 30 MPa. Assume that the same material is used for shaft and key and that the crushing stress is twice the value of its shear stress. The maximum torque is 25% greater than the full load torque. The shear stress for cast iron is 14 MPa. [15]

8.a) Classify springs according to their shapes. Draw neat sketches indicating in each case whether stresses are induced by bending or by torsion.

b) A helical spring is made from a wire of 6 mm diameter and has outside diameter of 75 mm. If the permissible shear stress is 350 MPa and modulus of rigidity 84 kN/mm^2, find the axial load which the spring can carry and the deflection per active turn. [7+8]

---ooOoo---

R13

Code No: 115AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
ENGINEERING GEOLOGY
(Civil 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 tunnel? [2]
  b) What is structural geology? [3]
  c) What are the physical properties of rock? [2]
  d) What is a mineral? [3]
  e) What is Strike and dip? [2]
  f) What is down throw of seam? [3]
  g) What is RQD? [2]
  h) What is porosity? [3]
  i) What is volume loss? [2]
  j) Describe the purposes of tunnelling. [3]

PART - B
(50 Marks)

2. Write an essay on importance of Geology in Civil Engineering. [10]
    OR
3. Discuss in detail failure of any dam in India. [10]

4.a) What is the Sedimentary rock? Write the classification of Sedimentary rocks.
  b) What is igneous rock? Explain the classification of igneous rocks. [5+5]
    OR
5.a) What is metamorphic rock? Write the texture and structure of metamorphic rock.
  b) What is texture of rock? Describe the texture of igneous rocks. [5+5]

6.a) What is fold? Write the different types of fold with sketches.
  b) State and explain different fault terminology. [5+5]
    OR
7.a) What is Joint? Write the different types of the joints with sketches.
  b) Describe the anticline and decline with sketches. List the types of faults. [5+5]

8. Describe the following methods with a neat sketch:
   a) Magnetic methods   b) Seismic method [5+5]
    OR
9.a) What are the considerations to be taken for constructing the dam?
  b) List the contributing factors for the success of a reservoir. [5+5]

10.a) Explain the effect of tunnel on the ground surface with a neat sketch.
   b) What is settlement trough? Describe the settlement trough with a neat sketch.   [5+5]

OR

11. What is subsidence? Describe the various methods for prevention of subsidence.   [10]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
AUTOMATA AND COMPILER DESIGN
(Information Technology)

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 e-closure with example.   [2]
  b)   What are the issues in lexical analysis?   [3]
  c)   Define 'Handle Pruning' in bottom-up parsing.   [2]
  d)   Define annotated parse tree.   [3]
  e)   What is type expression?   [2]
  f)   What is meant by structural equivalence?   [3]
  g)   What is a Basic Block?   [2]
  h)   What is an activation record for a procedure?   [3]
  i)   What is meant by assembly language code?   [2]
  j)   Define DAG with example.   [3]

PART - B
(50 Marks)

2.   Explain various phases of compiler and trace it with the program segment
       x = a + b * 60.   [10]
OR
3.a)   Draw NFA for the regular expression for ab*/ab.
  b)   What is Left Recursion? Eliminate left recursion from the following grammar:
       A->Ac/Aad/bd/c.   [5+5]

4.   Construct canonical parsing table for the grammar given below   [10]
           S->Aa/bAc/bBa
           A->d
           B->d
OR
5.a)   Explain in detail about syntax directed translation.
  b)   Write the syntax directed translation for declarations.   [5+5]

6.   Explain the specification of a simple type checker.   [10]
OR
7.a)   Consider following grammar:
       E->num.num/literal/num/E%E/E+E/ E/E/ *E/ E[E]
       Construct semantic rules to find type of expression.
  b)   Give an algorithm to test the equivalence of C types.   [5+5]

8. Describe the method to obtain faster access to nonlocals. [10]

OR

9. Explain different principles source of optimization technique with suitable examples. [10]

10.a) Explain the issues in design of code generator.
   b) Explain simple code generator with suitable example. [5+5]

OR

11. Explain in detail register allocation and assignment. [10]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
DESIGN OF MACHINE MEMBERS – I
(Common to ME, 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) Define factor of safety. [2]
 b) Explain the methods to reduce stress concentration in machine members. [3]
 c) What is row pitch and margin of a riveted joint? [2]
 d) What do you understand by bolt of uniform strength? [3]
 e) Explain the purpose of a gib. [2]
 f) How is a sunk key designed? [3]
 g) When do you consider column factor in design of shafts. [2]
 h) How is a flange coupling modified to make it flexible coupling. [3]
 i) What is a torsion spring? [2]
 j) Explain surging in springs. [3]

PART - B

(50 Marks)

2.a) What are theories of failure. Explain any two theories of elastic failure for bi-axial loading system with the help of equations.
 b) A solid circular shaft, 20 mm in diameter, is subjected to torsional shear stress, which varies from 0 to 35 N/mm^2 and at the same time, is subjected to an axial stress that varies from -15 to +30 N/mm^2. The frequency of variation of these stresses is equal to the shaft speed. The shaft is made of steel FeE 400(S_{ut}=540 N/mm^2 and S_{yt}=400 N/mm^2 and the corrected endurance limit of the shaft is 200 N/mm^2. Determine the factor of safety. [5+5]

OR

3.a) What are the general considerations in designing machine members. Discuss in detail.
 b) Explain about preferred numbers.
 c) A simply supported shaft of 50 mm diameter and 0.5 m long is subjected to, at its mid-section, a load that varies cyclically from 2P to 4P. Determine the value of P. Yield strength=450 MPa, Endurance limit=350 Mpa, Factor of safety=2, size correction factor=0.85 and surface correction factor =0.9. [3+3+4]

4.a)　Describe the procedure to design an eccentrically loaded welded joint.

　b)　A double riveted, chain lap joint is to be made for joining two plates of 10 mm thick. The allowable stresses are 60 MPa in tension, 80 MPa in crushing and 50 MPa in shear. Determine the rivet diameter, pitch of the rivets and row pitch. Also find the efficiency of the joint.　　　　　[5+5]

OR

5.a)　Explain how to design a bolt considering both initial tightening load and external force.

　b)　A flanged bearing for a horizontal shaft is fastened to a frame by means of 4 bolts, equally spaced on 160 mm pitch circle diameter. A 100 kN force acts at a distance of 50 mm from the frame. The diameter of the flange is 220 mm. Determine the size of the bolts, if the tensile stress for the bolt material is 80 MPa.　　　　　[5+5]

6.　Design a knuckle joint to connect two circular rods subjected to an axial tensile force of 50 kN. The rods are co-axial and a small amount of angular movement between their axes is permissible. Assume permissible stresses as: $f_t = 80$ N/mm^2; $f_s = 40$ N/mm^2; $f_c = 80$ N/mm^2.　　　　　[10]

OR

7.a)　Mention different types of cotter joints. Where are they used?

　b)　Design a socket and spigot type cotter joint to resist a load of 25 kN. Assume safe stresses as: σ_t=50 MPa; τ_{all}=40 MPa; σ_c=65 MPa.　　　　　[5+5]

8.a)　Write how a shaft is designed on the basis of rigidity.

　b)　A steel shaft 1.25 m long between bearings carries 1250 N pulley at its mid point. The pulley is keyed to the shaft and receives 20 kW at 200 rpm. The belt drive is horizontal and the ratio of the belt tensions is 3:1. The diameter of the pulley is 600 mm. Compute the shaft diameter.　　　　　[5+5]

OR

9.　Two 40 mm diameter shafts running at 500 rpm and transmitting a torque of 1200 Nm are connected by a rigid unprotected type of flange coupling. The flanges are fitted with six bolts. Permissible stresses are 35 MPa in shear and 45 MPa in crushing. Design the coupling with a neat sketch.　　　　　[10]

10.a)　Why Wahl's factor is to be considered in the design of helical compression or tension springs.

　b)　A spring loaded safety valve for a boiler is required to blow-off at a pressure of 1.2 N/mm^2. The diameter of the valve is 55 mm. Design a suitable compression spring for the safety valve, assuming spring index to be 6 and an initial compression 25 mm. The maximum lift of the valve is 15 mm. The shear stress in the material is to be limited to 450 MPa. Take G= 0.84×10^5 MPa.　　　　　[5+5]

OR

11.a)　Write the design procedure of helical compression springs under fatigue loading.

　b)　A bumper, consisting of two helical springs of circular section, brings to rest, a railway wagon of mass 1500 kg moving at 1.2 m/s. While doing so, the springs are compressed by 150 mm. The mean diameter of the coils is 6 times the wire diameter and permissible shear stress is 400 MPa. Design the springs. Take G= 0.84×10^5 MPa. [5+5]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
CONTROL SYSTEMS
(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.
(**Note: Graph sheets and semilog sheets are required to be provided during the
examination**).

PART - A

(25 Marks)

1.a) Briefly explain the differences between open loop and closed loop control systems with
a suitable examples. [2]
   b) What is a feedback? Explain the characteristics of feedback. [3]
   c) Draw the circuit diagram of A. C. Servomotor. [2]
   d) Give the transfer function representation of a D. C. Servo motor with block diagram. [3]
   e) What are standard test signals? Give their physical significance along with their
mathematical representation and wave forms. [2]
   f) Explain various time response specifications of a control system. [3]
   g) Briefly discuss about the concept of stability of a control system. Also explain how they
are classified. [2]
   h) Explain few advantages of root locus technique over Routh's Hurwitz stability criteria. [3]
   i) Define phase margin and gain margin. [2]
   j) Sketch the polar plot for the following transfer function $G(s) = \dfrac{1}{(1+s)(1+2s)}$.
   Determine whether the plot cross the real axis. [3]

PART - B

(50 Marks)

2. Write the differential equations governing the behavior the mechanical system shown
figure 1. Also obtain an analog electrical circuit based on free-voltage analogy. [10]
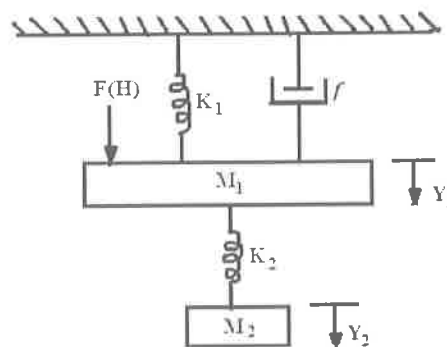
Figure 1
OR

3.   Obtain the transfer function of the mechanical systems (figure 2).   [10]
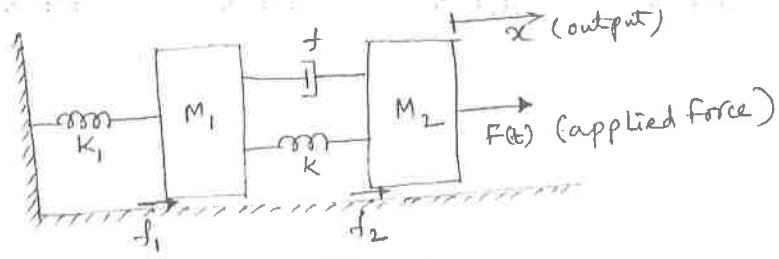

Figure 2

4.   Obtain the transfer function of the system show figure 3 using block diagram reduction technique.   [10]
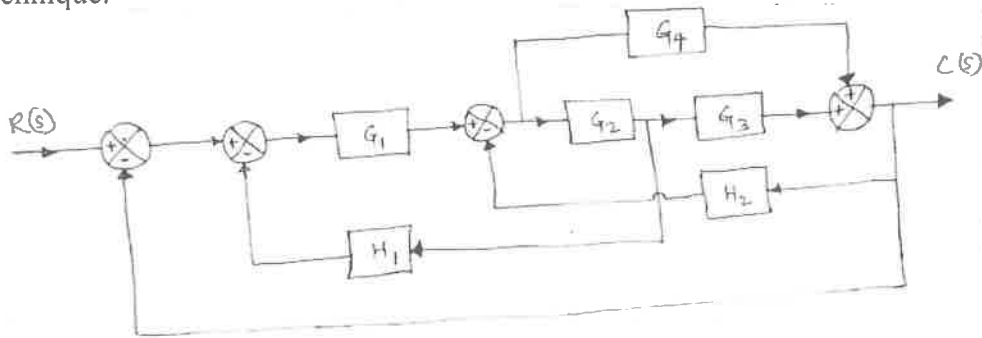

Figure 3

OR

5.   Obtain the overall transfer function $\dfrac{C(s)}{R(s)}$ for the signal flow graph using Marson's Gain formula (figure 4).   [10]
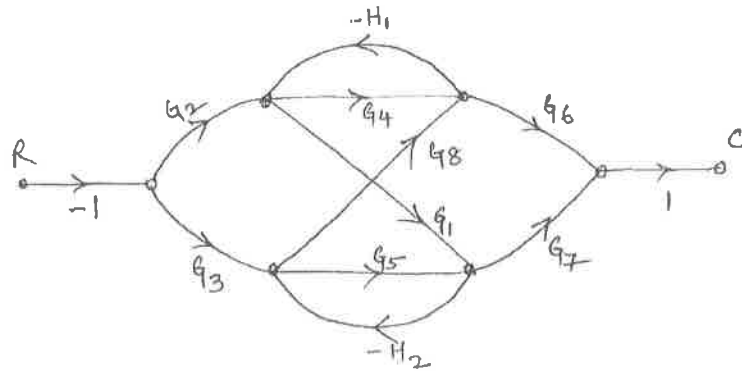

Figure 4

6.   A unity feedback system is characterized by an open-loop transfer function $G(s) = \dfrac{K}{s(s+10)}$. Determine the gain K so that the system will have a damping ratio of 0.5. for this valve of K determine settling time, peak overshoot and time to peak overshoot for a unit step input.   [10]

OR

7. The open-loop transfer function of a servo system with unity feedback is $G(s) = \dfrac{10}{s(0.1s+1)}$. Evaluate the static error constants $(K_p; K_v, K_a$ for the system. Obtain the steady state error of the system when subjected to an input given by the polynomial $r(t) = a_0 + a_1 t + \dfrac{a_2 t^2}{2}$. [10]

8. The characteristic equation of a servo system is given by $a_0 s^4 + a_1 s^3 + a_2 s^2 + a_3 s + a_4 = 0$. Determine the conditions which must be satisfied by the coefficients of the characteristic equation for the system to be stable. [10]

OR

9. Sketch the root locus plot of a unity feedback system with an open loop transfer function $G(s) = \dfrac{K}{s(s+2)(s+4)}$. Find the range of values of K for which the system has damped oscillatory response. What is the greatest value of K which can be used before continuous oscillations occur? Also determine the frequency of continuous oscillations. [10]

10. Sketch the Bode plot for the transfer function $G(s) = \dfrac{ks^2}{(1+0.2s)(1+0.2s)}$. Determine the system gain K for the gain cross-over frequency W_c to be $5\,rad/Sec$. [10]

OR

11. The straight line Bode plot of a feedback system is shown figure 5. Derive an expression for the value of W_C to yield maximum phase margin, in terms of W_1, W_2 Determine the maximum phase margin when m=1. [10]
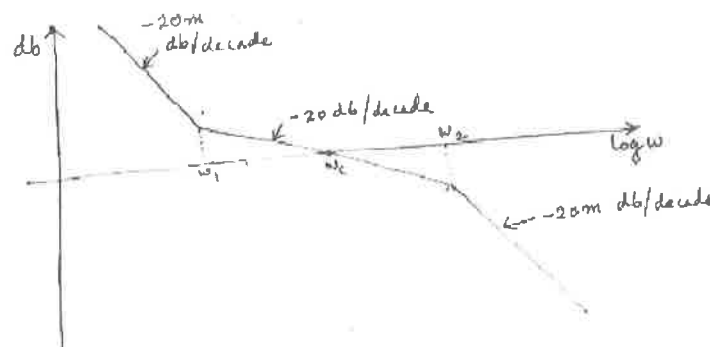

Figure 5

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
COMPILER 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)   Write regular expression over alphabet {a, b, c} containing at least one 'a' and at least one 'b'   [2]
  b)   What is input buffering? How is input buffering implemented?   [3]
  c)   What is operator precedence grammar? Give an example.   [2]
  d)   What is significance of lookahead operator in LR parsing?   [3]
  e)   What is the s – attributes and l – attributes?   [2]
  f)   What is activation record?   [3]
  g)   What is dead code elimination and reduction in strength?   [2]
  h)   Define loop unrolling. Give an example.   [3]
  i)   What is meant by register descriptor and address descriptor?   [2]
  j)   How to allocate registers to instruction?   [3]

PART – B
(50 Marks)

2.a)   Explain the concept of bootstrapping with example.
  b)   Consider the following Conditional statement:
        if (x > 3) then y = 5 else y = 10;
        How does lexical analyzer help the above statement in process of compilation?   [4+6]
OR
3.   Construct predictive parsing table for the following grammar   [10]
        S → (L) | a
        L → L, S | S

4.   Find the LR (0) set of items for the following grammar. Describe state diagram and construct parse table of that   [10]
        S → CC
        C → cC |d
OR
5.a)   Write a procedure to construct LALR parsing table.
  b)   Write short notes on YACC.   [5+5]

6.   What is symbol table? Discuss various ways to organizing symbol table.   [10]

OR

7.   Translate the following expression:
(a + b) * (c + d) + (a + b + c) into
a) Quadruples   b) Triples   c) Indirect triples   [3+3+4]

8. a)   What is liveness? Explain liveness with suitable example.
  b)   Write a procedure to identify basic blocks.   [5+5]

OR

9.   Illustrate loop optimization with suitable example.   [10]

10.   Explain various method to handle peephole optimization.   [10]

OR

11.   Generate the code for the following expression: x = (a + b) − ((c + d) − e). Also Compute its cost.   [10]

---ooOoo---

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
COMPUTER ORGANIZATION AND OPERATING SYSTEMS
(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) Perform $(-15)_{10} + (+3)_{10}$ using 2's compliment. [2]
   b) Discuss the metrics used in the performance of a computer. [3]
   c) Write down the differences between a microprocessor and micro controller. [2]
   d) Give a brief note on PROM. [3]
   e) Mention the basic differences between an Isolated I/O and Memory-Mapped I/O. [2]
   f) Explain the significance of PCI Bus. [3]
   g) How to map a logical address into a physical address? [2]
   h) Differentiate between Distributed System and a Real-Time System. [3]
   i) Discuss about back-up and recovery of a file system. [2]
   j) Define mounting. What is the need for mounting in a file system? [3]

PART - B
(50 Marks)

2.a) How index addressing mode is different from relative addressing mode? Explain.
   b) Obtain the 9's and 10's complement of the following six digit decimal numbers: 123901, 090567. [4+6]

OR

3. Draw the block diagram of a 4-bit parallel adder and subtractor and explain its significance and functionality. [10]

4. With the help of a neat block diagram, explain the decision-making capabilities in the control unit. [10]

OR

5. Explain the cache memory mapping techniques with relevant diagrams. [10]

6.a) What is a priority interrupt? Explain daisy-chaining priority methods with a neat diagram.
   b) Write a detailed description of Priority Encoder. [5+5]

OR

7. What are the features of USB? Explain USB protocol along with its merits and demerits. [10]

8. What are the necessary conditions for Deadlock? Explain Banker's algorithm with an illustrative example. [10]

OR

9.a) Explain about the implementation of the hashed page table approach.

b) Briefly explain about demand paging. [5+5]

10. Explain the following terms with neat diagrams and examples.
    a) Two level directory structure.
    b) DAG structure. [5+5]

OR

11.a) Explain how the remote file sharing can be done in RFS.

b) Explain why logging metadata updates ensures recovery of a file system after a file-system crash. [5+5]

---ooOoo---

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
CONCRETE TECHNOLOGY
(Civil Engineering)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a)   What is clinker and explain the various methods of its production in cement manufacturing.
  b)   Write the physical and chemical characteristics of C – S – H and calcium hydroxide in the hydration of cement.
  c)   Why the relationship between porosity and impermeability in hydrated cement paste is exponential.   [5+5+5]

2.a)   Explain the various types of mineral admixtures which are used in preparing concrete.
  b)   Write the mechanism of High Range Water Reducing (HRWR) agents in fresh concrete for the improvement of workability.   [7+8]

3.a)   What are the effects of shape, texture and maximum size of aggregates on the strength and workability of concrete?
  b)   What are the different moisture states in which aggregates exist?
  c)   What is the cause of the bulking phenomenon and what role does it play in concrete manufacturing process.   [7+4+4]

4.a)   What are the various factors which affect the workability of concrete? Explain.
  b)   Distinguish between segregation and bleeding of concrete. How to control the bleeding in fresh concrete.   [8+7]

5.a)   What is curing and describe the importance of curing and its methods.
  b)   Explain the maturity concept and what are the practical uses in the concrete industry.
                                                                                       [7+8]

6.a)   Explain the factors that affect the shrinkage and creep of concrete.
  b)   List the various non-destructive testing methods and explain in detail of any TWO methods.   [7+8]

7.a)   Define the durability of concrete and explain the various reasons for the durability problems in concrete.
  b)   Design a M30 concrete using IS 10262 - 1980 for the following data.
        Maximum size of aggregate = 20 mm (angular, IS: 383), Compacting factor 0.93, Type of exposure – Moderate, Specific gravity of Cement, FA, CA are 3.15, 2.6, 2.7 respectively, Zone of sand is II, Water absorption of CA, FA are 0.6%, 1.2%, Free moisture on CA, FA are 0.1%, 2.0%.   [5+10]

8.a) Explain in detail, the specific applications of Self Compacting Concrete (SCC). Explain the tests which are conducted on SCC.
   b) Write short notes on light weight concrete and its applications. [8+7]

---ooOoo---

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to AME, BT, EIE, IT, ME, MCT, MIE)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

1. Discuss elaborately various types of issues that require the application of Micro economic Theory in a business organization and the role of a Managerial economist in this regard.   [15]

2. What do you understand by 'Demand forecasting'? Explain different methods to forecast the demand for a product be estimated.   [15]

3. Define 'product function' and explain how equilibrium position can be reached by a manufacturing unit by adopting Isoquant analysis?   [15]

4. With what assumptions Break even theory can be applied? By taking assumed data, illustrate how it is helpful in decision making?   [15]

5.a) What are the differences between 'Perfect competition' and 'Monopolistic competition'
  b) Narrate various pricing methods with examples.   [7+8]

6.a) Why do long term investments require the application of capital budgeting techniques?
  b) Explain the factors influencing the estimation of working capital requirements.   [7+8]

7. What are the reasons for the preparation of financial statements at the end of a financial Year? How can the financial data be interpreted by suppliers, financiers and investors? Discuss elaborately.   [15]

8. From the following information taken from the books of Mahesh, prepare Trading, Profit & loss account for the year ending 31st March, 2015 and balance sheet as on that date after incorporating the following adjustments:

a) Closing stock was valued at Rs.50,000
b) Prepaid insurance – Rs.45
c) Commission received but not accrued – Rs.2,500
d) Commission accrued but not received – Rs.11,200.   [15]

Particulars	Dr. (Rs.)	Cr. (Rs.)
Opening stock	25,000	
Purchases and Sales	35,000	1,98,000
Returns	2,000	3,000
Wages	5,000	
Salaries	8,400	
Insurance	4,200	
Commission received		22,000
Buildings	30,000	
Debtors and Creditors	15,000	13,000
Drawings and capital	1,700	1,80,000
Bank overdraft		20,000
Land	2,94,300	
Cash	15,400	
	4,36,000	4,36,000

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
IC APPLICATIONS
(Common to ECE, EEE)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a)   What are the ideal characteristics of Op-amp?
 b)   Define input and output off set currents of op-amp.
 c)   Draw the circuit diagram of inverting amplifier and explain its working.   [4+4+7]

2.a)   Explain how Schmitt trigger is used to generate a square wave?
 b)   Explain how an op-amp is used as a differentiator?   [8+7]

3.a)   Design a first order low pass filter with a cutoff frequency of 2kHz.
 b)   Explain the working principle of wein bridge oscillator using opamp.   [8+7]

4.a)   Explain astable multivibrator using IC 555 timer with neat circuit diagram and derive the equation for time period.
 b)   Draw the block diagram of IC 566 and explain the significance of each block.   [7+8]

5.a)   Design a circuit of R-2R ladder Digital to Analog converter and explain its working.
 b)   Explain the working of dual slope Analog to Digital converter and what are the limitations of it.   [8+7]

6.a)   Explain the working of CMOS transmission gate with circuit diagram.
 b)   Design a interfacing circuit between CMOS to TTL gate.   [8+7]

7.a)   Design a priority encoder and explain its working.
 b)   Design a parallel binary adder and explain its working.   [8+7]

8.a)   Compare synchronous and asynchronous counters in all aspects.
 b)   Explain the working of decade counter with circuit diagram.   [7+8]

---ooOoo---

R13

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 the application of gyroscopic principles to aircrafts. [2]

  b) What will be the effect of the gyroscopic couple on a disc fixed at a certain angle to a rotating shaft? [3]

  c) Distinguish between brakes and dynamometers. [2]

  d) What is meant by the expression 'friction circle'? [3]

  e) Define the terms 'coefficient of fluctuation of energy' and 'coefficient of fluctuation of speed', in the case of flywheels. [2]

  f) What are the effects of friction and of adding a central weight to the sleeve of a Watt governor? [3]

  g) Distinguish primary and secondary balancing. [2]

  h) How do you balance V-engines? [3]

  i) Define free vibrations, forced vibrations and damped vibrations. [2]

  j) What do you understand by under damping, critical damping and over damping? [3]

PART - B

(50 Marks)

2. A four-wheeled trolley car of total mass 2000 kg running on rails of 1.6 m gauge, rounds a curve of 30 m radius at 54 km/h. The track is banked at 8^0. The wheels have an external diameter of 0.7 m and each pair with axle has a mass of 200 kg. The radius of gyration for each pair is 0.3 m. The height of centre of gravity of the car above the wheel base is 1 m. Determine, allowing for centrifugal force and gyroscopic couple actions, the pressure on each rail. [10]

OR

3. A rear engine automobile is travelling along a track of 100 metres mean radius. Each of the four road wheels has a moment of inertia of 2.5 kg-m^2 and an effective diameter of 0.6 m. The rotating parts of the engine have a moment of inertia of 1.2 kg-m^2. The engine axis is parallel to the rear axle and the crankshaft rotates in the same sense as the road wheels. The ratio of engine speed to back axle speed is 3 : 1. The automobile has a mass of 1600 kg and has its centre of gravity 0.5 m above road level. The width of the track of the vehicle is 1.5 m. Determine the limiting speed of the vehicle around the curve for all four wheels to maintain contact with the road surface. Assume that the road surface is not cambered and centre of gravity of the automobile lies centrally with respect to the four wheels. [10]

4. A rotor is driven by a co-axial motor through a single plate clutch, both sides of the plate being effective. The external and internal diameters of the plate are respectively 220 mm and 160 mm and the total spring load pressing the plates together is 570 N. The motor armature and shaft has a mass of 800 kg with an effective radius of gyration of 200 mm. The rotor has a mass of 1300 kg with an effective radius of gyration of 180 mm. The coefficient of friction for the clutch is 0.35. The driving motor is brought up to a speed of 1250 r.p.m. when the current is switched off and the clutch suddenly engaged. Determine

   a) The final speed of motor and rotor
   b) The time to reach this speed, and
   c) The kinetic energy lost during the period of slipping.

   How long would slipping continue if it is assumed that a constant resisting torque of 60 N-m were present? If instead of a resisting torque, it is assumed that a constant driving torque of 60 N-m is maintained on the armature shaft, what would then be slipping time? [10]

OR

5. The below Figure shows a brake shoe applied to a drum by a lever AB which is pivoted at a fixed point A and rigidly fixed to the shoe. The radius of the drum is 160 mm. The coefficient of friction at the brake lining is 0.3. If the drum rotates clockwise, find the braking torque due to the horizontal force of 600 N at B. [10]
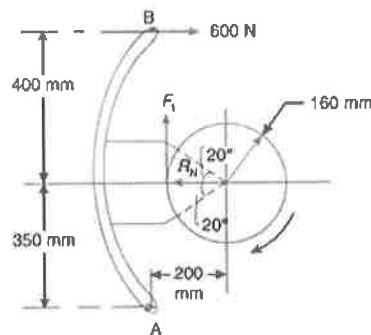
6. A certain machine requires a torque of $(1500 + 200 \sin \Theta)$ N.m to drive it, where Θ is the angle of rotation of the shaft. The machine is directly coupled to an engine which produces a torque of $(1500 + 200 \sin 2\Theta)$ N.m. The flywheel and the other rotating parts attached to the engine have a mass of 300 kg at a radius of gyration of 200 mm. If the mean speed is 200 rpm. Find (a) the fluctuation of energy (b) the total percentage fluctuation of speed (c) the maximum and the minimum angular acceleration of the flywheel and the corresponding shaft positions. [10]

OR

7. In an engine governor of the Porter type, the upper and lower arms are 200 mm and 250 mm respectively and pivoted on the axis of rotation. The mass of the central load is 15 kg, the mass of each ball is 2 kg and friction of the sleeve together with the resistance of the operating gear is equal to a load of 25 N at the sleeve. If the limiting inclinations of the upper arms to the vertical are 30^0 and 40^0, find, taking friction into account, range of speed of the governor. [10]

8. Four masses m1, m2, m3 and m4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are 45^0, 75^0 and 135^0. Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m. [10]

OR

9. A four crank engine has the two outer cranks set at 120^0 to each other, and their reciprocating masses are each 400 kg. The distance between the planes of rotation of adjacent cranks are 450 mm, 750 mm and 600 mm. If the engine is to be in complete primary balance, find the reciprocating mass and the relative angular position for each of the inner cranks. If the length of each crank is 300 mm, the length of each connecting rod is 1.2 m and the speed of rotation is 240 r.p.m., what is the maximum secondary unbalanced force? [10]

10. A machine mounted on springs and fitted with a dashpot has a mass of 60 kg. There are three springs, each of stiffness 12 N/mm. The amplitude of vibrations reduces from 45 to 8 mm in two complete oscillations. Assuming that the damping force varies as the velocity, determine (a) the damping coefficient (b) the ratio of frequencies of damped and undamped vibrations (c) the periodic time of damped vibrations. [10]

OR

11. An electric motor is to drive a centrifuge, running at four times the motor speed through a spur gear and pinion. The steel shaft from the motor to the gear wheel is 54 mm diameter and L metre long, the shaft from the pinion to the centrifuge is 45 mm diameter and 400 mm long. The masses and radii of gyration of motor and centrifuge are respectively 37.5 kg. 100 mm, 30 kg and 140 mm. Neglecting the inertia effect of the gears, find the value of L if the gears are to be at the node for torsional oscillation of the system and hence determine the frequency of torsional oscillation. Assume modulus of rigidity for material of shaft as 84 GN/m^2. [10]

---ooOoo---

R13

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 use of datalink layer ?	[2]
b)	What is ARP? Explain.	[3]
c)	Explain about Broadcast link.	[2]
d)	Give the classification of multiple access protocols.	[3]
e)	Write any two services network layer provides to transport layer.	[2]
f)	Explain about datagram and virtual circuit.	[3]
g)	What is internetworking?	[2]
h)	List out the internetworking devices.	[3]
i)	What is the role of UDP in internet transport protocol?	[2]
j)	What is TELENET?	[3]

PART-B

(50 Marks)

2. Explain about various transmission media in physical layer with a neat sketch. [10]

OR

3. Elaborate on the design issues of data link layer. [10]

4. Write in detail on Time–Division Multiplexing and Frequency-Division Multiplexing with an example for each. [10]

OR

5. Write and explain about various multiple access protocols. [10]

6. Explain the Optimality Principle with a suitable example. [10]

OR

7. Explain distance vector routing algorithm. [10]

8. What happens when large packet wants to travel through network with smaller maximum packet size? Explain. [10]

OR

9. Explain tree-structured numbering scheme. [10]

10. Explain about RPC with a neat sketch. [10]

OR

11. What is DNS? What are the services provided by DNS and explain how it works. [10]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
ANTENNAS AND WAVE PROPAGATION
(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) Define the terms antenna efficiency and radiation efficiency.   [2]
  b) If the power density due to a point source in a free space at a distance of 25 Km is 100 micro watt/m^2 then what is the power density if the distance is (i) doubled (ii) halved.   [3]
  c) What is optimum horn? Explain its important features.   [2]
  d) Explain how unidirectional pattern is formed in Yag Uda antenna from the bi directional pattern of folded dipole.   [3]
  e) Why is zoning done in lens antenna?   [2]
  f) Discuss various methods available for analysis of microstrip antenna.   [3]
  g) Explain how beam steering is achieved in uniform linear array?   [2]
  h) Calculate directivity of a given linear uniform BSA of 10 element with separation of λ/4 between the elements.   [3]
  i) What is skip distance?   [2]
  j) What is wave tilt? List all the factors that affect wave tilt.   [3]

PART - B
(50 Marks)

2.a) Derive the expression for radiation fields of a centre fed half wavelength dipole antenna. Sketch the radiation pattern.
  b) Prove the reciprocity theorem as applicable to antennas and hence show the equality of directional pattern for transmission and reception by same antenna.   [5+5]

OR

3.a) Compare far fields of small loop antenna and short dipole antenna.
  b) What is the radiation resistance of antenna? Derive the expression for radiation resistance of half wave length dipole antenna.   [5+5]

4.a) Derive the construction and basic principles of operation of a helical antenna under (i) normal mode of operation (ii) axial mode of operation
  b) Explain the working of folded dipole antenna.   [5+5]

OR

5.a) Draw the sketch of Yagi Uda array antenna. Prove how the longer antenna behind the main antenna behaves as a reflector and the shorter antenna in front of main antenna acts as a director.
  b) What is electromagnetic horn antenna? What are the various types of horn? What are their practical applications?   [5+5]

6.a) Discuss the principle of operation and the consideration which have to be gone into the design and construction of parabolic reflector antenna.

b) Explain the various feeding mechanisms used in parabolic reflector antennas. [5+5]

OR

7.a) Show that the contour of a nonmetallic dielectric lens antenna is a hyperbola.

b) Explain the principle of working of lens antenna. [5+5]

8.a) What is binomial array antenna. What its basic principle of working? Mention the advantages and disadvantages.

b) What is the principle of pattern multiplication explain with an example. [5+5]

OR

9.a) What is near field and far field region? Why is the condition $2D^2/\lambda$ chosen for far field region.

b) With a neat sketch explain the procedure of radiation pattern measurement. [5+5]

10.a) Derive the relation for dielectric constant of ionosphere layer in terms of plasma frequency.

b) Explain the phenomenon of ducting? What are the conditions required for manifestation of this phenomenon. [5+5]

OR

11.a) Briefly explain the tropospheric propagation and multi-hop propagation.

b) Explain the following terms with diagram (i) Duct propagation (ii) Skip zone [5+5]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
LINEAR IC APPLICATIONS
(Electronics and Instrumentation 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) Give the difference between monolithic and hybrid ICs.   [2]
  b) What are the characteristics of an ideal op amp?   [3]
  c) What is the need for voltage regulation?   [2]
  d) Draw a neat figure to explain a basic comparator.   [3]
  e) Give the differences between phase shift oscillator and wein bridge oscillator?   [2]
  f) Discuss the principle of oscillations.   [3]
  g) Mention any two application of 555 Timer in Mono stable mode.   [2]
  h) List the Important feature of 555 Timer.   [3]
  i) Give a note on D/A conversion fundamentals.   [2]
  j) Where do we use successive approximating type ADC?   [3]

PART - B

(50 Marks)

2.a) Write short notes on classification of IC.
  b) Explain various DC and AC characteristics of an op-amp.   [4+6]
                                      OR
3.a) Explain the open loop and closed loop operation of an op amp.
  b) Draw the Schematic block diagram of the basic OPAMP. Explain the Significance of
     virtual ground in basic inverting OPAMP. How would you explain its existence? [4+6]

4.a) Describe the principle operation of an Integrator and obtain the necessary equations.
  b) Draw the circuit of instrumentation amplifier and explain various applications of it.
                                                                                           [5+5]
                                      OR
5.a) Draw the circuit of zero crossing detector and explain its working with relevant
     waveforms.
  b) Draw and explain the features of 723 voltage regulator.   [5+5]

6.a) Draw the circuit of square wave generator and explain its working.
  b) Design an active first order Butterworth filter LPF with a cutoff frequency of 2 KHz
     and pass band gain of 4.   [5+5]
                                      OR
7.a) Explain the Wien bridge oscillator with neat waveforms.
  b) Explain in detail the All Pass filter.   [5+5]

8.a) Design a 555 astable multivibrator to operate at 10 kHz with 40 % duty cycle.
 b) Explain the operation of a 565 PLL applications.   [5+5]

OR

9.a) Draw the circuit diagram of a PLL AM detector and explain its operation.
 b) Describe the Working of VCO.   [5+5]

10.a) Explain the working of a Parallel A/D converters.
 b) Explain the operation of R-2R ladder D/A converter with neat diagrams. [5+5]

OR

11.a) Discuss how to control DC motor speed using 555 timer.
 b) Explain the working of a Dual Slope Converter.   [5+5]

---ooOoo---

Code No: 115EP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
CONCRETE TECHNOLOGY
(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 flash set of cement and how to avoid this?　　　　　　　　　　　[2]
　b)　Explain the mechanism of deflocculating of cement by superplasticizer.　　[3]
　c)　Define workability in terms of energy.　　　　　　　　　　　　　　　[2]
　d)　Define Laitance and factors responsible for it?　　　　　　　　　　　[3]
　e)　State Abram's water cement ratio law.　　　　　　　　　　　　　　　[2]
　f)　How does drying shrinkage effect creep?　　　　　　　　　　　　　　[3]
　g)　State the merits and demerits of BIS mix design method.　　　　　　　[2]
　h)　What do you understand by target mean strength?　　　　　　　　　　[3]
　i)　Give the application of cellular concrete.　　　　　　　　　　　　　　[2]
　j)　What is 'no-fines' concrete?　　　　　　　　　　　　　　　　　　　[3]

PART - B

(50 Marks)

2.a)　Explain how the Bogue's compounds participate in the development of strength of cement.
　b)　Explain the effect of h/D ratio and size of aggregate on the strength properties of concrete.　　　　　　　　　　　　　　　　　　　　　　　　　　[5+5]

OR

3.a)　What is Alkali aggregate reaction and how it can be controlled.
　b)　What are the chemical admixtures? Explain different types of admixtures.　[5+5]

4.a)　List the factors effecting the workability of concrete.
　b)　Explain the procedure for determining the setting times of concrete.　　[5+5]

OR

5.a)　Discuss the applicability of the various workability tests to concretes of different levels of workability.
　b)　Define bleeding and segregation of concrete and Explain the methods to control them.
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　[5+5]

6.a) Calculate the Gel/space ratio and hence estimate the 28 day strength for 50 kg of cement at 0.45 water/cement ratio on 75% hydration.

b) Calculate the maturity value and estimate the 14 days strength for M25 grade concrete if it is cured at 15^0C from 0 hr to 6 hr; 8^0C from 6 hr to 12 hr and 12^0C for the rest of the period during a day. The Plowman's constants are A=21 and B=61. [5+5]

OR

7.a) Define creep of concrete and explain the main factors affecting the creep of concrete.

b) Discuss about static and dynamic moduli of elasticity of concrete along with their relation. [5+5]

8. Design M35 concrete mix using BIS method for the data given below:
a) Cement-OPC 53 grade; specific gravity-3.05
b) Fine aggregate- river sand, Zone-III, specific gravity-2.65
c) Coarse aggregate-20mm crushed granite, specific gravity-2.65
d) Free moisture in sand is 5% with 10% bulking
e) Exposure-moderate
f) RCC work with good quality control
g) Workability-110mm slump (pumpable concrete)
Use of SP allowed. Assume any other data suitably. [10]

OR

9.a) Briefly discuss the 'sampling and acceptance criteria' for each concrete batch.

b) What are the factors to be considered in the choice of concrete mix proportions? [5+5]

10.a) Enumerate different types of fibres used for the production of "fibre reinforced concrete" and also state the factors that affect the properties of fibre reinforced concrete?

b) Briefly discuss the tests to be conducted to satisfy the requirements for 'self-compacting concrete' in the fresh state. [5+5]

OR

11.a) Differentiate between polymer concrete and polymer impregnated concrete and also state the principal consideration in the design of polymer concrete mixtures.

b) What are the various methods of making light weight concrete? [5+5]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
DESIGN OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

1.a) Explain balanced, under-reinforced and over-reinforced sections.
  b) Derive the stress block parameters. [7+8]

2. Sketch the reinforcement details of a rectangular beam simply supported on supports of 230 mm width. The clear span of the beam is 7 m. The beam is to have a width of 300 mm, the characteristic superimposed load is 15 KN/m. Design the beam using M 25 and Fe 500 and sketch the reinforcement details. [15]

3.a) Give some examples for structural elements, which will be subjected to torsional moment.
  b) Discuss in detail why the development length will be different for bars in tension and compression. [7+8]

4. Analyze and design a R.C. slab for a room having inside dimensions 4 m × 9 m. The thickness of supporting wall is 300 mm. The slab carries 100 mm thick lime concrete at its top, the unit weight of which may be taken as 19kN/m^3. The live load on the slab may be taken as 3.0 kN/m^2. Assume that the slab is simply supported at the ends. Use M 20 grade concrete and Fe 415steel. [15]

5. Design a rectangular isolated footing of uniform thickness for R.C. column bearing a vertical load of 1000KN. The SBC of soil is 150 KN/m^2. Use M25 grade concrete and Fe 415 bars. Draw the reinforcement details. [15]

6.a) What are the types of reinforcements used to resist shear force in columns?
  b) Design the longitudinal reinforcement in a short column 450mm × 600mm subjected to an ultimate axial load of 1600 KN together with ultimate moments of 120 KN-m and 90KN-m about the major and minor axis respectively. The reinforcements are distributed equally on all four sides. Adopt M20 grade concrete and Fe415 steel bars. [6+9]

7.a) What are the reasons for cracks in structural concrete?
  b) A rectangular simply supported beam of span 6 m is 300 × 600 mm in cross section and is reinforced with 3 bars of 20 mm on tension side with an effective cover of 50 mm. Determine the short term deflection due to an imposed working load of 25 kN/m, excluding self weight of beam. Assume grade of concrete M20 and grade of steel as Fe 500. [6+9]

8. Design a dog-legged stair for a building in which the vertical distance between floors is 3.8 m. The stair hall measures 3.5 m × 3.5 m. The live load may be taken as 3.5 kN/m^2. Adopt M20 concrete and Fe 415 steel. [15]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
MANAGEMENT SCEINCE
(Common to AE, EEE)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1. Discuss elaborately the evolution and development of management thought in chronological order. [15]

2. What do you understand by 'Delegation'? Explain the process of Delegation. What are the barriers to effective delegation? Give broad outlines for effective delegation. [15]

3.a) Define the basic procedure involved in method study and work measurement.
 b) What are the various types of process charts? How can they be adopted? [7+8]

4.a) Define and explain the concept 'Operations Management'
 b) Explain the concept 'Marketing Mix' and elaborate its constituent.
 c) What is meant by 'Product Life Cycle'? With the help of a block diagram, identify its phases. [5+5+5]

5. Define the concepts 'Method study' and 'Work measurement'. Narrate briefly the different steps involved in Method study. [15]

6. How is Strategic Management different from traditional approach of Management? How can 'SWOT Analysis be conducted? How can it benefit an Organization? [15]

7. Write short notes on:
 a) Just In Time approach,
 b) Total Quality Management
 c) ERP. [5+5+5]

8.a) Distinguish between PERT and CPM.
 b) From the following data, draw the network. Find the critical path and total duration of the project: [7+8]

Activity	Preceding Activity	Duration (in days)
1-2	-	4
1-3	-	4
1-4	-	4
2-5	1-2	8
3-6	1-3	16
4-6	1-4	8
5-7	2-5	4
6-7	3-6, 4-6	10
7-8	5-7, 6-7	8

---ooOoo---

R09

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a)   A hole and shaft pair has a basic of size 35mm and are to have a clearance fit with maximum clearance of 0.04mm and a minimum clearance of 0.01mm. The hole tolerance is to be 1.2 times the shaft tolerance. Determine limits for both hole and shaft
   i) using a hole basis system   ii) using a shaft basis system.
  b)   What are the advantages of interchangeable assembly?   [5+5]

2.a)   What is a Sine bar? Explain how it can be used to set a component to a given angle.
  b)   Explain the different methods of getting magnification in dial indicators.   [5+5]

3.a)   Suggest and explain a method for testing the straightness.
  b)   What are the uses and specific applications of tool maker's microscope? Explain. [5+5]

4.a)   The heights of peak and valleys of 18 Successive points on a surface are 30, 25, 46, 37, 19, 41, 21, 40, 18, 42, 24, 40, 25, 40, 40, 18, 37, 21 microns respectively, measured over a length of 20mm. Determine CLA and RMS values of roughness surface.
  b)   Explain an instrument used to measure the surface roughness.   [5+5]

5.a)   Explain the construction and working of sigma comparator.
  b)   List out various characteristics of a comparator.   [5+5]

6.a)   Explain how a thread micrometer can be used to measure effective diameter of a thread. What are the advantages and limitations?
  b)   Explain how major diameter of internal thread can be measured?   [5+5]

7.a)   Explain the basic characteristics of surfaces.
  b)   Explain the use of laser for surface modification.   [5+5]

8.a)   What are coating methods? Explain them in detailed.
  b)   What are the applications and advantages of electroforming?   [5+5]

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R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
IC APPLICATIONS
(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 Linear and Digital ICs.   [2]
  b)   Classify the ICs.   [3]
  c)   Define CMRR.   [2]
  d)   What is the necessity of a sample & hold circuit?   [3]
  e)   List different types of Filters.   [2]
  f)   State the Barkhausen criterion.   [3]
  g)   Mention the applications of the Schmitt trigger.   [2]
  h)   What is the importance of Pin 5 of IC 555?   [3]
  i)   List the various A/D conversion techniques.   [2]
  j)   List the draw backs of Binary weighted Resistor technique D/A conversion.   [3]

PART - B

(50 Marks)

2.a)   Draw the circuit diagram of Open Collector 2-input NAND gate and with the help of
       functional table explain its operation.
  b)   Compare the characteristics of various logic families with respect to Power Dissipation,
       Propagation Delay, Fan-in and Fan-out.   [6+4]

OR

3.   Explain how CMOS-TTL interfacing can be achieved. Give the input and output levels
       of voltages and explain the same.   [10]

4.   Explain the four Differential Amplifier configurations.   [10]

OR

5.a)   The input signal to an op-amp is 0.03 sin 1.5×10^5 t. What can be the maximum Gain
       of an Op-Amp with the slew rate of 0.4 V / μsec?
  b)   Explain how a Multiplier can be used as a voltage divider.   [5+5]

6.a)   Discuss the amplitude stabilization of Phase shift Oscillator.
  b)   Design and draw the circuit diagram of a Wein bridge Oscillator using op-amp to
       produce sustained oscillations of a time period of 0.1 m sec.   [3+7]

OR

7.   Obtain the Transfer function of the first order High pass Butter worth filter.   [10]

8.a) Draw the circuit and explain how IC555 can be used for Pulse Position Modulation (PPM).
   b) Explain the functioning of 555 in Monostable configuration.   [5+5]

OR

9. Describe any four applications of Phase Locked Loop with the help of suitable circuit diagrams.   [10]

10.a) Describe Parallel Comparator type ADC operation.
   b) Explain the working of Inverted R-2R ladder D/A converter.   [5+5]

OR

11.a) Find out the Step size and Analog output when input is 0011 and 1011. Assume $V_{ref} = +5V$.
   b) Explain Successive Approximation ADC with the help of block diagram.   [4+6]

---ooOoo---

Code No: 115AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
WATER RESOURCES ENGINEERING – 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 Ø index and explain. [2]
 b)   Draw and describe with neat sketch of hydrologic cycle. [3]
 c)   Differentiate the effluent stream and influent stream. [2]
 d)   Explain the flood hydrograph. [3]
 e)   Define confined and unconfined aquifers. [2]
 f)   Classify the specific capacity and specific draw down. [3]
 g)   What is duty and relate with delta. [2]
 h)   Describe the drip irrigation system. [3]
 i)   Draw neat sketch of ridge canal. [2]
 j)   Describe feeder canal, carrier canal and branch canal. [3]

PART - B

(50 Marks)

2.a)   What are different types of precipitations? Describe each.
 b)   A basin has the area in the form of a pentagon with each side of length 50km. The five rain gauges located at the corners A,B,C,D and E have recorded 80,91 , 93 ,69, and 65mm respectively. Compute the average depth of rain fall over the basin using the Arithmetic mean and thiessen methods [5+5]

OR

3.a)   Discuss the factors affecting the runoff.
 b)   The rate of rain fall for successive 30min period of 210 min storm are 4.5, 5, 13, 9.5, 5.5,5.5 and 4cm/hr. assuming the Ø index of 4.5 cm/hr, find the net rain fall over the basin in cm, the total rain fall and value of W- index. [5+5]

4.a)   What is synthetic hydrograph? Describe with neat sketch.
 b)   What is a unit hydrograph? How do you obtain from the given direct runoff? [5+5]

OR

5.a)   Explain the types of wells with neat sketch.
 b)   The ordinate of 6 hr UH are given derive the 12hr UH [5+5]
       Time (hr)   0,6,12,18,24,30,36,42,48,54,60
       12hr(UGO)discharge (cumec) 0,5,13,30,35,32,20,14,8,4,0

6.a) Ground water flows through an aquifer with cross section area of 1×10^4 m^2 and a length of 1500 m. hydraulic heads are 300m and 250m at the ground water entry and exit points in the aquifer ,respective . Ground discharge into a stream at the rate of 1500m^3/day . What is the hydraulic conductivity of the aquifer? If the porosity of them aerial is 0.3 what is the pore velocity of water.

b) Obtain expression for the steady radial flow to wells in unconfined aquifers. [5+5]

OR

7.a) A tube well of 30m diameter penetrate fully in the artesian aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3m. The aquifer consists of sand effective size of 0.2mm having coefficient of permeability equal to 50m/day. Assume radius of influence is equal to 150m.

b) Explain the perched aquifer and water table aquifer. [5+5]

8.a) What is sprinkler irrigation discuss the advantages and disadvantages.

b) Discuss the various Indian agriculture soils and how to improve their methods of improving soil fertility. [5+5]

OR

9.a) Classify the types of irrigation efficiencies.

b) Write short note on water logging, crop rotation, and soil water and plant relation. [5+5]

10.a) How do you classify the type of canals? Explain any two.

b) Write the design procedure of irrigation canal using the Kennedy theory. [5+5]

OR

11.a) What is design discharge over catchment area? Explain SCS method of design discharge.

b) How many methods stream flow can be measured? [5+5]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
ANALOG COMMUNICATIONS
(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)	Write the expression for amplitude modulated wave.	[2]
b)	What are the methods for detecting AM waves?	[3]
c)	Draw the frequency domain representation of SSB modulated wave.	[2]
d)	Compare different AM techniques.	[3]
e)	Define modulation index for FM.	[2]
f)	Differentiate FM and AM.	[3]
g)	What are the different types of noise sources in analog communication?	[2]
h)	How do you define the effective noise temperature?	[3]
i)	What are image frequencies? Explain.	[2]
j)	What is the need for AGC circuit?	[3]

PART - B

(50 Marks)

2.a) Derive the relation between the output power of an AM transmission and the depth of modulation.
   b) When the modulation percentage is 75, an AM transmitter produces 10KW. How much of this is carrier power. What would be the percentage power saving if the carrier and one of the side bands were suppressed? [5+5]

OR

3.a) Draw the circuit diagram for balanced ring modulator and explain its operation indicating all the waveforms of the modulator.
   b) What is the effect of frequency and phase error in demodulation of DSB-SC wave using synchronous detector. [5+5]

4.a) Discuss various methods used to generate SSB signals with neat sketches.
   b) Explain the need of VSB modulation. [5+5]

OR

5. Describe the time domain band-pass representation of VSB. Draw and explain the block diagram of VSB generation corresponding to the time domain description. [10]

6.a) Derive the expression for FM signal from fundamentals and differentiate narrow band FM and wide band FM.
  b) Explain the principle of direct method of generation of FM signal using relevant diagrams. [5+5]

OR

7. Prove that narrow band FM offers no improvement in SNR over AM. [10]

8.a) Derive the equation for noise figure of FM receiver.
  b) What is the purpose of pre-emphasis and de-emphasis filtering? Explain the filtering process with suitable sketches. [5+5]

OR

9. Compare noise performance of PM and FM system. [10]

10.a) Explain the working of tuned radio frequency receiver with the help of a block diagram.
  b) Give the comparison between phase discriminator and ratio detector. [5+5]

OR

11.a) Explain with a neat block diagram PPM generation and detection.
  b) Write short notes on time division multiplexing. [5+5]

---ooOoo---

R13

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 tire height h_T and diameter D for the tire P215/65R15 96H.	[2]
b)	Explain classification of vehicles by FHWA.	[3]
c)	Explain the relation between Optimal Drive and Brake Force Distribution.	[2]
d)	Explain the relation between Volumetric, thermal, and mechanical efficiencies.	[3]
e)	What are the forces acting on a rigid vehicle? Explain.	[2]
f)	Write about steady state turning.	[3]
g)	Define rolling.	[2]
h)	Explain about time response of vehicle roll dynamics.	[3]
i)	What is damping?	[2]
j)	Explain the importance of the critical damping.	[3]

PART - B

(50 Marks)

2.a) With the help of line diagram explain about Radial and Non-Radial Tires.
   b) Explain the effect of tire structure, size, wear, and temperature on the rolling friction-coefficient. [5+5]

OR

3.a) Explain SAE standards for tyre design.
   b) Alfa Romeo Spider^{TM} has the following characteristics.
   m = 1690kg ≈ 3725.8 lb, l = 2530mm ≈ 99.6 in,   Tires = P225/50R17
   Determine the rolling resistance coefficient μ_r for the front and rear tires of the car at zero and at top speed v_M. v_M = 235.0km/h ≈146.0mi/h Assume a1/a2 =1 .2 and use p = 27psi. [5+5]

4.a) Consider a car with the following specifications that is parked on a level road. Find the load on the front and rear axles.
   m = 1765kg l =2 .84m a1 =1 .22m a2 =1 .62m
   b) Define acceleration capacity. [5+5]

OR

5. A model of Jaguar XJ™ is a rear-wheel drive car with a 4.2-liter V 8 engine. Some of the car's specifications are close to the following values.

m = 3638lb,   l = 119.4in,   Front tire = P235/50R18,   Rear tire = P235/50R18

PM = 300hp at ωM = 6000 rpm,   If gear ratios of the car's gearbox are

1st gear ratio = n1 =4 .17,   2nd gear ratio = n2 =2 .34,   3rd gear ratio = n3 =1 .52

4th gear ratio = n4 =1 .14,   5th gear ratio = n5 =0 .87,   6th gear ratio = n6 =0 .69

Reverse gear ratio = nr =3 .40,   final drive ratio = nd =2 .87

Check the gearbox stability condition. In case the relative gear ratio is not constant, determine the new gear ratios using the relative ratio of the first two gears.   [10]

6. Use the Lagrange method and find the equation of motion for the pendulum shown in Figure 1. The stiffness of the linear spring is k.   [10]
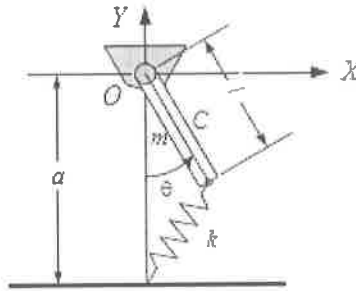
Figure 1:
A compound pendulum attached with a linear spring at the tip point

OR

7.a) Derive the expression for equation of motion of a pendulum attached to an oscillating mass

b) Find the principal moments of inertia and directions for the following inertia matrix: [5+5]

$$(I) = \begin{pmatrix} 3 & 2 & 2 \\ 2 & 2 & 0 \\ 2 & 0 & 4 \end{pmatrix}$$

8. Derive Euler's equation of Motion of a six DOF vehicle.   [10]

OR

9. Consider a bicycle model of a car such that tires are always upright and remain perpendicular to the road surface. Develop the equations of motion for the roll model of the car.   [10]

10. Determine the potential energy of the pendulum in Figure 2, at an angle θ, if:
    a) The free length of the spring is l = a−1.2b.
    b) The free length of the spring is l = a−0.8b   [10]
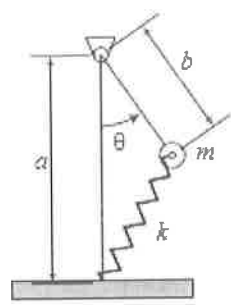
Figure 2: Spring connected pendulum

OR

11. Consider a bicycle car model with the following characteristics:
    m = 1085/2kg,   m1 = 40kg,   m2 = 40kg;   Iy = 1100kgm²
    distance from mass center to front axle a1 = 1.4m, distance from mass center to reart axle a2 = 1.47m,   k1 = 10000N/m,   kt1 = kt2 = 150000N/m
    Determine its natural frequencies and mode shapes for (a) k2 = 8000N/m
    (b) k2 = 10000N/m (c) k2 = 12000N/m. (d) Compare the natural frequencies for different k1/k2 and express the effect of increasing stiffness ratio on the pitch mode.   [10]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
MACHINE TOOLS
(Common to ME, MCT, 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) Under what conditions a continuous chip with built-up-edge is formed? [2]
 b) Briefly discuss about chip breakers. [3]
 c) Differentiate between single spindle and multi-spindle automatic lathes. [2]
 d) Write short notes on the Turret indexing mechanism. [3]
 e) How do you specify a drilling machine? [2]
 f) Give the differences and similarities between planer and shaper. [3]
 g) Give a neat sketch of an internal pull types broaches and indicate the various terms relating to its teeth. [2]
 h) Explain the general considerations in selection of milling cutters. [3]
 i) What is trueing? [2]
 j) Write a short note on shellac bond and Bakelite bond. [3]

PART - B

(50 Marks)

2.a) Explain the relationship amongst the cutting velocity, chip flow velocity and shear velocity as applied to orthogonal cutting?
 b) What do you understand by the term 'Tool life'? What factors influence the life of a cutting tool? [5+5]

OR

3.a) Define chip breaker? And what do you understand by Inhomogeneous Strain-chip?
 b) Define the various tool parts of a single point cutting tool. What are the standard angles of cutting tool? Describe them with neat sketches? [5+5]

4. Briefly explain about the working principle of lathe machine, operations which can be performed on lathe, specifications and classification of lathe machine? [10]

OR

5.a) Briefly discuss about the different type of taper turning methods with sketches.
 b) Discuss about tool holders of lathe machine. [5+5]

6.a) Give classification of planer machine? And explain about Double column planning machine, edge-planning machine

b) What is a twist drill? Explain the parts and function of a twist drill. What are the advantages of using it? [5+5]

OR

7.a) What is a slotter? Classify it, and explain the slotted disc mechanism with a neat sketch.

b) Classify boring machines. And Explain in detail with neat sketches horizontal type of boring machines. [5+5]

8.a) Compare up-cut and down-cut milling process with particular reference to chip formation and forces induced in component and cutter.

b) What is lapping? Write in detail any three types of lapping. [5+5]

OR

9.a) Describe the features and working of a universal milling machine with the help of a block diagram.

b) What is honing? Describe in detail about honing and honing tools. [5+5]

10.a) List out factors which influence the performance of grinding wheel. Explain them in detail.

b) Sketch and explain three methods of cylindrical grinding. [5+5]

OR

11.a) What is 'grain size' related to grinding? How it effects the performance of grinding process.

b) Discuss the selection procedure of a grinding wheel. [5+5]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
SOFTWARE 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)	What are the merits of incremental model?	[2]
b)	What are the fundamental activities of a software process?	[3]
c)	Differentiate ERD and DRD.	[2]
d)	What are non functional requirements?	[3]
e)	Define design process.	[2]
f)	List the principles of a software design.	[3]
g)	Distinguish between verification and validation.	[2]
h)	Write about drivers and stubs.	[3]
i)	Give a note on the various estimation techniques.	[2]
j)	Define maintenance. What are the types of software maintenance?	[3]

PART - B

(50 Marks)

2.a) Define the term Software. Describe its various characteristics.
b) Elaborate on the changing nature of software in detail.   [5+5]

OR

3.a) Explain software development life cycle. Discuss various activities during SDLC.
b) What are various myths about software?   [5+5]

4. Give an overview of various system models.   [10]

OR

5.a) Discuss about principal requirements engineering activities and their relationships.
b) Explain how a software requirements document is structured.   [5+5]

6.a) Distinguish between coupling and cohesion? How do they effect software design?
b) For a Case study of your choice show the architectural and component design.   [5+5]

OR

7. List and explain different kinds of architecture styles and patterns.   [10]

8. What is black box testing? What is boundary value Analysis? Explain the technique specifying rules and its usage with the help of an example. [10]

OR

9.a) Define unit testing. Explain about unit testing considerations and procedures.

b) What is equivalence class partitioning? List rules used to define valid and invalid equivalence classes. Explain the technique using examples. [5+5]

10.a) What is the purpose of Delphi method? State advantages and disadvantages of the method.

b) Explain the COCOMO model for estimation. [5+5]

OR

11. What is software configuration management? Explain various aspects of the configuration management. [10]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
ADVANCED STRUCTURAL ANALYSIS
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

1. Analyze the frame shown in figure 1 using Moment distribution method. Draw the B.M.D. [15]
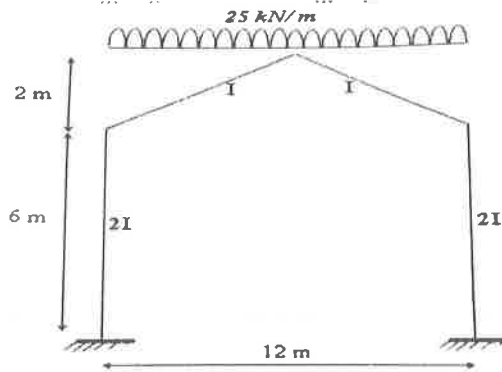
Figure 1

2. Analyze the frame shown in figure 2 using Kani's method. Draw the B.M.D. [15]
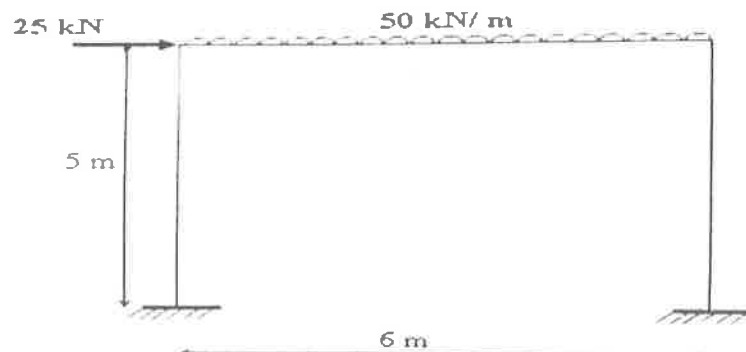
Figure:2

3.a) Write the assumptions to be considered for fully plastic moment.
 b) Determine the shape factor for the section shown in figure 3. [7+8]
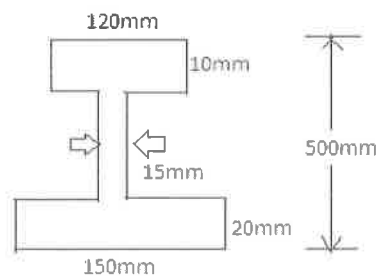
Figure 3

4. Find the collapse load for the continuous beam shown in figure 4 by taking plastic moment of resistance as of beam as M_p. [15]
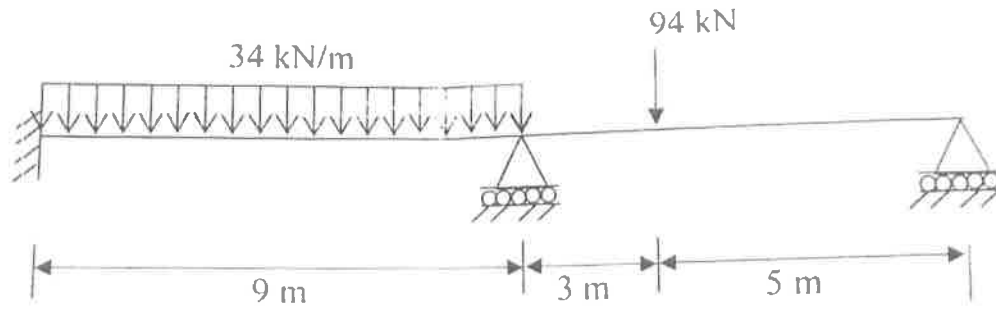
Figure 4

5. Analyze the frame shown in figure 5 by using substitute frame method. Assume any other necessary data. [15]
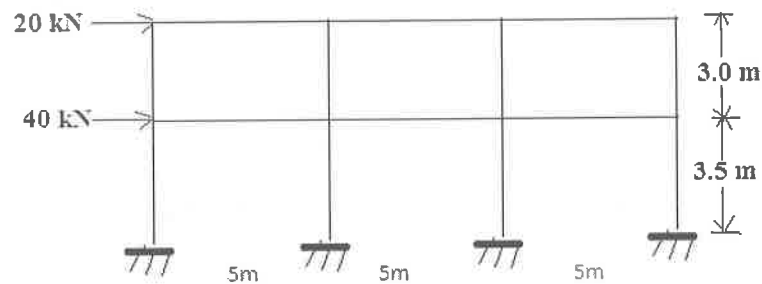

Figure 5

6. Analyze the frame shown in figure 6 by using cantilever method and draw B.M.D. Cross sectional area of central column is twice the cross sectional area of outer column. [15]
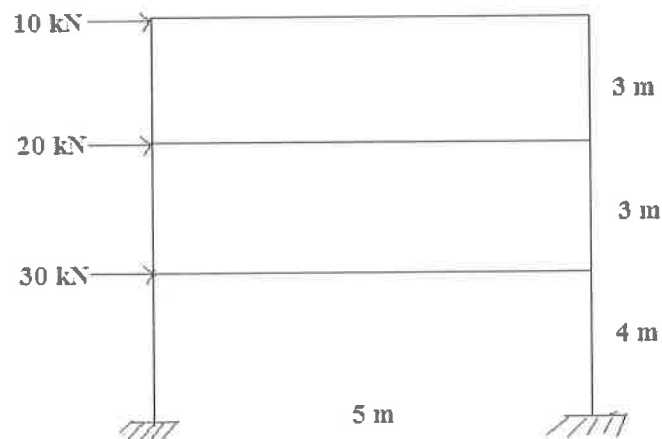

Figure 6

7.a) What is meant by shape function and write down the shape function for one dimensional element.
  b) Explain about Lagrangian serendipity elements. [8+7]

8.a) Explain clearly about Free vibration.
  b) Write about Eigen value and Eigen vector in structural dynamics. [9+6]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
CONTROL SYSTEMS
(Common to ECE, EEE, ETM)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a) How are control systems classified?
 b) Obtain the *f-v* and *f-i* analogous circuits for the mechanical system shown in figure 1. Also write down the equilibrium equations. [6+9]
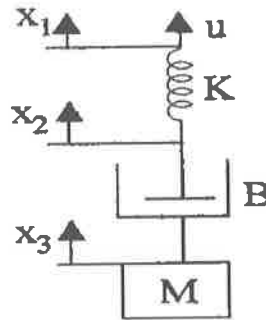

Figure 1

2.a) Obtain the transfer function of an d.c servomotor.
 b) Draw the signal flow graph for the block diagram given in figure 2 and obtain the transfer function C(s)/R(s). [6+9]
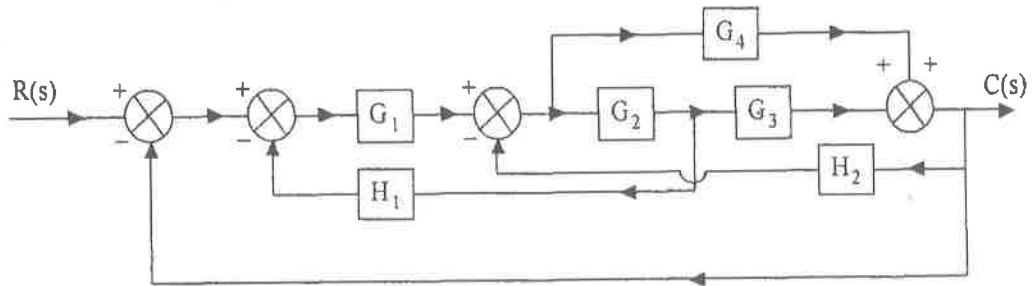

Figure 2

3.a) Explain the effect of PD and PI controllers on the system performance.
 b) A unity feedback system having an open loop transfer function.
 $G(s) = \dfrac{k(s+2)(s+3)}{s^2(s^2+8s+15)}$. Determine (i) type of a system (ii) error constants k_p, k_v, k_a and (iii) steady state error for unit step, unit ramp and unit parabolic inputs. [7+8]

4. Draw the root locus plot of the system with the following open loop transfer functions, with unity feedback. Determine the (a) Centroid (b) angles of asymptotes (c) break away/ break in points, if any (d) angles of departure/arrival, if any (e) value of K, if any, for jw-axis crossing and frequency of sustained oscillations for this value of K.

$$\frac{K}{S(S+4)(S+11)}.$$ [15]

5. Sketch the magnitude and phase Bode plots for the following transfer function. [15]

$$G(s) = \frac{20(1+s)}{s^2(0.25s+1)(0.025s+1)}$$

6.a) Explain the effect of adding poles and zeros of G(s) H(s) on the shape of the Nyquist criterion

b) State and explain Nyquist criterion. [7+8]

7. What is lead compensator? Discuss the design procedure of a lead compensation. [15]

8.a) Obtain the equation for the solution of non homogeneous state equation by Laplace transformation.

b) Define the following terms with respect to state variable approach. (i) state (ii) state variables (iii) state –space and (iv) state vector. [7+8]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
DYNAMICS OF MACHINERY
(Common to AME, ME, MCT)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

Illustrate your answers with NEAT sketches wherever necessary

1. Design a four – bar linkage to generate the function $y = e^x - x$ for values of x between $x_0 = 0$ and $x_f = 1$ (corresponding to $y_0 = 1$ and $y_f = 01.7183$) using the Chebychev spacing. [15]

2.a) What is a free body diagram? Draw and explain the free body diagrams of all the members of a four bar mechanism.

  b) An in – line slider – crank mechanism with 30 mm crank length and connecting rod length of 70 mm operates at a crank speed of 20 rpm. There is a constant 40 N force on the slider (towards the crankshaft). Plot the connecting rod position, position of slider, connecting rod force, and crankshaft torque against the crank position, when the crank angle $\varphi = 60^0$. [5+10]

3. The mass of a turbine rotor of a ship is 8 tonnes and has a radius of gyration of 0.6 m. It rotates at 1800 rpm clockwise, when looking from the stern. Determine the gyroscopic effects in the following cases :
  a) If the ship travelling at 100 kmph steers to the left in a curve of 75 m radius.
  b) If the ship is pitching and the bow is descending with maximum velocity. The pitching is simple harmonic, the periodic time being 20 s, and the total angular movement between the extreme positions is 10^0.
  c) If the ship is rolling, and at a certain instant, has an angular velocity of 0.03 rad/s clockwise when looking from the stern. [15]

4.a) What are the different types of friction clutches? Describe with a neat sketch the working of a cone clutch.

  b) In a single block brake, the drum diameter is 300 mm, the angle of contact is 90^0, and the coefficient of friction between the lining and the drum is 0.30. If the operating force is 400 N, applied at the end of a lever 400 mm long, determine the torque transmitted by the brake. The distance of the fulcrum from the center of the brake drum is 200 mm, and assume that the force of friction passes through the fulcrum. [7+8]

5. The equation of turning moment curve of a three crank engine is $(5000 + 1500 \sin 3\theta)$ N – m where θ is the crank angle in radians. The M.I. of the flywheel is 9.81 kN – m^2, and the mean speed is 300 rpm. Determine the:
  a) Power of the engine,
  b) The maximum % fluctuation of speed of the flywheel, when the
  i) Resisting torque is constant, and
  ii) Resisting torque is $(5000 + 600 \sin \theta)$ N – m. [15]

6.a) Show that the sensitiveness for a Watt governor and a Porter governor, having all arms equal in length and intersecting on axis, is the same.

b) In a Porter governor, the upper and lower arms are respectively 200 mm and 250 mm long, and are pivoted on the axis of rotation. The mass of central load is 15 kg, the mass of each ball is 2 kg, and the friction of sleeve is equivalent to a load of 24 N at the sleeve. If the limiting inclinations of the upper arms to the vertical are 30^0 and 40^0, find, taking friction into account, the range of speed of the governor.   [5+10]

7.a) For a reciprocating engine, prove that for one revolution of the crank, the maximum value of primary force occurs two times where as the maximum value of secondary force occurs four times.

b) Four masses A, B, C, and D are carried by a rotating shaft at radii of 100, 25, 200, and 150 mm respectively. The planes in which the masses revolve are spaced 600 mm apart, and the masses of B, C, and D are 10, 5, and 4 kg respectively. Find the required mass of A and the relative angular setting of the four masses so that the shaft shall be in complete balance.   [7+8]

8. A machine of 100 kg mass is supported on a spring of stiffness 700 kN/m, and has an unbalanced rotating element which results in a disturbing force of 350 N at a speed of 3000 rpm. Assuming a damping factor of 0.2, determine its amplitude of motion due to unbalance, the transmissibility, and the transmitted force.   [15]

---ooOoo---