Code No: 117EA

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**INSTRUMENTATION AND CONTROL SYSTEMS**
**(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) | What is the role of manipulation elements of measuring elements. | [2] |
| b) | Give the classification of errors found in measures instruments. | [3] |
| c) | Give the classification of measurement of pressure. | [2] |
| d) | Explain the working principle of manometers | [3] |
| e) | Explain the Working principle of Seismic instruments. | [2] |
| f) | Explain the principle of operation of hot wire anemometer. | [3] |
| g) | Explain the functions of strain gauge rosettes. | [2] |
| h) | Explain the measurement of power using elastic force meters. | [3] |
| i) | What are the requirements of a control system? | [2] |
| j) | What are the basic elements of a control system? Explain | [3] |

**Part-B (50 Marks)**

2.a) Classify measuring instruments.
b) What are desired, modifying and interfering inputs for a measurement system? Give examples each of these quantities. [5+5]

**OR**

3.a) What are the different sources of errors in measurements and measuring instruments? Explain them in brief.
b) Describe the terms Linearity, Repeatability and calibration. [5+5]

4. Write a short note measurement of pressure by the following gauges
a) Thermal conductivity gauges
b) Mcleod pressure gauge. [5+5]

**OR**

5.a) Compare and contrast the advantages and limitations of resistance thermometers and thermistors.
b) Describe the construction and working of Ionization pressure gauges for measurement of pressure. [5+5]

6.a) Describe the construction of bubbler level indicator.
b) Explain the working principle of ultrasonic flow meter. [5+5]

**OR**

7.a) Discuss in detail about electrical tachometers.

b) What are the mechanical methods to measure the vibrations explain with neat sketches. [5+5]

8.a) What is the temperature compensation with respect to strain gauges?

b) List the essential characteristics required for the backing material of a bonded strain gauge. [5+5]

**OR**

9.a) Explain with neat sketch the principle of sling psychrometer.

b) Discuss in detail with neat sketch the working principle of torsion meters. [5+5]

10.a) Explain the advantages of open loop control system.

b) Discuss about speed control systems. [5+5]

**OR**

11.a) What is a servomechanism? Describe the feature of servomechanism.

b) What is a block diagram? Explain the steps involved in the preparation of block diagrams. [5+5]

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Code No: 117BN

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**CLOUD COMPUTING**
**(Computer Science and Engineering)**

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

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

**Part- A (25 Marks)**

| | | |
|---|---|---|
| 1.a) | What is parallel computing? | [2] |
| b) | Explain the need of virtual machine? | [3] |
| c) | What is Virtualization? | [2] |
| d) | Explain the features of cloud computing? | [3] |
| e) | What is cloud infrastructure? | [2] |
| f) | Explain Leasing model? | [3] |
| g) | What is the need for Cloud Mashups? | [2] |
| h) | What are the Key Components of a Service-Level Agreement? | [3] |
| i) | What is organizational readiness? | [2] |
| j) | What is production readiness? | [3] |

**Part-B (50 Marks)**

| | | |
|---|---|---|
| 2. | Explain the Distributed System Models. | [10] |
| | **OR** | |
| 3.a) | Explain virtualization of clusters. | |
| b) | Describe the data model for virtual machine. | [5+5] |
| 4.a) | Give an overview of interprise cloud computing paradigm. | |
| b) | Explain the seven-step model of migration into a cloud. | [5+5] |
| | **OR** | |
| 5.a) | Explain the cloud integration methodologies. | |
| b) | Describe the cloud supply chain(C-SC). | [5+5] |
| 6.a) | Explain the Virtual Machine(VM) provisioning process. | |
| b) | Describe the life cycle of a VM within OpenNebula. | [5+5] |
| | **OR** | |
| 7.a) | Explain the Amazon Elastic Compute Cloud (EC2). | |
| b) | Explain features of Cluster as a Service (CaaS). | [5+5] |

8.a) Describe the model for federated cloud computing.
b) Discuss the performance-related issues of HPC in the Cloud. [5+5]

**OR**

9.a) Explain the Business Benefits of Cloud Computing.
b) Explain the cloud best practices. [5+5]

10.a) Explain the Organizational Readiness Self-Assessment.
b) Describe the Lewin's Change Management Model. [5+5]

**OR**

11.a) Distinguish Cloud Computing from Outsourcing and Provision of Application Services.
b) Explain the Cloud service lifecycle. [5+5]

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Code No: 117FM **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**MOBILE APPLICATION DEVELOPMENT**
**(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) | What is J2ME configuration? | [2] |
| b) | What is smart card? Write its applications. | [3] |
| c) | List out the methods called each time when Midlet is invoked | [2] |
| d) | How do you reduce network transmission in mobile application | [3] |
| e) | What is the purpose of shownotify () and hidenotify() methods. | [2] |
| f). | Write the use of Gauge class. | [3] |
| g) | What is record store? | [2] |
| h) | What is prepared statement and write its syntax | [3] |
| i) | Write the header fields of Http Connection. | [2] |
| j) | Write about cookies. | [3] |

**Part-B (50 Marks)**

| | | |
|---|---|---|
| 2.a) | Explain about radio data networks in detail. | |
| b) | Write the differences between J2ME application and standard java application. | [5+5] |
| | **OR** | |
| 3.a) | Write the key features of J2ME application. | |
| b) | Explain how J2ME is related with wireless technology. | [5+5] |
| 4. | Write the best practices used to build J2ME application and explain neatly. | [10] |
| | **OR** | |
| 5.a) | Explain, how security is provided in midelt suite. | |
| b) | Write the life cycle of midlet. | [5+5] |
| 6.a) | Explain Ticker class in detail. | |
| b) | Write a J2ME application to implement slide show of pictures. | [5+5] |
| | **OR** | |
| 7.a) | Write a J2ME program to display an image on canvas. | |
| b) | Describe alert class in detail. | [5+5] |
| 8.a) | Explain the procedure of sorting of records of record store. | |
| b) | Write a program to sort the records on record store. | [5+5] |
| | **OR** | |

9.a) What is save point? How do you create save point in transaction?
b) Write a program to update a row in result set. [5+5]

10.a) Write the steps to transmit a background process.
b) Explain why do you make a process as background process. [5+5]

**OR**

11.a) Demonstrate the steps to retrieve the information from web server using Midlet.
b) Write a program to read data from socket connection. [5+5]

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Code No: 117JN **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**WATER RESOURCES ENGINEERING-II**
**(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 a mass inflow curve of a reservoir and how it is prepared? [2]
b) Classify the reservoirs on the basis of their purpose. [3]
c) What are the forces acting on a gravity dam? [2]
d) Explain the functions of drainage gallery. [3]
e) What is rock toe in an earth dam? [2]
f) Enumerate priming devices for siphon spillways. [3]
g) What is the importance of fish ladder in a diversion work? [2]
h) Write a note on silt ejectors. [3]
i) How energy is dissipated in Sarda type fall? [2]
j) What is level crossing? [3]

## PART-B

**(50 Marks)**

2.a) Describe the factors that govern the selection of site for a reservoir.
b) Explain in detail how the life of a reservoir is determined. [5+5]

**OR**

3.a) Describe various types of dams.
b) What are the factors to be considered in the selection of a site for the dam? [5+5]

4. Design the practical profile of a gravity dam of stone masonry given the following data: RL of base of dam = 198 m; RL of HFL of reservoir = 228 m; Specific gravity of masonry = 2.4; Safe compressive stress in masonry = 1200 $kN/m^2$; Assume weight of masonry to be 20$kN/m^3$. Neglect earthquake pressures, wave pressure and silt pressure. Consider full uplift as per USBR recommendations. Determine the stability of the dam. [10]

**OR**

5.a) What is a gravity dam and what are the forces acting on a gravity dam?
b) What are the modes of failures of a gravity dam? [5+5]

6.a) What are the causes of failures of earthen dams?
b) Describe the procedure to draw the seepage line of a homogeneous earth dam with a horizontal filter at toe. [5+5]

**OR**

7.a) Describe various types of siphon spillways.

b) Explain the design principles of ogee spillway. [5+5]

8.a) Describe in brief various types of weirs. Distinguish clearly between weir and barrage.

b) Briefly explain Khosla's theory and discuss the procedure to determine apron length. [5+5]

**OR**

9.a) Explain the function of upstream and downstream piles and inverted floor at the downstream end of impervious floor.

b) A weir has a horizontal impervious floor of length of 40 m with a full reservoir depth of 5 m. The downstream water level may be assumed at floor level. Determine depths of upstream and downstream piles using Bligh's theory with a safe gradient of 1 in 15. Calculate the thickness of impervious floor just adjacent to the weir on downstream side, which is at a distance of 20 m from downstream end of the impervious floor. [5+5]

10.a) Draw a neat sketch of straight glacis fall and explain briefly its components.

b) Data refer to a fall site: full supply discharge 6.5 cumecs, bed width u.s/d.s = 5.6 m, full supply level u.s/d.s = 20.00/19.10 m. Full supply depth u.s./d.s. = 1.20/1.20 m. Design cistern of Sarda type of fall for these conditions. Assume Bligh's seepage gradient as 1 in 7. How the energy is dissipated in this type of fall? [5+5]

**OR**

11.a) Define proportionality of an outlet. Distinguish between a hyper-proportional outlet and a sub-proportional outlet.

b) What is meant by semi-modular outlet? Explain how APM outlet is working as semi-module outlet? [5+5]

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Code No: 57025 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**INSTRUMENTATION AND CONTROL SYSTEMS**
**(Common to ME, AME)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) Explain the generalized measurement system.
b) What are the various methods of measurements? Explain them with examples. [7+8]

2.a) What is calibration? How is it indicated?
b) What are the requirements of transducers? Classify mechanical transducers. [7+8]

3.a) Explain the measurement of positive and negative pressure using various types of manometers.
b) Explain the working principle of pressure measurement using bellows with a neat sketch. [7+8]

4.a) Explain the importance of Reynolds number in measurement of flow.
b) Explain the working principles of various floats with neat sketches. [8+7]

5.a) Explain the working principle of a piezoelectric accelerometer with a schematic diagram.
b) Explain the working principle of seismic velocity pickup with the help of neat sketch. [8+7]

6.a) Explain the factors influencing the selection and installation of strain gauges.
b) Define gauge factor. How to determine bonding stresses in a beam using strain gauge method. [8+7]

7.a) Classify the instruments used to measure moisture and humidity in gases. Explain the operating principle of any one.
b) Explain the working principle of centrifugal force tachometer with a neat sketch. [7+8]

8.a) What is servomechanism? Explain the speed control system with a neat diagram.
b) What is a transfer function? Derive the transfer function of an open loop control system. [7+8]

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Code No: 57007 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**ESTIMATING AND COSTING**

**(Civil Engineering)**

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

**Answer any Five Questions**

**All Questions Carry Equal Marks**

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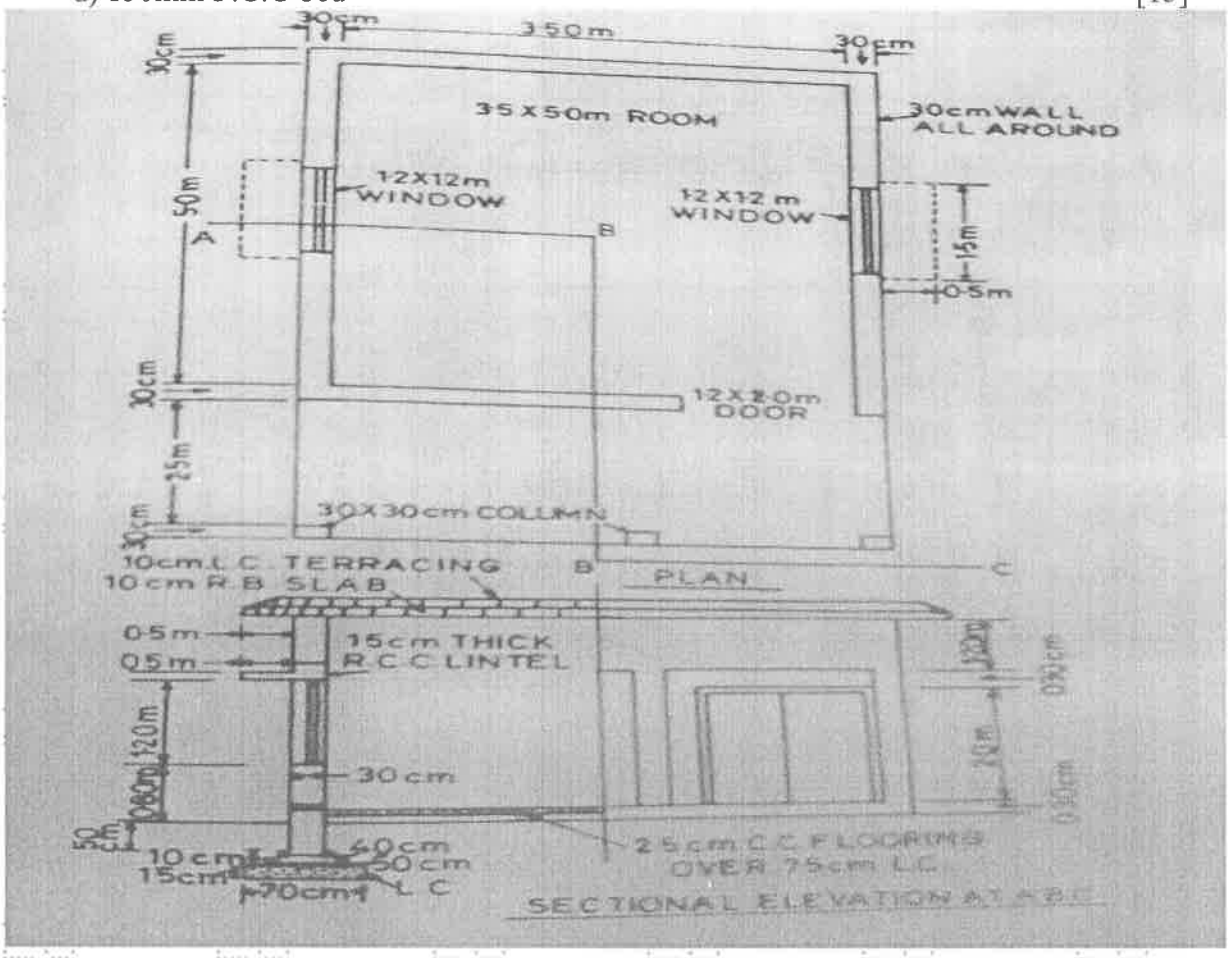
1.a) Prepare an approximate estimate for the proposed construction of a government building with the following data.
Plinth area-100 $m^2$, cost of construction-Rs 900/-per $m^2$
Formation of roads & lawns-1%
Fluctuation of rates- 4%
Unforeseen items – 2%
Contingencies-3%

b) Briefly explain the principles of working out quantities for detailed estimate. [9+6]

2. Estimate the following items of building plan shown in figure. Prepare detailed estimation by 'Center-Line' method .
a) Earthwork Excavation in Foundation
b) First class Brickwork in super structure
c) 2.5cm damp proof course
d) 150mm P.C.C bed [15]



3. Prepare an estimate for the portion of a road from chainage 14 to 20 from the data given below. Draw also the longitudinal and typical cross sections for cutting and banking. The rate of earth work in cutting is Rs 9 per Cum and embankment is Rs 8 per Cum. The formation width of proposed road is 10m, side slope in cutting is 1.5:1 and 2:1 in banking. R.L of formation is 108.75. [15]

| Chainage in meters (30m) | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|
| Ground level in (m) | 108.6 | 109.25 | 109.4 | 108.85 | 108.5 | 107.25 | 106.8 |

4. Prepare a data sheet and calculate the cost of materials for 1 Cum of plain cement concrete for foundation. Mix proportion is 1:4:8. Assume any necessary data. [15]

5. Estimate a two way slab 5m × 4.0 m clear span has the following details of reinforcement and data.
   a) Thickness of slab =130mm
   b) bearing over 20cm thick walls=150mm
   c) main reinforcemnt
      i) Middle strip along long and short span =10mm @ 115 mm c/c. Alternately bent at 800mm from support.
      ii) Edge strip along long span = 10mm @ 230mm c/c
   d) corner mesh both at top and bottom= 10 mm @ 90mm c/c.
   Assume any necessary data. [15]

6.a) List out various contract documents and explain about any two documents.
   b) Write about various conditions of contracts. [7+8]

7. Prepare rates analysis for the given works.
   a) R.C.C work in slabs
   b) First class brickwork in super structure with 1:6 cement mortar.
   c) 2.5 cm thick concrete floor (1:2:4)
   d) Plastering with 1:3 cement mortar.
   Assume any necessary data. [15]

8.a) What is specification and necessity of specification?
   b) Write down the detailed specifications for the given works.
   i) R.C.C Work ii) First class brick work. [5+10]

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Code No: 57015 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**POWER SYSTEM OPERATION AND CONTROL**
**(Electrical and Electronics Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

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1.a) Explain about heat rate, cost and incremental cost curves of a thermal power station.
b) A constant load of 300MW is supplied by two 200 MW generators, with the incremental fuel costs are $\frac{dC_1}{dP_{G1}} = 0.1P_{G1} + 20 \quad Rs/Mwh.$ $\frac{dC_2}{dP_{G2}} = 0.12P_{G2} + 15\ Rs/Mwh.$ with $P_G$ in MW and costs C in Rs/h. Determine the most economical division of load between the generators. [7+8]

2.a) Derive the necessary conditions for optimal load scheduling with network losses considered.
b) Briefly explain the interactive steps involved in solving the coordination equations.[7+8]

3. Explain in detail about short term hydro-thermal scheduling problem and its solution technique. [15]

4.a) Briefly explain about automatic generation control and its necessity?
b) Derive the approximate linear models for governor, turbine and generator local systems. Draw their respective block diagrams. [7+8]

5.a) What is a control area? Draw the block diagram of an isolate single area load frequency control system.
b) Obtain the steady state and dynamic response of single area LFC system (uncontrolled). [8+7]

6. Prove that the steady state derivation in system frequency for a step change in load demand is smaller in case of two area load frequency controlled system as compared to that of single area load frequency controlled systems. [15]

7.a) Briefly explain about the relation between load frequency control and economic dispatch control problem.
b) Give the necessity of proportional plus integral control of single area load frequency control systems. Mention the designed featured of the feedback control loop and compare its steady state and dynamic response with that of uncontrolled case. [7+8]

8.a) Briefly give an overview of reactive power control in power systems.
b) Distinguish between line and load compensation.
c) Write short notes on shunt compensation. [15]

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R09

Code No: 57070

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**OPTOELECTRONICS AND LASER INSTRUMENTATION**

**(Electronics and Instrumentation Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) Explain the principle of operation of Avalanche photo diode.
b) What is the significance of Numerical aperture and derive the expression for it in step index fiber? [7+8]

2. Describe the working of the following lasers
a) Ruby laser.
b) Nd-YAG laser [7+8]

3.a) Explain in detail about the Quadrant photo diode.
b) Briefly explain about Dye laser and Excimer laser. [7+8]

4.a) Explain the Instrumental development of simple pulsed telemeter.
b) Explain about accuracy of pulsed telemeter. [7+8]

5.a) Explain the operation of Basic Laser interferometer.
b) Discuss the Principle of operation of Laser Vibrometer. [7+8]

6.a) Describe the principle of laser Doppler velocity meter with neat sketches.
b) Explain the following with respect to Gyroscopes
i) Sagnac effect ii) Relativity [7+8]

7.a) Write about multiplexed and distributed optical fiber sensors.
b) Explain the principal of operation of Optical Strain gauge. [6+9]

8. Explain in detail the following medical applications of lasers
a) Plastic surgery
b) Removal of tumors of vocal cords. [7+8]

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Code No: 117DV

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**INDUSTRIAL MANAGEMENT**
**(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) What are the functions of management? [2]
b) Asses the contribution of scientific management to the development of management thought? [3]
c) What is departmentation? How it is essential for the management of a business enterprise? [2]
d) How will you determine if an organization does or does not have a good product development process in place? [3]
e) What are the factors which determine the appropriate span of management? [2]
f) Compare the urban and rural site plant layout. [3]
g) Discuss the fundamental factors affecting quality. [2]
h) What are the steps involved in work study? [3]
i) What do you mean by performance appraisal? Discuss its need and importance in an organization? [2]
j) What do you mean by PERT and CPM? What are their uses in managerial planning and control? [3]

**Part-B (50 Marks)**

2.a) Explain briefly the Fayol's principles of management and Mayo's Hawthorne Experiments.
b) Differentiate between Japanese and American management with suitable examples.[5+5]

**OR**

3.a) Briefly explain about the different types of organization structures.
b) Bring out the significance of the statement, effective management is always contingency or situational management. How does systems approach of management differ from contingency approach? [5+5]

4.a) What do you mean by matrix organization? How does it differ from project organization? Discuss the situations under which matrix organization can be used fruitfully.
b) How does line and staff organization structure differ from pure line organization structure? What are the benefits and limitations of line and staff organization structure? [5+5]

**OR**

5.a) Describe various bases for departmentation and suggest a scheme of departmentation for a large marketing company with a field network all over the country.

b) Differentiate the inverted pyramid structure, beam and flat organization structure.[5+5]

6.a) Discuss the main objective which a factory planning engineer should attempt to achieve when designing a plant layout. Explain what is meant by a travel chart and show how such a chart can be of use in determining the best relative location of departments in a factory?

b) Explain briefly travel chart? What type of layout do you think might be appropriate for the manufacture of the V- belt pulley, discuss. [5+5]

**OR**

7. What is value analysis? Explain in detail. [10]

8.a) i) A department store manager wishes to make a work sampling study to estimate the percentage time that the clerks are busy waiting for customers and percent time that they are idle. The current best guess is that clerks are idle 25 percent of the time. Determine the number of observation required if we wish to be 95 percent confident that the results is with in ± 1.5 percent, given number of observations at 20% is 2995 and at 30% it is 3750 for the same precision. (ii) Compare stop watch study and work sampling in terms of cost to make studies, representatives of samples taken and comparative accuracy.

b) Suppose an organization utilizes a variable based measurement system for process control. During a period, it was found that while all the plotted observations with in the control limits in the X bar chart, on point was lying outside the control limits in the R chart. What should the organization do in this case? [5+5]

**OR**

9.a) i) Draw a simo chart for in setting a letter in a envelope and sealing it.
ii) What do you understand by a flow process chart explain.

b) A manufacturer of garments wants to set up a quality control system using control charts for process control. The manufacturer has the three options to choose from:
i) Measure the critical dimensions of the garment for establishing its quality.
ii) Segregate every batch of production into good quality and seconds quality.
iii) Estimate the number of defects for bale of cloth issued for production
The manufacturer is not sure about what it means to choose which of the above. Prepare a report explaining the pros and cons of each of the choices, the nature of efforts required to setup control charts and implications of their use. [5+5]

10.a) What are the benefits of job evaluation and its limitations?

b) Consider the following data of a project.

| | | Duration (weeks) | | |
|---|---|---|---|---|
| Activity | Predecessor(s) | A | m | b |
| A | - | 1 | 2 | 3 |
| B | - | 2 | 2 | 8 |
| C | A | 6 | 7 | 8 |
| D | B | 1 | 2 | 3 |
| E | A | 1 | 4 | 7 |
| F | C,D | 1 | 5 | 9 |
| G | C,D,E | 1 | 2 | 3 |
| H | F | 1 | 2 | 9 |

i) Construct the project network.

ii) Find the expected duration and variance of each activity.

iii) Find the critical path and the expected project completion time. [10]

**OR**

11.a) Projects involve direct as well indirect costs and project managers need to use this information in project management. Comment on this statement.

b) A firm is considering the launch of a new product in the national market. The project consists of the ten major activities. The precedence relationship and the estimated duration of each of the activity is given in the table below.

| Activity | Predecessor | Duration (weeks) |
|---|---|---|
| A | - | 8 |
| B | - | 3 |
| C | A | 6 |
| D | B | 4 |
| E | B | 5 |
| F | A | 4 |
| G | B | 6 |
| H | C, D, E | 6 |
| I | F, G, H | 6 |

i) Draw a network of the above project.

ii) What is the total duration of the project?

iii) Identify the critical path? Do you have any specific observation to make?

iv) Suppose the duration of the activity 'f' was wrongly estimated and the revised estimate is 10 weeks. What is the implication of this change? [10]

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Code No: 117AB **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**ADVANCED FOUNDATION ENGINEERING**
**(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) | Define net ultimate bearing capacity of soil. | [2] |
| b) | Give the various types of shallow foundations | [3] |
| c) | What is negative skin friction in piles? | [2] |
| d) | Explain about under reamed piles. | [3] |
| e) | Define the coefficient of earth pressure at rest. | [2] |
| f) | What is Rankine's active state of soil. | [3] |
| g) | Differentiate between shallow cut and deep cut. | [2] |
| h) | What is a cantilever sheet pile? | [3] |
| i) | What are expansive soils? | [2] |
| j) | Explain the mechanism of swelling. | [3] |

**Part-B (50 Marks)**

2.a) A concrete footing of 1m × 2m size is resting at a depth of 1m in a soil $E=10^4$ kN/m$^2$, $\mu=0.3$. Estimate the immediate settlement if the footing is subjected to a pressure of 200kN/m$^2$. Assume footing to be rigid.

b) A square footing 2.5m size is founded at a depth of 1.5m in a sandy deposit which has the corrected N value of 30. The water table is at a depth of 2m from the ground surface. Find the net allowable soil pressure if i) the desired factor of safety is 3.0 and ii) the permissible settlement is 40mm. Use Teng's equation. [5+5]

**OR**

3. A strip footing is 2m wide and at a depth of 2m in a soil of 19 kN/m$^3$ and a cohesion of 10 kN/m$^2$. Determine the increase in bearing capacity when $\phi$ is increased from $20^0$ to $25^0$. Use Terzaghi's theory. Assume local shear failure. [10]

4. Design a friction pile group to carry a load of 3500 kN including the weight of pile cap, at a site where the soil is uniform clay to a depth of 10 m underlain by rock. The average compressive strength of clay is 50 kN/m$^2$. The clay may be assumed to be of normal sensitivity and normally loaded with a liquid limit of 70%. Adopt a factor of safety 2.5 against shear failure. [10]

**OR**

5.a) Describe various types of pile foundations.

b) Discuss different methods for the installation of piles. How would you estimate the load carrying capacity of a pile in cohesionless soils? [5+5]

6. A retaining wall is 7 m high, with its back face smooth and vertical. It retains sand with its surface horizontal. Using Rankine's theory, determine active earth pressure at the base when the backfill is a) dry, b) saturated and c) submerged, with water table at 2 m below the surface. Take $\gamma_t$=18 kN/m$^3$ , $\gamma_{sat}$=21 kN/m$^3$ and $\phi=30^0$. [10]

**OR**

7. Consider a 5m high frictionless retaining wall with a vertical back and inclined backfill. The inclination of the backfill with the horizontal, $\alpha=10^0$. For the backfill, given $\gamma$=18 kN/m$^3$, c′=5 kN/m$^2$, $\phi'=25^0$. Determine Rankine's active force per unit length of the wall after the occurrence of the tensile crack. [10]

8. An excavation 8m deep is to be made in cohesionless soil $\gamma$=19kN/m$^3$ and $\phi=30^0$. The sides of the excavation are supported by anchored sheet piles with fixed end support. Determine the minimum depth of embedment for equilibrium. The anchors are at a depth of 1.5m below the surface. [10]

**OR**

9.a) What is meant by braced excavations? Explain about deep cuts in sand.

b) A cut 3m wide, 605m deep is proposed in a cohesionless deposit($\phi'=36^0$) Assuming the first row of struts to be located at 0.5m below ground surface and spacing between the struts as 1.5m. Calculate the maximum strut load. Assume the horizontal spacing of struts as 3m, $\gamma$=20kN/m$^3$ and $\delta=15^0$. [5+5]

10. Describe the various stabilization methods of expansive soils with suitable examples. [10]

**OR**

11.a) Discuss the problems in expansive soils with suitable examples.

b) Explain about under reamed pile foundations for expansive soils. [5+5]

---ooOoo---

Code No: 117CG

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**DIGITAL CONTROL SYSTEMS**
**(Common to EEE, EIE)**

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

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

**Part- A (25 Marks)**

1.a) What is a pulse transfer function? [2]
b) Discuss in brief the mapping between s-plane and z-plane. [3]
c) Write down the properties of state transition matrix. [2]
d) State the conditions for the system to be state controllable and observable. [3]
e) What is bilinear transformation? [2]
f) What are the advantages of dead beat control? [3]
g) What are lag – lead compensators. [2]
h) What are primary strips? [3]
i) What are the necessary and sufficient conditions for designing a state feedback controller through pole placement? [2]
j) Write the Ackermann's formula. [3]

**Part-B (50 Marks)**

2.a) Given the Z-transforms

$$X(z) = \frac{z^{-1}}{(1 - z^{-1})(1 + 1.3z^{-1} + 0.4z^{-2})}$$

Determine the initial and final values of x ( k ). Also find x (k ), in a closed form.
b) State and explain the sampling theorem. [5+5]

**OR**

3.a) State the limitations of Z- Transforms.
b) Obtain the z-transform of
i) $f(t) = t^2$ ii) $f(t) = e^{-at}\sin wt$ [5+5]

4.a) Explain the concept of controllability and observability of discrete time control system.
b) Derive necessary conditions to be satisfied for system to be controllable. [5+5]

**OR**

5.a) The pulse transfer function of digital control system is given by

$$G(z) = \frac{5z}{z^2 + 2z + 2}$$

Obtain a state space representation for the system.
b) Obtain the state transition matrix for the above system. [5+5]

6.a) Using Jury's stability criterion find the range of K, for which the characteristic equation: $Z^3 + Kz^2 + 1.5\,Kz - (K+1) = 0$ is closed loop stable.

b) Write short notes on complementary strips. [6+4]

**OR**

7.a) Explain in brief the Routh Stability Criterion.

b) Explain the stability analysis of the closed loop system. [5+5]

8.a) Explain the design procedure of digital PID controllers.

b) Explain assumption considered to design digital controllers through deadbeat response method. [5+5]

**OR**

9. Consider the single input digital control system

$$X(k) = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X(k) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(k)$$

Determine the state feedback matrix K such that the state feedback $\mu(k) = -K X(k)$, places the closed loop system poles at $0.3 \pm j0.3$. [10]

10.a) Draw the block diagram for digital system with a reduced order observer.

b) Explain how reduced order observation is different from minimum order observation. [5+5]

**OR**

11. State the salient steps involved in the design of state feedback controller through pole placement with a suitable example. [10]

---ooOoo---

**R13**

Code No: 117CJ

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**DIGITAL IMAGE PROCESSING**
**(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 image resolution. | [2] |
| b) | What are the steps involved in DIP? | [3] |
| c) | Specify the objective of image enhancement techniques. | [2] |
| d) | Differentiate between linear spatial filter and non-linear spatial filter. | [3] |
| e) | What is meant by image restoration? | [2] |
| f) | What is inverse filtering? | [3] |
| g) | Define region growing. | [2] |
| h) | What are the three types of discontinuity in digital image? | [3] |
| i) | Define huffman coding. | [2] |
| j) | What are different compression methods? | [3] |

**Part-B (50 Marks)**

2.a) What is meant by digital image processing? What are the applications of it? How an image is represented digitally?
b) Non uniform sampling is useful for what type of images. Give reasons. [5+5]

**OR**

3.a) Is fast algorithm applicable for computation of Hadamard transform, if so what are the problems encountered in implementation.
b) Explain Discrete Cosine Transform and specify its properties. [5+5]

4.a) What is a histogram of an image? Sketch histograms of basic image types.
b) Discuss how histogram is useful for image enhancement. [5+5]

**OR**

5. What are the techniques used for image smoothing? Explain any one spatial and one frequency techniques used for image smoothing. [10]

6. Describe constrained least square filtering technique for image restoration and derive its transfer function. [10]

**OR**

7. Describe with mathematical model, both constrained and unconstrained restoration. [10]

8.a) Explain the segmentation techniques that are based on finding the regions.
b) Write the applications of segmentation. [7+3]

**OR**

9.a) Explain any two methods for linking the edge pixels to form a boundary of an object.
b) Explain with examples morphological operations dilation and erosion. [7+3]

10.a) Explain the schematics of image compression standard JPEG.
b) Draw and explain a general compression system model. [5+5]

**OR**

11.a) Describe in detail the lossless predictive coding error free compression.
b) Explain briefly the transform based compression. [5+5]

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Code No: 117DT **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**HUMAN COMPUTER INTERACTION**

**(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) | Write about GUI interface. | [2] |
| b) | Write a short note on Indirect Manipulation. | [3] |
| c) | Write short notes on web pages. | [2] |
| d) | What are the screen design goals? | [3] |
| e) | Write short notes on window management. | [2] |
| f) | Give guidelines for presenting error messages on web. | [3] |
| g) | Write the difference between java script and HTML. | [2] |
| h) | Write short notes on CASE tools for interface design. | [3] |
| i) | Discuss about head-up display projects. | [2] |
| j) | What is speech digitization? | [3] |

**Part-B (50 Marks)**

2. Write short notes on:
a) Popularity of graphics b) Interface popularity. [5+5]

**OR**

3. What are the benefits of a good design? What is the importance of good design? [10]

4. With respect to screen design write notes on
a) Screen elements and organization b) Screen navigation. [5+5]

**OR**

5.a) What is the purpose of a screen?
b) Discuss about display /read only screens. [5+5]

6.a) Explain different types of messages.
b) Give the message box guidelines. [5+5]

**OR**

7. Write about:
a) Window components. b) Window operations. [5+5]

8. Explain in detail about specification methods. [10]

**OR**

9. Explain briefly about the features of user interface building tools. [10]

10. Write about:
a) Digital photography and scanners b) Digital video. [5+5]

**OR**

11. What are the indirect-control pointing devices? Compare pointing devices. [10]

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Code No: 117EV

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**MECHATRONICS**

**(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) | Write the applications of liquid flow sensors. | [2] |
| b) | Write the advantages of mechatronics system. | [3] |
| c) | Draw the diagram of FET? | [2] |
| d) | Write about solid state electronic devices. | [3] |
| e) | Write about advantages of hydraulic actuating systems. | [2] |
| f) | Write about control valves. | [3] |
| g) | Write about applications of Digital electronics and systems. | [2] |
| h) | Explain about the PLC Registers in brief. | [3] |
| i) | Write about the importance of system and interfacing. | [2] |
| j) | Explain about DAQS. | [3] |

**Part-B (50 Marks)**

| | | |
|---|---|---|
| 2. | Explain about control systems and microprocessor-based controllers. | [10] |
| | **OR** | |
| 3. | Explain about proximity, velocity and motion sensors. | [10] |
| 4. | Explain about DIA and TRIAC in detail. | [10] |
| | **OR** | |
| 5. | Explain about the types of amplifiers with neat circuit diagrams. | [10] |
| 6. | Explain about electro-pneumatic system with neat diagram. | [10] |
| | **OR** | |
| 7. | Explain about the electro-hydraulic servo system with neat diagram. | [10] |
| 8. | Explain about micro controllers with neat diagram. | [10] |
| | **OR** | |
| 9. | Write about PLCs versus computers, and application of PLCs for control. | [10] |
| 10. | Explain about D to A converters. | [10] |
| | **OR** | |
| 11. | Explain about design of mechatronics systems and future trends. | [10] |

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Code No: 117EZ

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**METROLOGY AND SURFACE ENGINEERING**

**(Automobile 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) The slip gauge set M 38 consists of the following.

| Range ( mm) | Steps( mm) | Pieces |
|---|---|---|
| 1.005 | -- | 1 |
| 1.01 – 1.09 | 0.01 | 9 |
| 1.1 – 1.9 | 0.1 | 9 |
| 1.0 – 9.0 | 1.0 | 9 |
| 10.0 – 100.0 | 10.0 | 10 |

Choose the suitable slips to give the following dimensions
(i) 29.875mm (ii) 15.09mm [2]

b) In an assembly of two parts of 50 mm nominal diameter the lower deviation of the hole is zero and upper deviation is 5 microns. While that of the shaft is - 8 and - 4 microns respectively. Estimate the allowance and type of fit. [3]

c) What are the required characteristics of gauges? [2]

d) Discuss the applications of optical projection for precision measurement. [3]

e) The heights of peak and valleys of 20 Successive points on a surface are 35, 25, 40, 22, 37, 19, 41, 21, 42, 18, 42, 24, 44, 25, 40, 18, 40, 18, 39, 21 microns respectively, measured over a length of 20mm. Determine CLA and RMS values of roughness surface? [2]

f) Explain the working principle of pneumatic comparator. [3]

g) What are the uses of alignment tests? [2]

h) What are the essential requirements for performing alignment tests? [3]

i) What do you mean by surface integrity? [2]

j) What are the applications of diamond coating? [3]

**Part-B (50 Marks)**

2.a) Do you think interchangeability reduces number of rejects? Justify your answer.

b) Differentiate between hole basis system and shaft basis system. [5+5]

**OR**

3.a) Explain clearly what is meant by the system of limits and fits. Why is this system used in engineering practice?

b) Explain the terms 'Clearance' 'Interference' and 'Allowance' with respect to the mating conditions of a shaft and a hole. [5+5]

4.a) Explain the constructional details of a vernier micrometer.
b) Describe the use of optical flats and monochromatic light for dimensional comparison. [5+5]

**OR**

5. Design the general type GO and NOGO gauge for a component having $25H7/f8$ fit . Fundamental deviation of 'f' shaft = $-5.5D^{0.41}$ $25mm$ falls in the diameter step of 18 and 30. Take wear allowance as 8% of the gauge tolerance and determine (a) type of fit (b) allowance. [5+5]

6.a) Sketch and explain Taylor-Hobson talysurf surface roughness measuring instrument.
b) Describe an experiment to determine the pitch error of a lead screw. [5+5]

**OR**

7.a) Explain the construction and working of sigma comparator.
b) Describe the functional arrangement of various types of CMMs. [5+5]

8. With the help of line diagrams explain the procedure for conducting various alignment tests on lathe. [10]

**OR**

9.a) Enumerate various equipment and their essential requirements for performing alignment tests.
b) What are the uses of acceptance charts? [5+5]

10.a) Explain the basic phenomena of wear on surfaces.
b) List out various mechanical surface treatment techniques and briefly explain them. [5+5]

**OR**

11.a) Explain the role of lubricants in the reduction of wear on surfaces.
b) What is the basic principle involved vapor deposition? Give the applications of vapor deposition. [5+5]

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Code No: 117HP

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**SOFTWARE PROJECT MANAGEMENT**

**(Common to CSE, IT)**

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

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

## Part- A

**(25 Marks)**

1.a) What is late risk resolution? [2]
b) What are various cost estimation models? [3]
c) What is roundtrip engineering? [2]
d) What are the top five principles of a modern process? [3]
e) Define transition phase. [2]
f) Write the typical release description outline. [3]
g) Define product release milestone. [2]
h) Who are stakeholders? List them. [3]
i) Define rework and adaptability. [2]
j) What are the major components of software cost? Why? [3]

## Part-B

**(50 Marks)**

2.a) What are five necessary improvements in waterfall model?
b) Describe return on investments in different domains. [5+5]

**OR**

3.a) Give industrial software metrics top 10 list.
b) Briefly explain pragmatic software cost estimation. [5+5]

4.a) How to improve software processes?
b) What are the principles of modern software management? [5+5]

**OR**

5.a) Discuss about reuse with a neat diagram.
b) Describe transitioning to an iterative process. [5+5]

6. Explain about model-based architecture in a management perspective. [10]

**OR**

7.a) Explain about construction phase.
b) Distinguish between implementation set and deployment set. [7+3]

8.a) What are default agendas for the life-cycle architecture milestone?
b) Discuss about the cost and schedule estimating process. [5+5]

**OR**

9.a) What are the activities of software architecture team?
b) Explain in detail about software change orders. [5+5]

10.a) What are the seven core metrics? Explain.
b) Give an example to distinguish small scale project and large scale project. [7+3]

**OR**

11.a) What are the basic characteristics of a good metric? Explain.
b) Give a common subsystem overview of CCPDS-R. [4+6]

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Code No: 117HA

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**ROBOTICS**
**(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 Degrees of Freedom. | [2] |
| b) | What are the different types of control modes in a robot system? | [3] |
| c) | What is joint coordinates? | [2] |
| d) | What is the difference between forward and inverse kinematics? | [3] |
| e) | Define manipulator. | [2] |
| f) | Discuss about planar two link manipulators. | [3] |
| g) | What is trajectory planning? | [2] |
| h) | Explain about application of encoders. | [3] |
| i) | Describe the role of robot in inspection. | [2] |
| j) | Explain about robot cell layout design. | [3] |

**Part-B (50 Marks)**

2.a) What is Robotics? Explain the various components involved in Robotic System with block diagram.
b) Explain the classification of robots by different controlling methods. [5+5]

**OR**

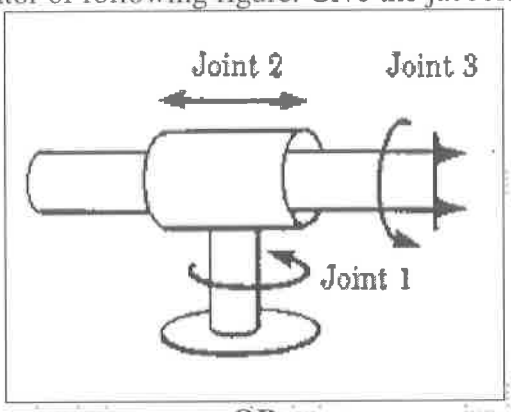
3.a) With a neat sketch explain the magnetic gripper and List its advantages and limitations.
b) How the robot end effector interface is achieved. Explain. [5+5]

4. Find the rotation matrix for a rotation of $30^0$ about the OZ axis followed by a rotation of $60^0$ about OX axis, followed by a rotation of $90^0$ about OY axis. [10]

**OR**

5. Derive the inverse kinematics of the 3-DOF manipulator by considering an example. [10]

6. Give that 3×3 jacobian which calculates linear velocity of the tool tip from the three joint rates for the manipulator of following figure. Give the jacobian in frame {0}. [10]




**OR**

7. Using Lagrange Euler formulations determine the equation of motion for the RP manipulator. [10]

8. What are the considerations that are made while planning a joint interpolated motion trajectory? Explain. [10]

**OR**

9. Explain various feedback components used for robot operation. [10]

10. Explain the various applications of robot in manufacturing and explain how the robots are handling materials in a shop floor. [10]

**OR**

11. Write a short note on following:
a) Work volume
b) General considerations of Robot in Material Handling. [5+5]

---ooOoo---

Code No: 117MB **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**MECHANICS OF COMPOSITE MATERIALS**
**(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) Differentiate orthotropic materials from isotropic materials. [2]
b) What are the main constituents of a composite material? [3]
c) Explain difference between fibers and whiskers. [2]
d) Why are reinforcement made in thin fibre form? [3]
e) Are $\nu_{12}$ and $\nu_{21}$ independent of each other for a unidirectional orthotropic lamina? [2]
f) What are the values of stiffness matrix elements $C_{11}$ and $C_{12}$ in terms of the Young's modulus and Poisson's ratio for an isotropic material? [3]
g) Distinguish between micro and macro mechanics approaches. [2]
h) What are the assumptions used in classical lamination theory? [3]
i) Name the yield criteria used for the failure analysis of composite materials. [2]
j) Explain what are cross-ply, symmetric and angle-ply laminate. [3]

**Part-B (50 Marks)**

2.a) Explain various applications of composites in detail.
b) How are composites classified? Briefly explain each type of composites with their merits and demerits. [5+5]

**OR**

3.a) Write the applications of composite materials for military aircrafts.
b) Enumerate six primary material selection parameters that are used in evaluating the use of a particular material. [5+5]

4.a) Explain the function of a matrix and reinforcement in a composite material.
b) What are metal matrix composites? Explain with suitable examples. [5+5]

**OR**

5.a) Find three applications of ceramic matrix composites.
b) Find three applications of carbon matrix composites. [5+5]

6.a) Write the number of independent elastic constants for three-dimensional anisotropic, monoclinic, orthotropic, transversely isotropic, and isotropic materials.
b) Reduce the monoclinic stress–strain relationships to those of an orthotropic material. [5+5]

**OR**

7. The engineering constants for an orthotropic material are found to be

$$E_1 = 4\,Msi,\ E_2 = 3\,Msi,\ E_3 = 3.1\,Msi,$$

$$\nu_{12} = 0.2,\ \nu_{23} = 0.4,\ \nu_{31} = 0.6,$$

$$G_{12} = 6\,Msi,\ G_{23} = 7\,Msi,\ G_{31} = 2\,Msi$$

Find the stiffness matrix [C] and the compliance matrix [S] for the preceding orthotropic material. [10]

8. Find the stiffness matrices [A] and [B] for a three ply [0/30/-45] graphite epoxy laminate. Assume each lamina has a thickness of 5 mm. The properties of graphite/Epoxy are $E_1$ = 181 GPa, $E_2$ = 10.3 GPa, $\nu_{12}$ = 0.28 and $G_{12}$ = 7.17 GPa. [10]

**OR**

9. A beam is made of two bonded isotropic strips as shown in the figure 1. The two strips are of equal thickness. Find the stiffness matrices [A], [B], and [D]. [10]

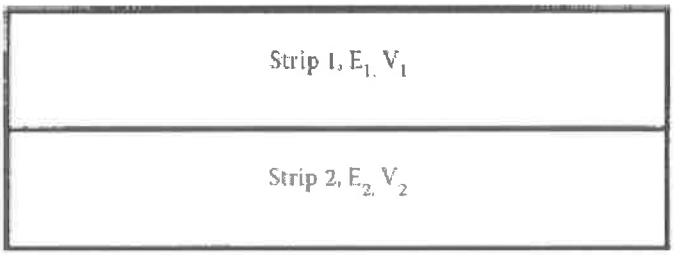



Figure 1

10.a) Explain the Tsai-Hill failure criteria for composites.

b) Explain the Tsai-Wu failure criteria for composites. [5+5]

**OR**

11. Determine the maximum value of $\alpha > 0$, if stresses of $\sigma_x = 3\ \alpha$, $\sigma_y = -2\ \alpha$, $\tau_{xy} = 5\ \alpha$ are applied to a $60^0$ lamina of graphite/epoxy. The material properties of this lamina are given as follows:
$V_f$ = 0.7, $E_1$ = 181 GPa, $E_2$ = 10.30 GPa, $\nu_{12}$ = 0.28, $G_{12}$ = 7.17 GPa, X = 1500 MPa, X' = 1500 MPa, Y = 40 MPa, Y' = 246 MPa and S = 68 MPa.
Use the following failure theories
a) Maximum Stress Theory
b) Maximum Strain Theory
c) Hoffman Failure Theory. [3+3+4]

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Code No: 57016 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**HIGH VOLTAGE ENGINEERING**
**(Electrical and Electronics Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

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1.a) Discuss about surge voltage and their distribution and control in high voltage power apparatus.
b) Discuss about the applications of solid insulating material used in:
i) Transformers ii) Capacitors iii) Bushings. [6+9]

2.a) Derive an expression for current growth in gaseous medium due to primary and secondary ionization processes of Townsend's mechanism.
b) Show graphically the relation between the breakdown field strength of a gas and the gas pressure for uniform field with a constant electrode separation. Give the physical significance of the curve. [8+7]

3.a) Explain the phenomena of thermal breakdown in solid dielectrics.
b) Explain the breakdown mechanism in composite dielectrics due to aging and partial discharges. [8+7]

4.a) Draw a typical impulse current generator circuit and explain its operation and discuss its applications.
b) Determine the ripple voltage and regulation of a 10 stage Cockroft-Walton type DC voltage Multiplier circuit having a stage capacitance = 0.01 μF, supply voltage = 100 kV at a frequency of 400 Hz and a load Current = 10 mA. [8+7]

5.a) Discuss various methods of measuring high impulse currents.
b) What is capacitance voltage transformer? Explain with phasor diagram how a tuned capacitance voltage transformer can be used for voltage measurements in power systems. [7+8]

6.a) What are the mechanisms by which lightning strokes develop and induce over voltages on overhead power lines?
b) What is meant by insulation co-ordination? How are the protective devices chosen for optimal insulation level in a power system? [8+7]

7.a) Explain how the volume resistivity of a solid dielectric is determined.
b) Explain the high voltage Schering Bridge for the tan δ and capacitance measurement of insulators or bushings. [7+8]

8. Mention the different electrical tests done on isolators and circuit breakers. Why is synthetic testing advantageous over the other testing methods for short circuit tests? Give the layout for synthetic testing. [15]

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Code No: 57140 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**AUTOMOTIVE CHASIS AND SUSPENSION**
**(Automobile Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) How do you classify automobiles? Explain in detail giving examples.
b) Discuss various resistances encountered during the motion of an automobile? [7+8]

2.a) How do you check the alignment of chasis frame? Explain clearly.
b) Draw cross section of an automobile tyre and show on it various structural features. [7+8]

3.a) What do you understand from the terms: over-steer, under-steer and cornering power and slip angle?
b) Describe in detail the equipment to check wheel alignment and steering geometry. [7+8]

4.a) Write a brief note on electric brakes. How are these compared to the mechanical and hydraulic brakes?
b) Write a note on 'tandem master cylinder'. [7+8]

5.a) Explain in detail the function and construction of a leaf spring and show how it is mounted on a rear and front. Illustrate your answers with simple sketches.
b) Explain the construction and working of a telescopic type of shock absorber with the help of a neat diagram. [7+8]

6.a) Explain the compression spring. Where is it used?
b) Discuss the causes of the common trouble experienced in the suspension system of an automobile and suggest appropriate remedies in each case. [7+8]

7. What are the different types of load test conducted for an automobile? Explain mileage test in brief. [15]

8. What is the function of carburetor in three wheeled vehicles? Draw and explain starting, idling and running circuits in a typical carburetor? [15]

--ooOoo--

R09

Code No: 57010

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**DISASTER MANAGEMENT AND MITIGATION**
**(Civil Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) Explain in detail the terms environmental stress and environmental disaster.
b) Explain in detail different approaches and its relation with human ecology in respect of environmental disaters. [7+8]

2.a) Discuss the various types of natural disasters and highlight the specific efforts to mitigate disasters in India.
b) Distinguish between Endogenous Hazards and Exogenous Hazards. Explain each one by considering suitable example. [7+8]

3.a) What is the cause for the Tsunami 2004 which inflicted heavy loss to life and property along the coastal Tamilnadu? Specify its epicenter and magnitude.
b) What are the factors to be considered while planning the rebuilding works after a major disaster due to earthquake? [7+8]

4.a) What are the necessary steps to avoid dangerous epidemics after a flood disaster?
b) Explain in detail the causes of Soil Erosion and Conservation measures of Soil Erosion. [7+8]

5.a) Discuss major issues involved in disaster preparedness.
b) Discuss the important guiding principles of rehabilitation and reconstruction. [7+8]

6.a) Explain the legal / financial problems the management has to face if safety measures taken by them are found to be in-adequate.
b) Describe NGO management and explain role of NGO in disaster risk reduction activities. [7+8]

7.a) Describe the integrated approach to control the disaster.
b) Explain the role of an engineer to reduce the effect of disaster. [7+8]

8.a) Sustainable management of natural resources is essential to provide livelihood and environmental security. Discuss
b) Describe the causes and preventive measures of coastal disasters. [7+8]

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Code No: 57026 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**ROBOTICS**
**(Mechanical Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) Describe the relation between automation and robotics.
b) Discuss briefly the various design considerations of grippers. [7+8]

2.a) Explain briefly about Euler angles.
b) For the point (3i+7j+5k), perform the following operation. Translate 6 units along Y and then rotate $30^0$ about X. [7+8]

3. Write and explain the algorithm for deriving the forward kinematics for any manipulator based on D-H convention. [15]

4.a) What is dynamic modeling?
b) Find the joint space singularities of the cylindrical coordinate robot. Describe the self-motion of the manipulator out singularities if present. [7+8]

5. Establish the dynamic model of a one-axis robot with Lagrangian-Euler formulation. [15]

6.a) Differentiate between path planning and trajectory planning.
b) The trajectory of a particular joint is specified as follows, path points in degrees 10, 35, 25 and 10. The duration of these three segments should be 2,1,3 seconds respectively. The magnitude of the default acceleration to use at all blend points is 50 degrees/$sec^2$. Calculate all segment velocities, blend times and linear times. [7+8]

7.a) Explain the working and function of potentiometer with neat sketch.
b) What is the resolution in degrees, of an encoder with 12 tracks? [8+7]

8.a) Explain the use of robots in assembly operations.
b) Describe the material handling operations performed by robot. [7+8]

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Code No: 57027 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**MECHANICAL VIBRATIONS**
**(Mechanical Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

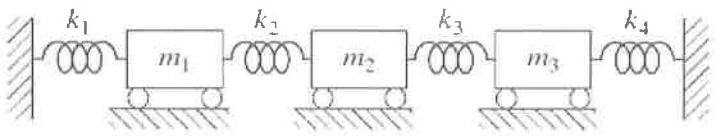
1.a) What assumptions are made in finding the natural frequency of a single degree of freedom system using the energy method?
b) A mass of 20 kg slides back and forth on a dry surface due to the action of a spring having a stiffness of 10 N/mm. After four complete cycles, the amplitude has been found to be 100 mm. What is the average coefficient of friction between the two surfaces if the original amplitude was 150 mm? How much time has elapsed during the four cycles?[7+8]

2.a) How many resonant conditions are there when the external force is not harmonically applied?
b) Find the response of an undamped system subjected to a square pulse $F(t) = F_o$ for $0 \leq t \leq t_o$ and 0 for $t > t_o$ by using the Laplace transformation method. Assume the initial conditions as zero. [7+8]

3.a) What is phase-shift error? When does it become important?
b) A vibrometer is used to measure the vibration of an engine whose operating-speed range is from 500 to 2000 rpm. The vibration consists of two harmonics. The amplitude distortion must be less than 3 percent. Find the natural frequency of the vibrometer if (i) the damping is negligible and (ii) the damping ratio is 0.6. [7+8]

4. What is the general form of equations of motion for a two degree of freedom forced vibration? Explain the procedure to obtain the steady state response of this system.[15]

5. Find the flexibility and stiffness influence coefficients of the system shown in Figure. Also, derive the equations of motion of the system. [15]



6. The mass and stiffness matrices of a three-degree-of-freedom spring-mass system are given by

$$[M]=\begin{bmatrix}3 & 0 & 0\\ 0 & 2 & 0\\ 0 & 0 & 1\end{bmatrix} \quad \text{and} \quad [K]=\begin{bmatrix}2 & -1 & 0\\ -1 & 2 & -1\\ 0 & -1 & 2\end{bmatrix}$$

Determine the natural frequencies and mode shapes of the system using Holzer's method. [15]

7.a) How many natural frequencies does a continuous system have?

b) A thin bar of length l and mass m is clamped at one end and free at the other. What mass M must be attached to the free end in order to decrease the fundamental frequency of longitudinal vibration by 50 percent from its fixed-free value? [7+8]

8. A flywheel, with a weight of 45 kg and an eccentricity of 12.5 mm, is mounted at the center of a steel shaft of diameter 25 mm. If the length of the shaft between the bearings is 750 mm and the rotational speed of the flywheel is 1200 rpm, find (a) the critical speed, (b) the vibration amplitude of the rotor, and (c) the force transmitted to the bearing supports. [15]

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Code No: 117BG

R13

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**CELLULAR AND MOBILE 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) Mention the limitations of conventional mobile telephone systems. [2]
b) Discuss the dependence of frequency reuse distance on cell reuse pattern. [3]
c) Explain polarization diversity. [2]
d) Mention the effect on coverage and interference of mobile link by decrease in transmitted power level. [3]
e) List the antennas used for space diversity. [2]
f) State the factors on which the minimum separation of cell site antennas depends. [3]
g) List any three techniques for increasing frequency spectrum utilization. [2]
h) Define spectrum utilization factor. [3]
i) Explain the need for hand off. [2]
j) Define intersystem hand off. [3]

**Part-B (50 Marks)**

2. Explain the steps involved in planning a cellular system. Illustrate how the performance criteria is evaluated. [10]

**OR**

3. Explain briefly different ways of improving coverage and capacity in cellular systems. [10]

4. Determine the real time co-channel interference measurement of mobile radio transreceivers. [10]

**OR**

5. Explain the near field and far field interference and how to avoid it. [10]

6. Let a distance between two fixed stations be 40 Km. The effective antenna height at one end $h_1$ is 200m above sea level. Find $h_2$ at the other end so that the received power always meets the condition Pr<Po (the received power is less than received power in free space) at 850 MHz transmission. Find the range of h2 which would keep Pr>Po and find the maximum received power Pr for Pr=4Po. [10]

**OR**

7. Derive the path loss prediction model in non obstructive condition. [10]

8.a) Describe in detail the adjacent channel assignment using omni-directional and directional antennas.

b) Explain how channel sharing and borrowing is performed.

c) Compare omni and sectorized cells for seven cell system in fixed channel assignment. [4+2+4]

**OR**

9. Illustrate the frequency management chart and spectrum allocation for 666 channels and discuss the functions of set up and voice channels. [10]

10. Explain about:

a) Dropped calls

b) Mobile assisted hand off

c) Soft hand off. [10]

**OR**

11. Explain in detail the need for hand off and determine the probability of requirement of hand off. [10]

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Code No:117DW

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B.Tech IV Year I Semester Examinations, March - 2017**
**INDUSTRIAL WASTEWATER TREATMENT**
**(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 are the primary sources of pollution? | [2] |
| b) | What are the physical properties of industrial wastes? | [3] |
| c) | What do you mean by Pretreatment of Industrial waste? | [2] |
| d) | What are the advantages of Equalization of Industrial Wastes? | [3] |
| e) | What do you mean by Nitrification? | [2] |
| f) | Name the safe disposal methods of wastewater. | [3] |
| g) | What is the composition of Sugar Industry wastewater? | [2] |
| h) | What is the composition of Steel Industry wastewater? | [3] |
| i) | What are the advantages Joint treatments of Industrial Wastewater? | [2] |
| j) | What are the advantages of Common Effluent Treatment? | [3] |

## Part-B (50 Marks)

2.a) Enumerate the Special treatments required for treating the Industrial water and explain any one of them in detail.
b) What are the differences between Industrial and Municipal wastewaters? [5+5]

**OR**

3.a) What is meant by Self Purification of Streams? And describe the factors that affect Self Purification of Streams.
b) Describe the problems arising when industrial waste waters discharged in to oceans.[5+5]

4.a) Enumerate the basic theories of Industrial wastewater management and explain the Volume reduction.
b) Write a detailed note on Equalization. [5+5]

**OR**

5.a) Explain how recirculation of wastewater in industry is useful.
b) Explain how the oil will be separated by Floatation. [5+5]

6.a) Differentiate the Nitrification and Denitrification.
b) Describe the problems arising when industrial waste waters are discharged in to rivers. [5+5]

**OR**

7.a) Describe the process of removal of Phosphates from industrial waste waters.
b) Write a note on Air Stripping Process of Industrial Wastewater. [5+5]

8.a) Explain the sources of Sugar mill wastes and the recommended process for their treatment.

b) Explain the sources of Food Processing industry wastes and the recommended process for their treatment. [5+5]

**OR**

9.a) Explain the sources of Steel Industry wastes and the recommended process for their treatment.

b) Explain the sources of Petroleum Refinary wastes and the recommended process for their treatment. [5+5]

10.a) Explain the Characteristics of Textile mill wastes and the recommended process for their treatment.

b) Describe the treatment steps involved in the common effluent treatment plant. [5+5]

**OR**

11.a) Explain the Characteristics of Tanneries wastes and the recommended process for their treatment.

b) What is the scope of Common effluent treatment plants? [5+5]

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Code No: 57035 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**VLSI DESIGN**

**(Common to ECE, EIE, IT)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

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1.a) With neat sketches explain oxidation process in IC fabrication.
b) List out Differences between CMOS and bipolar technologies [8+7]

2.a) Explain the threshold voltage equation of MOS transistor.
b) Define the delay unit and explain estimation of CMOS Inverter delay. [8+7]

3.a) Explain the basic operation of CMOS logic gate.
b) What is stick diagram? Explain about different symbols used for components in stick diagram. [5+10]

4.a) With suitable diagrams explain some switch logic arrangements.
b) Explain the Fan in-Fan out characteristics of CMOS with necessary diagram. [7+8]

5.a) Draw and explain the 4 bit parity generator.
b) Draw the structure of carry select adder and explain its working principle. [7+8]

6.a) Explain the read and write operations of 3T DRAM memory cell.
b) Draw and explain stick diagram the 3 transistor static RAM with NAND. [7+8]

7.a) Explain about configurable FPGA based I/O blocks.
b) What is CPLD? Draw its basic structure of CPLD and give its applications. [5+10]

8.a) What is the need of Test and Testability in VLSI system design?
b) Draw and explain the architecture of test access port controller. [7+8]

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Code No: 117CD **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**DATA WAREHOUSING AND DATA MINING**
**(Computer Science and Engineering)**

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

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

**Part- A (25 Marks)**

1.a) What is a data mart? [2]
b) What is a fact table? [3]
c) What is data mining? [2]
d) List similarity measures. [3]
e) What is maximal frequent itemset? [2]
f) How to compute confidence measure for an association rule? [3]
g) What is classification? [2]
h) Define information gain. [3]
i) What is an outlier? [2]
j) List the demerits of k-means algorithm. [3]

**Part-B (50 Marks)**

2. What are the various components of data warehouse? Explain their functionality in detail. [10]

**OR**

3. What is the significance of OLAP in data warehouse? Describe OLAP operations with necessary diagram/example. [10]

4. Explain different data mining tasks for knowledge discovery. [10]

**OR**

5. What is the need of dimensionality reduction? Explain any two techniques for dimensionality reduction. [10]

6. A database has six transactions. Let min-sup = 50% and min-conf = 75%.

| TID | List of items |
|---|---|
| 001 | Pencil, sharpener, eraser, color papers |
| 002 | Color papers, charts, glue sticks |
| 003 | Pencil, glue stick, eraser, pen |
| 004 | Oil pastels, poster colours, correction tape |
| 005 | Whitener, pen , pencil, charts, glue stick |
| 006 | Colour pencils, crayons, eraser, pen |

Find all frequent item sets using Apriori algorithm. List all the strong association rules. [10]

OR

7.a) What are the advantages of FP-Growth algorithm?

b) Discuss the applications of association analysis. [5+5]

8. Explain decision tree induction algorithm for classifying data tuples and discuss suitable example. [10]

OR

9.a) What are the characteristics of k-nearest neighbor algorithm?

b) How to evaluate the classifier accuracy? [5+5]

10. What is the goal of clustering? How does partitioning around medoids algorithm achieve this goal? [10]

OR

11.a) Differentiate between AGNES and DIANA algorithms.

b) How to access the cluster quality? [5+5]

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Code No: 117FZ

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**OPERATIONS RESEARCH**

**(Common to ME, CSE, IT, MCT, AME, MNE, AGE, 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) What is meant by redundant constraint? [2]
b) What are the shadow prices? What is its significance in simplex method of solving LPP? [3]
c) When does degeneracy occur in Transportation Problem? [2]
d) Distinguish between assignment and allocation problem [3]
e) What are the conditions recommended for the replacement of a machine with a new one when you already have an old one? [2]
f) Explain the possibility and working rules of a maximization case in sequencing. [3]
g) Which competitive situation is called a game? [2]
h) What are the consequences of over-inventory and under-inventory situations? [3]
i) Define Bellman's principle of optimality with examples. [2]
j) What do you understand by (M/M/1) : ( α/FCFS). Explain the terms [3]

## Part-B (50 Marks)

2. Solve the following problem by simplex method adding artificial variable

Max. $Z=2x_1+5x_2+7x_3$

Subject to $3x_1+2x_2+4x_3 \leq 100$

$x_1+4x_2+2x_3 \leq 100$

$x_1+x_2+3x_3 \leq 100$

$x_1, x_2, x_3 \geq 0$ [10]

**OR**

3. Old hens can be brought at Rs 20 each and young ones at Rs. 50 each. The old hens lay 3 eggs per week and the young ones lay 5 eggs per week, each egg being worth of Rs. 1.50 ps. A hen (young or old) costs Rs. 1.50 per week to feed; I have only Rs. 800 to spend for hens. How many of each kind should I buy to give a profit of at least Rs.60/- per week, assuming that I cannot house more than 20 hens? [10]

4. Solve the following transportation problem, by findings; find the IBFS by North West corner rule and OBFS by stepping stone method, where the entries are cost coefficients. [10]

| | | To Destination | | | | Availability |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | |
| From Origins | 1 | 15 | 0 | 20 | 10 | 50 |
| | 2 | 12 | 8 | 11 | 20 | 50 |
| | 3 | 0 | 16 | 14 | 18 | 100 |
| Requirement | | 30 | 40 | 60 | 70 | 200 |

**OR**

5. Raju and Co. has four lathe machines on which four workers operate. Any worker can operate any machine but due to the difference in skill and machine complexity the time of operation varies. The average times in hours when same job done on each machine by each worker is given below

| | $L_1$ | $L_2$ | $L_3$ | $L_4$ |
|---|---|---|---|---|
| $W_1$ | 7 | 6 | 4 | 9 |
| $W_2$ | 5 | 5 | 8 | 8 |
| $W_3$ | 4 | 5 | 4 | 6 |
| $W_4$ | 7 | 8 | 5 | 8 |

a) Find optimal allocation.
b) The company wants to replace the less efficient lathe with a new machine. The probable times (in hrs) that each worker can operate is estimated as 4, 5, 6 and 6 respectively. Verify whether the company has to replace any machine. If so, which machine is to be replaced? [10]

6. There are six jobs, each of which must go through machines A, B and C. Processing time (in hours) are given in the following table

| *Job* | *1* | *2* | *3* | *4* | *5* | *6* |
|---|---|---|---|---|---|---|
| Machine A | 12 | 10 | 9 | 14 | 7 | 9 |
| Machine B | 7 | 6 | 6 | 5 | 4 | 4 |
| Machine C | 6 | 5 | 6 | 4 | 2 | 4 |

Order of the processing of each job is ACB. Sequence suggested is 5-3-6-2-1-4.
Find the total time elapsed for the sequence suggested. [10]

**OR**

7. An individual is planning to purchase a car will cost Rs. 1, 20,000. The resale value of the car at the end of the year is 85% of the previous year value. Maintenance and operation costs during the first year are Rs. 20,000 and they increase by 15% every year. The minimum resale value of car can be Rs. 40,000.
a) When should the car be replaced to minimize average annual cost (ignore initial)?
b) If interest of 12% is assumed, when should the car be replaced? [10]

8. Write the assumptions made in game theory. Solve the following game graphically. [10]

| | |
|---|---|
| 1 | -3 |
| 3 | 5 |
| -1 | 6 |
| 4 | 1 |
| 2 | 2 |
| -5 | 0 |

**OR**

9. The demand for an item in a company is 15000 units per year and the company can produce the items at a rate of 300 per month. The cost of one set-up is Rs. 500 and holding cost of 1 unit per month is 15 paise. The shortage cost of one unit is Rs. 20 per month. Determine:
a) Optimum production batch quantity and number of shortages.
b) Optimum cycle time and production time.
c) Maximum inventory level in the cycle.
d) Total associated cost per year if the cost of the items is Rs. 20 per unit. [10]

10. A person repairing radios finds that the time spent on the radio sets has an exponential distribution with mean 20 minutes. If the radios are repaired in the order in which they come in and their arrival is approximately Poisson with an average rate of 15 for 8-hour day, what is the repairman's expected idle time in each day? How many jobs are ahead of the average set just brought in? [10]

**OR**

11. A medical representative located at city 1 has to travel to city 10. He knows the distance of alternative routes from city 1 to city 10 and has drawn the network map based on the distance between the cities as in the following table. Draw the network and find the shortest possible route. Also, find the shortest routes from any city to city 10. [10]

| From city | To city | Corresponding distance in km |
|---|---|---|
| 1 | 2, 3, 4 | 4, 6, 3 |
| 2 | 5, 6, 7 | 7, 10, 5 |
| 3 | 5, 6, 7 | 3, 8, 4 |
| 4 | 5, 6, 7 | 6, 10, 5 |
| 5 | 8, 9 | 4, 8 |
| 6 | 8, 9 | 3, 7 |
| 7 | 8, 9 | 8, 4 |
| 8 | 10 | 7 |
| 9 | 10 | 9 |

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Code No: 117EG

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**MANAGEMENT SCIENCE**
**(Common to ECE, MMT)**

**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 scalar chain principle? | [2] |
| b) | What are the advantages of narrow span of control? | [3] |
| c) | What are Therbligs? | [2] |
| d) | What are the control charts for inspection by attributes? | [3] |
| e) | Define HRD. | [2] |
| f) | What is job analysis? Why is it needed? | [3] |
| g) | What is crash time? | [2] |
| h) | What is cost slope? Mention its significance. | [3] |
| i) | What is the typical time horizon for long range planning? | [2] |
| j) | What is demotion? What would be its impact on workforce? | [3] |

**Part-B (50 Marks)**

2.a) Describe Maslow's theory of motivation.
b) Define authority and responsibility. What is the relationship among them? [5+5]

**OR**

3. What are the various group of people to whom the business organization owe responsibility? Briefly describe the nature of each of them. [10]

4.a) Calculate the number of observations required for an accuracy of plus minus 5% and confidence level of 95%, if the average percentage of occurrence of an activity is 0.8.
b) Describe the following store records:
i) Goods Received Note ii) Invoice iii) Material Issue Requisition. [5+5]

**OR**

5.a) A company follows EOQ while planning for its requirement of materials. For particular item at EOQ, the inventory carrying cost is Rs5600/-. What is the total ordering cost?
b) What are the elements of marketing mix? Explain each of them briefly. [2+8]

6.a) Explain some of the on- the- job training methods.
b) What are the factors affecting compensation policy? [5+5]

**OR**

7.a) What are the steps involved while handling grievance?
b) What are the various incentives offered by employer to its staff? [5+5]

8. A small project is composed of 7 activities whose time estimates are listed below.

| activity | Estimated time duration in weeks | | |
|---|---|---|---|
| | optimistic | Most likely | pessimistic |
| 1-2 | 1 | 1 | 7 |
| 1-3 | 1 | 4 | 7 |
| 1-4 | 2 | 2 | 8 |
| 2-5 | 1 | 1 | 1 |
| 3-5 | 2 | 5 | 14 |
| 4-6 | 2 | 5 | 8 |
| 5-6 | 3 | 6 | 15 |

Draw PERT diagram and represent the project completion time. [10]

**OR**

9. A project has the following time schedule:

| Activity | Time in months | activity | Time in months |
|---|---|---|---|
| 1-2 | 2 | 3-7 | 5 |
| 1-3 | 2 | 4-6 | 3 |
| 1-4 | 1 | 5-8 | 1 |
| 2-5 | 4 | 6-9 | 5 |
| 3-6 | 8 | 7-8 | 4 |
| -- | -- | 8-9 | 3 |

Construct PERT network and compute critical path and its duration. [10]

10.a) What is 'Bench marking' and what are its limitations?

b) What are the various elements in the corporate planning process? [5+5]

**OR**

11.a) What is the purpose of environmental scanning?

b) What is balance score card? [5+5]

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Code No: 117GY

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**REMOTE SENSING AND GIS**

**(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 do you mean by relief displacement. | [2] |
| b) | Explain the importance of parallax. | [3] |
| c) | Define remote sensing. | [2] |
| d) | Draw electromagnetic spectrum. | [3] |
| e) | Explain the use of spatial data. | [2] |
| f) | Explain datum and its importance. | [3] |
| g) | What do you mean by data structure? | [2] |
| h) | Explain geobase data model. | [3] |
| i) | What is metadata? Explain along with examples. | [2] |
| j) | Describe the process of digitization. | [3] |

**Part-B (50 Marks)**

2. Elaborate the effect of flying height on ground coverage along with a neat sketch. [10]

**OR**

3.a) Explain photographic resolution.
b) Elaborate the fundamentals of air photo interpretation. [5+5]

4. List and explain any two satellites and write down characteristics of satellites. [10]

**OR**

5.a) Explain advantages of remote sensing.
b) Elaborate remote sensing process along with a flow chart. [5+5]

6. Explain the UTM projection along with its applicability. [10]

**OR**

7.a) What are the map projections parameters and its importance in GIS.
b) List and explain any three GIS operations. [5+5]

8.a) Write down advantages of raster models.
b) Write down disadvantages of vector models. [5+5]

**OR**

9.a) List and explain different shape files used in GIS.
b) List out various topology rules used in GIS data processing. [5+5]

10.a) Differentiate between manual and automatic digitization.
b) Explain different data input methods in GIS. [5+5]

**OR**

11. Explain the step by step procedure for the integration of raster and vector data in the combined model. [10]

---ooOoo---

Code No: 117JR **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**WIRELESS NETWORKS AND MOBILE COMPUTING**
**(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) | Discuss about infrastructure and adhoc networks. | [2] |
| b) | What are the different frequency band available in GSM? | [3] |
| c) | What is meant by hidden and exposed terminals, near and far terms? | [2] |
| d) | What are the MAC protocols for GSM? | [3] |
| e) | Explain the operation of congestion control in TCP. | [2] |
| f) | How route optimization is done in IP? | [3] |
| g) | What is data recovery process? | [2] |
| h) | Give the classification of data delivery mechanisms. | [3] |
| i) | Give the classification of routing algorithms for MANETs. | [2] |
| j) | Discuss about security issues in MANETs. | [3] |

**PART- B (50 Marks)**

| | | |
|---|---|---|
| 2.a) | Explain in detail about traffic and control channels in GSM. | |
| b) | Describe the characteristics of communication devices. | [5+5] |
| | **OR** | |
| 3.a) | Explain about GSM network. | |
| b) | What are the merits and demerits of WLAN? | [5+5] |
| 4.a) | Explain about multiple access with collision avoidance. | |
| b) | Explain in detail about DAMA with a neat sketch. | [5+5] |
| | **OR** | |
| 5.a) | Describe MAC frame format with neat diagram. | |
| b) | Explain about CDMA. | [5+5] |
| 6.a) | Describe the fast retransmit/fast recovery transmission in mobile networks. | |
| b) | Explain why tradition TCP cannot be used in mobile networks. | [5+5] |
| | **OR** | |
| 7.a) | Explain about location management in network layer of mobile IP. | |
| b) | Write a note on snooping TCP. | [5+5] |

8.a) Explain about data synchronization.
b) Explain in detail about QoS issues. [5+5]

**OR**

9.a) How the frame structure of DAB is different from DBB?
b) Explain the Convergence of Broadcasting in mobile communication. [5+5]

10. Discuss routing algorithms and security in MANETs. [10]

**OR**

11.a) What is J2ME, JavaCard explain.
b) Explain about wireless application protocol (WAP). [5+5]

---ooOoo—

Code No: 57001 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**GROUND WATER DEVELOPMENT AND MANAGEMENT**
**(Civil Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

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1.a) Write short note on: i) Ground water hydrology ii) Zone of saturation.
b) Draw neat sketch of different types of aquifers. [7+8]

2.a) It is observed that in an field test that the 3hr 20 min was required for a tracer to travel from one well to another 20m apart, and difference in water surface elevations 0.5m. Sample of the aquifer between the wells indicated a porosity of 15%. Determine the permeability of an aquifer, seepage velocity and Reynold number for the flow taking average grain size as 1mm and kinematic viscosity 0.008 stokes.
b) Explain Darcy law and storage coefficient. [8+7]

3.a) A 40cm well penetrates 50m deep. After a long period of pumping a rate of 1400lpm, the draw down in the wells at 20m and 45m from the pumping well are found to be 2.2m and 1.8m, respectively. Determine the specific capacity of the aquifer. What is the draw down in the pumped well?
b) Discuss i) yield of an open well and ii) recuperation test. [7+8]

4.a) From the pumping tests of a semiconfined aquifer of thickness 30 m and permeability 20/day, it is estimated that the recharge rate from an overlying unconfined aquifer through an aquitard of thickness 2m, is 50mm/year. The average piezometric surface in semi confined aquifer is 16m below the water table in the unconfined aquifer. Determine the hydraulic character of the aquifer.
b) Write main assumptions of theis equation and Chows development over theis equation. [8+7]

5.a) Explain the seismic refraction method of geophysical investigation.
b) With help of aerial photography, discuss how to carry the subsurface investigation. [7+8]

6. Explain the various artificial recharge methods to improve the ground water table. [15]

7.a) Elaborate the type of drilling equipment types auger, screen design, rotary drilling.
b) A 30cm well log is drilled in an area for which the bore log is given below. The ground water table changes 10m in monsoon and 15m in summer. Preliminary test shows that the well can yield 2500lpm with draw down of 5 m. The average permeability of the sandy strata may be taken as 30m/day. Determine the strength of strainer. Assume radius of influence of 300m. [7+8]

8.a) Describe Ghyben Herzberg relation in detail.
b) Write about the Abatement of sea water intrusion. [7+8]

---ooOoo---

Code No: 57003

**R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**ELEMENTS OF EARTHQUAKE ENGINEERING**
**(Civil Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) Explain the phenomenon of earthquakes. Also, discuss the causes of earthquakes.
b) Describe briefly the direct and indirect effects of an earth quake. [8+7]

2.a) Name the various modelling techniques of the structures and explain lumped mass approach in detail.
b) Explain the terms critical damping and Logarithmic decrement. [9+6]

3.a) How do functional requirement affect the building structure from the point of view of earth quake resistance?
b) For the building, locate the centre of mass. The building has non uniform distribution of mass as shown in figure 1. [8+7]

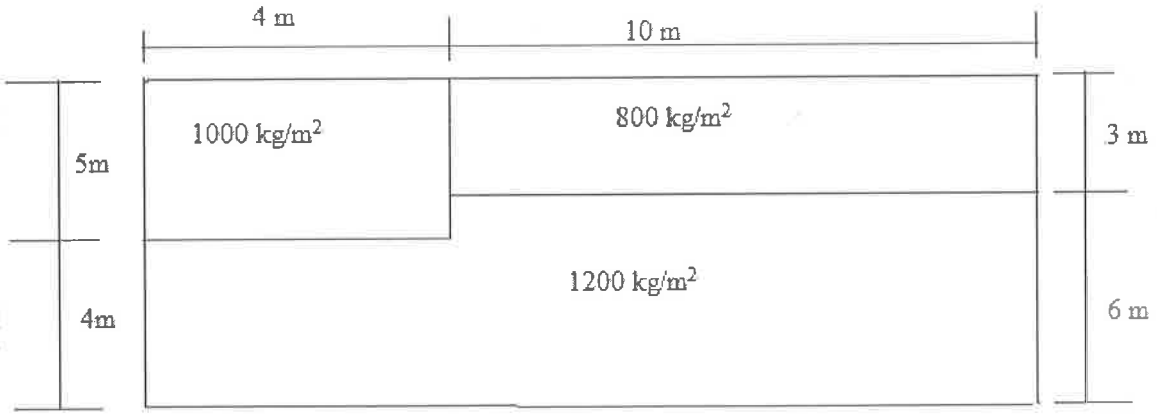


**Figure: 1**

4.a) State the assumptions made in the analysis of earth quake resistant design of buildings.
b) Discuss the factors required for assessing the lateral design forces. [8+7]

5. Plan of a single storey building having two shear walls in each direction is shown in figure 2. All the four walls are of M30 grade of concrete, 200mm in thickness and 4m long. Height of the building is 3.2 m. Designed shear force on the building is 120kN in either direction. Determine the design lateral force for different shear walls using the torsion provision of the code. [15]

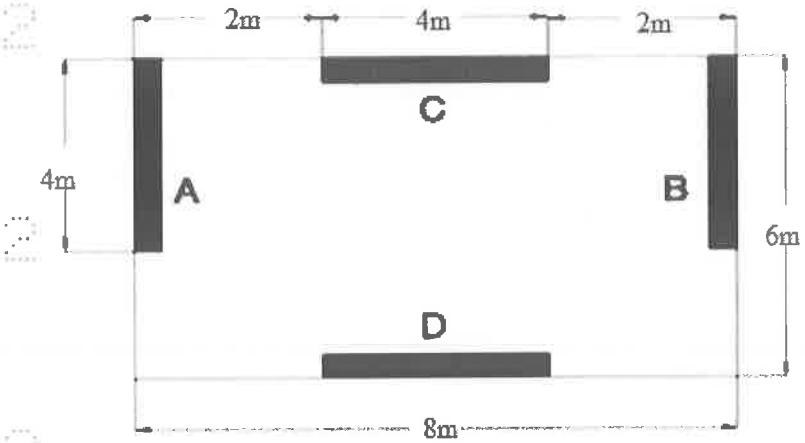


**Figure: 2**

6.a) Describe the various earth quake resistant features that can be introduced in a masonry building to make it earth quake resistant.

b) Discuss the behaviour of the following masonry walls in seismic regions:
i) Unreinforced masonry wall ii) Infill walls [7+8]

7.a) What are the effects of non-structural elements on structural system during earth quake?

b) Write short notes on:
i) Failure mechanism of non-structures.
ii) Consequences of failure of non-structural elements. [7+8]

8.a) State the requirements for Ductility in earth quake resistant designed buildings.

b) Describe behaviour of beams and columns in RC buildings during earthquakes. [8+7]

---ooOoo---

R09

Code No: 57012

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**SWITCH GEAR AND PROTECTION**
**(Electrical and Electronics Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) What are the two theories explaining Current zero interruption? Explain any one theory in detail.
b) In a system of 132kV, the line to ground capacitance is 0.01μF and the line inductance is 5H. Determine the voltage appearing across the pole of a circuit Breaker. If a magnetizing current of 5 amps (instantaneous value) is interrupted. Determine also the value of resistance to be used across the contacts to eliminate the Restriking voltage. [7+8]

2. How is $SF_6$ gas is used as an arc quenching medium? Explain the constructional details, features, principle of working, advantages, disadvantages and applications of $SF_6$ circuit breaker with neat diagram. [15]

3.a) Distinguish between Over current relays and Directional relays.
b) Explain the principle and operation of Attracted armature type relay. [7+8]

4.a) Explain a scheme of protection for failure of alternator excitation.
b) A 3-phase, 2-pole, 11kV, 10,000kVA alternator has neutral earthed through s resistance of 7ohms. The machine has current balance protection which operates upon out of balance current exceed 20% of full load. Determine % of winding protected against earth fault. [7+8]

5.a) Explain the Buchholtz's relay protection of transformer with neat diagram.
b) A 3-phase 66/11 kV, star/delta connected transformer is protected by a biased differential protection scheme. The CTs on the low tension side have a ratio of 300/5. What should be the ratio of CTs on the high tension side? [10+5]

6. Explain in detail protection of bus bars. [15]

7.a) What are the drawbacks of ungrounded system?
b) Explain in detail various methods of neutral grounding. [5+10]

8.a) Explain the operation of zinc oxide lightning arrestor with neat diagram.
b) Define impulse ratio of protective device and explain the volt-time characteristics. [10+5]

---ooOoo---

Code No: 57022 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**OPERATIONS RESEARCH**

**(Common to ME, AME)**

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

**Answer any Five Questions**

**All Questions Carry Equal Marks**

- - -

1.a) Solve the following LPP using graphical method.

Max $Z = 8x_1 + 6x_2$

Subject to constraints $2x_1 + x_2 <= 72$

$x_1 + 2x_2 <= 48$, where $x_1, x_2 >= 0$

b) Solve the following LPP using 2-phase simplex method.

Max $Z = 4x_1 + 3x_2$

Subject to constraints $3x_1 + 4x_2 <= 6$

$5x_1 + 6x_2 >= 15$, where $x_1, x_2 >= 0$ [7+8]

2.a) Solve the following transportation problem by finding IBFS using VAM and test for optimality?

| | D1 | D2 | D3 | D4 | Supply |
|---|---|---|---|---|---|
| O1 | 23 | 27 | 12 | 14 | 10 |
| O2 | 13 | 12 | 20 | 51 | 40 |
| O3 | 22 | 28 | 12 | 32 | 53 |
| Demand | 20 | 35 | 25 | 41 | |

b) Solve the following traveling salesperson problem. [8+7]

| | | TO | | | | |
|---|---|---|---|---|---|---|
| | | I | II | III | IV | V |
| FROM | I | ∞ | 6 | 12 | 6 | 4 |
| | II | 6 | ∞ | 10 | 5 | 4 |
| | III | 8 | 7 | ∞ | 11 | 3 |
| | IV | 5 | 4 | 11 | ∞ | 5 |
| | V | 5 | 2 | 7 | 8 | ∞ |

3.a) Write Jonson's procedure for determining an optimal sequence for processing N items on two machines. Give justification of the rule used in the procedure.

b) The cost of a new machine is Rs.5000. The maintenance cost of nth year is given by Rn=500(n-1); n=1,2…. . Assuming that the money value will not change with time, after how many years will it be economical to replace the machine by new one? [8+7]

4.a) Consider the following pay-off matrix and determine the optimal strategy.

| | | B | | |
|---|---|---|---|---|
| | | I | II | III |
| A | I | 6 | 9 | 4 |
| | II | 5 | 10 | 7 |
| | III | 9 | 8 | 9 |

b) A and B play game in which each has three coins 5p, 10p and 20p. Each selects a coin without the knowledge of the others choice. If the sum of the coins is an odd amount, A wins B's coin. If the sum is even, B wins A's coin. Find the best strategy for each player and the value of the game [7+8]

5. Trains arrive at the yard every 20 minutes and the service time is 40 minutes. If the line capacity of the yard is limited to 6, find: a) The probability the yard is empty.
b) The average number of trains in the system. [15]

6.a) The annual demand for an automobile component is 36,000 units. The carrying cost is Rs. 0.5/unit/year. The ordering cost is Rs. 25/- per order and the shortage cost is Rs. 15/unit/year. Find the optimal values of i) Economic Order Quantity ii) Maximum Inventory c) Cycle time d) No. of orders.

b) The demand for an item is 6000 units per year. Its production rate is 1000 units per month. The carrying cost is Rs. 550/- /unit/year and the setup cost is Rs. 2000/- per set-up. The Penalty cost is Rs. 1000/- per unit per year. Find out i) Economic Order Quantity ii) Number of orders per year iii) Time between two consecutive orders.[7+8]

7.a) The owner of a chain of four grocery stores has purchased six crates of fresh strawberries. The estimated probability distribution of potential sales of the strawberries before spoilage differ among the four stores. The following table gives the estimated total expected profit at each store, when it is allocated various number of crates.

| | Stores | | | |
|---|---|---|---|---|
| No. of crates | 1 | 2 | 3 | 4 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 4 | 2 | 6 | 2 |
| 2 | 6 | 4 | 8 | 3 |
| 3 | 7 | 6 | 8 | 4 |
| 4 | 7 | 8 | 8 | 4 |
| 5 | 7 | 9 | 8 | 4 |
| 6 | 7 | 10 | 8 | 4 |

For administrative reasons, the owner does not wish to split crates between stores. However he is willing to distribute zero crates to any of his stores. Find the allocation of 6 crates into 4 crates so as to maximize the expected profit. Use dynamic programming approach.

b) An electric item has three components in series. So the reliability of the system is equal to the product of the reliabilities of the three components, i.e., $T = r_1 r_2 r_3$. It is a known fact that the reliability of the system can be improved by providing standby units at extra cost. The details of costs and reliabilities for different number of standby units or each of the components of the system are summarized in table. The table capital budgeted for this purpose is Rs 8. Determine optimal number of standby units such that total reliability of the system is maximized. [8+7]

| N. of Standby units | Component 1 | | Component 2 | | Component 3 | |
|---|---|---|---|---|---|---|
| | Cost (Rs.) | Reliability | Cost (Rs.) | Reliability | Cost (Rs.) | Reliability |
| 1 | 1 | 0.70 | 3 | 0.85 | 2 | 0.85 |
| 2 | 2 | 0.85 | 4 | 0.95 | 3 | 0.92 |
| 3 | 3 | 0.95 | 6 | 0.98 | 5 | 0.97 |

8.a) Explain about different types of simulations in detail.
b) Discuss on simulation languages with respect to implementation and compatibility. [7+8]

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Code No: 57081 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**WIRELESS NETWORKS AND MOBILE COMPUTING**

**(Information Technology)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) Explain the architecture of GSM with neat diagram?
b) Explain the various applications of Mobile Computing. [8+7]

2.a) Define FHSS frequency hopping technique. How does it help in receiving signals?
b) List the basic features of CDMA systems. [8+7]

3.a) Explain how registration of mobile node is carried out with appropriate request and reply packet format.
b) Describe in detail about GRE encapsulation with appropriate packet format. [8+7]

4.a) Explain about Mobile IP with neat diagram.
b) Explain about Conventional TCP/IP protocols. [8+7]

5.a) Explain the advantages of hoarding the data at mobile device.
b) Explain three-tier client server architecture in detail. [8+7]

6.a) Define data dissemination broadcast models?
b) List advantages of Pull based mechanisms. [8+7]

7.a) Explain about security in MANETs.
b) Explain in detail AODV routing algorithms for MANETs. [7+8]

8.a) Explain about J2ME architecture.
b) Explain XML based languages used in mobile applications? Give examples. [8+7]

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R13

Code No: 117FE

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B.Tech IV Year I Semester Examinations, March - 2017**
**MICROWAVE ENGINEERING**
**(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 dominant and degenerative modes of waveguide. | [2] |
| b) | Write the equation of Q factor of Microstrip line. | [3] |
| c) | Which is the dominant mode in circular waveguide? | [2] |
| d) | What is post and what is the application of it? | [3] |
| e) | Compare 'O' type and 'M' type tubes. | [2] |
| f) | What are the limitations of conventional tubes? | [3] |
| g) | How pi-mode is separated in Magnetron? | [2] |
| h) | How LSA mode of Gunn diode is used to produce oscillations? | [3] |
| i) | Why S-parameters are needed in Microwave frequencies? | [2] |
| j) | Why an Isolator is needed in Microwave bench? | [3] |

**Part-B (50 Marks)**

2.a) Derive the field equations for Rectangular Waveguide in TE mode starting from Maxwell's equations.
b) Why TEM wave is not possible in Rectangular waveguide? [5+5]

**OR**

3.a) Draw the field line for the following modes of Rectangular waveguide
i) TE10 ii) TM11 iii) TM12 iv) TM22
b) Determine the impedance of Rectangular waveguide in TE and TM mode. [5+5]

4.a) What are the different types of Attenuators? Explain them with neat diagrams.
b) Draw the structure diagram of E-plane Tee and explain its characteristics. [5+5]

**OR**

5.a) Why Matched loads are needed in Microwave circuits? Explain its working with neat diagrams.
b) Explain the principle of Faraday rotation. [5+5]

6. Explain how velocity modulation is converted into current modulation with Applegate diagram and also derive the equation for output power efficiency. [10]

**OR**

7. Explain how TWT is increased gain by increasing the bunching of electrons and derive the equation of gain. [10]

8.a) Explain how 8-cavity cylindrical Magnetron is used to produce oscillations.
b) What are the applications of Magnetron oscillator? [5+5]

**OR**

9.a) Explain how Gunn diode is used in waveguide oscillator.
b) What are the different avalanche transit time devices? [5+5]

10. Draw the structure of Magic tee and write its characteristics and also derive its S-matrix. [10]

**OR**

11. Explain how a slot section is used to measure the frequency of a given microwave signal. [10]

---ooOoo---

Code No: 117GP **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**POWER PLANT ENGINEERING**
**(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) What are different components of pulverized fuel burning system? [2]
b) Differentiate between underfeed and overfeed fuel bed systems. [3]
c) Explain the starting equipment used for the internal combustion engine power plant. [2]
d) Explain the principle of operation of fuel cell used for power generation. [3]
e) Explain different non conventional sources for power generation. [2]
f) Differentiate between dams and spillways used in hydro electric power plants. [3]
g) What are the major sources for the radiation hazards in nuclear power plants? [2]
h) Explain the breeding materials used for the chemical reaction in the nuclear power plants. [3]
i) Define the terms demand factor, diversity factor and load factor. [2]
j) Explain the effects of effluents on the environment and human health. [3]

**Part-B (50 Marks)**

2.a) What are different methods used for collection of the dust before sending the flue gas through chimney? Explain them with suitable diagrams.
b) Explain ash handling cycle layout for the thermal power plant and discuss the salient features. [5+5]

**OR**

3.a) Discuss the constructional and operational features of retort stokers used in thermal power plants.
b) What are different types of hoppers used for coal in steam power plants? Explain them. [5+5]

4.a) Draw the schematic diagram of magneto hydrodynamic direct energy conversion power generation unit along with their auxiliary components and discuss the principle.
b) What type of fuel injection system is used in internal combustion engine power plants? Explain the merits and demerits. [5+5]

**OR**

5.a) Compare the principle of operation of combined cycle power plant with the cogeneration unit along with their limitations.
b) Differentiate between closed cycle and open cycle power plants along with their advantages. [5+5]

6.a) What is Hydrological cycle? Explain its significance in locating the site and design of hydro electric power plants.

b) How to make use of the tides for power generation based on their capacities? Explain the principle of operation. [5+5]

**OR**

7.a) Explain the characteristics of hydrographs with respect to the power generation along with the suitable curves.

b) Differentiate between the constructional and working of horizontal axis wind turbine and vertical axis wind turbines. [5+5]

8.a) What are the byproducts formed during nuclear fission and fusion reactions in the nuclear power plants? Explain their applicability.

b) Explain the principle of operation of boiling water reactor used for power generation along with a neat sketch. [5+5]

**OR**

9.a) How the Graphite can be used in the nuclear power plant reactors? Explain the special requirement of Graphite in the reactions.

b) How to make use of the gas for the cooling of a chemical reactor in the nuclear thermal power plants? Explain with a suitable diagram. [5+5]

10.a) Draw the load curve for the power requirement in India and discuss the methods to fulfill the part load conditions.

b) A power station has the installed capacity of 150 MW. Calculate the cost of generation. Capital cost = Rs.$140\times10^6$. Rate of interest and depreciation = 20 %; Annual cost of fuel oil, salaries and taxation = Rs.$30\times10^6$; Load factor = 42 %. [5+5]

**OR**

11.a) What are different pollutants evolved from the thermal and nuclear power plants? Explain the methods to control them.

b) The following data is given for a steam power plant: Maximum Demand 25,000 kW; Load factor 40%; Coal consumption 0.86 kg/kWh; Boiler efficiency 85%; Turbine efficiency 90%; Price of coal Rs. 55 per Ton; Determine: i) Thermal efficiency of the station ii) Coal bill of the station for one year. [5+5]

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Code No: 117CF **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**DESIGN PATTERNS**

**(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) | Describe about pattern name. | [2] |
| b) | What do you mean by consequences? | [3] |
| c) | Write about document structure. | [2] |
| d) | Explain briefly about "Monoglyph". | [3] |
| e) | Describe the motivation for Bridge Pattern. | [2] |
| f) | What are all the Participants for Proxy Pattern? | [3] |
| g) | What are the Consequences of Chain of Responsibility Pattern. | [2] |
| h) | Write the Pattern name and Classification of Observer Pattern. | [3] |
| i) | What can we expect from a Design Pattern? | [2] |
| j) | Write about Applicability of State Pattern. | [3] |

**Part-B (50 Marks)**

2.a) How to use design patterns? Explain in detail.
b) Explain about selection of a design pattern. [5+5]

**OR**

3. How a Design pattern solves the design problem? Illustrate with an example. [10]

4. Discuss the Motivation, Structure, Collaborations and Implementation of the following Patterns:
a) Abstract Factory b) Prototype. [5+5]

**OR**

5. Explain in detail about "supporting multiple window systems". [10]

6. Discuss the Intent, Applicability, Sample code, and Known uses of the following Patterns:
a) Adapter b) Flyweight. [5+5]

**OR**

7. Discuss the pattern name, Applicability, Consequences and Related Patterns of the following Patterns
a) Bridge b) Proxy [5+5]

8. Explain in detail about Command pattern. [10]

**OR**

9. Describe in detail about Iterator Pattern. [10]

10. Explain the Motivation, Participants, Structure and Implementation of following Patterns
a) State b) Template Method. [5+5]

**OR**

11. Discuss briefly about the following Patterns:
a) Visitor b) Strategy. [5+5]

---ooOoo—

Code No: 57005 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**GIS AND REMOTE SENSING**

**(Civil Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) Discuss in brief, the types of aerial photographs with a neat sketch.
b) What are the types of errors in Photogrammetry? Explain. [7+8]

2. Explain
a) Electromagnetic Spectrum
b) Atmospheric Window
c) Image Enhancement
d) Stefan-Boltzmann Law. [15]

3.a) Explain the energy interaction with the Earth's surface features.
b) What is converging Evidence. Explain? [7+8]

4.a) What is GIS? What are the components involved in a GIS?
b) Explain the procedure involved in creating a basemap in GIS. [8+7]

5. What is digitization? What are the types involved and the differences? [15]

6.a) What is meant by Visual Analysis Methods? Explain each with a neat sketch.
b) Write about data storage. [8+7]

7. What is LULC Classification? Explain in detail the level based classification. [15]

8. Explain the process involved in the reservoir sedimentation mapping in GIS with a neat flow chart. [15]

--ooOoo--

Code No: 57013 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**UTILIZATION OF ELECTRICAL ENERGY**
**(Electrical and Electronics Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

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1.a) Compare between the group drives and individual drives with respect to industrial environment.
b) List different types of industrial loads.
c) What is load equalization? Explain. [7+4+4]

2.a) Explain the principle of dielectric heating. List some of its applications.
b) A 15 kW, 220V single-phase resistance oven employs nickel – chrome wire for its heating elements. If the wire temperature is not to exceed $1000^0$C and the temperature of the charge is to be 600 $^0$C, calculate the diameter and the length of the wire. Assume radiating efficiency to be 0.6 and emissivity as 0.9. For nickel - chrome resistivity is $1.016 \times 10^{-6}$ Ω - m. [5+10]

3. Compare between AC welding and DC welding. With a neat diagram, discuss in detail the principle and working of metallic Arc welding. [15]

4.a) Define the following terms:
i) Illumination ii) Utilisation Factor
iii) Mean hemi-Spherical Candle power iv) Glare
b) Describe the laws of illumination. [8+7]

5.a) Explain with a neat diagram, the principle of operation of a sodium vapour lamp and mention its use.
b) A lamp with a reflector is mounted 12m above the centre of a circular area of 24 meters diameter. If the combination of the lamp and reflector gives a uniform Candle Power of 1000 over the circular area, determine the maximum and minimum illumination produced on the area. [8+7]

6.a) Mention the advantages of electric traction. Give a brief review of electric traction systems in India.
b) What is regenerating braking? Why is this preferred in electric traction? [10+5]

7.a) Explain the terms crest speed, average speed and schedule speed. Discuss the factors effecting the schedule speed.
b) Explain different speed time curves with respect to suburban service. [8+7]

8.a) What is coefficient of adhesion? How does it affect slipping of the driving wheels of the traction unit?
b) An electric train has an average speed of 42 km/hr on a level track between stops 1400m apart. It is accelerated at 1.67 km/hr/sec and it is baked at 2.9 km/hr/sec. Estimate the energy consumption at the axle of the train per tonne-km. Take tractive resistance constant at 50 Newtons/tonne and allow 10% for rotational inertia. [6+9]

---ooOoo---

R09

Code No: 57023

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**POWER PLANT ENGINEERING**
**(Mechanical Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

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1.a) What is the necessity of coal storage? Discuss the different methods used for coal storage at plant.
b) Draw the modern steam power plant layout and explain individual unit and different circuits involved in elaborately. [7+8]

2.a) What are the major advantages of pulverized fuel burning system?
b) Describe different types of overfeed stokers and discuss the merits and demerits of each other. [7+8]

3.a) Draw a neat line diagram of a Diesel power plant showing all the system auxiliaries.
b) Explain the operation of a Fuel pump and how is the fuel supply regulated in Diesel power plant. [7+8]

4.a) With a neat block diagram explain the governing system of an open cycle gas turbine power plant.
b) Discuss the advantages of gas turbine power plant over combined cycle power plant. [7+8]

5.a) Draw line diagrams and explain different types of spill ways and dams.
b) Compare and Contrast storage and Pondage. [7+8]

6.a) Explain the principle, working and operating regime of thermoelectric generator.
b) Explain the aerodynamics of wind turbine blade. [7+8]

7.a) Draw the line diagram and explain CANDU reactor and its working details.
b) Explain useful Biproducts of nuclear power generation and their users. [7+8]

8.a) Explain load factor and diversity factor.
b) For a power plant, yearly duration curve is a straight line from 360 MW to 90 MW. With the help of two generating units of 200 MW each, power is supplied. Calculate the maximum demand, load factor and utilization factor. [7+8]

---ooOoo---

Code No: 57036 R09

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**MICROWAVE ENGINEERING**
**(Electronics and Communication Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) A rectangular waveguide with a width of 4cm and a height of 2cm is used to propagate an EM wave in the $TE_{10}$ mode. Determine the wave impedance, phase velocity and group velocity of the waveguide for the wavelength of 6cm.
b) Derive the expression for field components of a wave in rectangular waveguides. [7+8]

2.a) Derive the expression for quality factor and coupling coefficient of cavity resonator.
b) What are the various losses in a microstrip line? Explain. [8+7]

3.a) Explain the working of a two-hole directional coupler with a neat diagram and derive the coupling and directivity of a two-hole directional coupler.
b) Explain the operation of E-plane Tee and H-plane Tee with help of a sketch. [8+7]

4.a) Explain the Faraday rotation with neat diagram. Explain the working of a ferrite isolator.
b) Define scattering matrix? Derive the scattering matrix for the H-plane. [7+8]

5.a) A reflex klystron operates at peak mode of n=2 with DC beam voltage of 300V, beam current of 20mA and signal voltage of 40V. Determine i) Input Power ii) Output power iii)The efficiency
b) Explain the principle of operation of two-cavity klystron with neat diagram. [7+8]

6.a) What is slow wave structure? Explain the amplification process of TWT structure with neat sketch.
b) Explain the working principle of 8-Cavity cylindrical Magnetron. [7+8]

7.a) Explain the principle of operation of an IMPATT diode.
b) Explain several modes of operation of Gunn diode and its applications [7+8]

8.a) Explain how the loaded quality factor of a cavity resonator can be measured.
b) What is slotted section? Describe the equipment is used to measure impendence using a slotted line. [7+8]

--ooOoo--

Code No: 117BD **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**CAD/CAM**

**(Common to ME, AE, AME, MSNT)**

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

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

**Part- A (25 Marks)**

| | | |
|---|---|---|
| 1.a) | List out the computer peripherals' for CAD | [2] |
| b) | Differentiate between the database and data structure | [3] |
| c) | What is blending function? | [2] |
| d) | Write the parametric equation of Surface of revolution | [3] |
| e) | Define the MCU,DPU, CLU in NC system | [2] |
| f) | Differentiate the ACO and ACC type adaptive controllers | [3] |
| g) | What is an ideal cell? | [2] |
| h) | What are the benefits of MRP | [3] |
| i) | State the objectives of quality control | [2] |
| j) | Distinguish between the FMS and FMC | [3] |

**Part- B (50 Marks)**

2.a) How CAD /CAM systems are evaluated? Explain in detail by categorizing different evaluation parameters during selection.
b) What is automation? Explain the various categories of automation. [5+5]

**OR**

3.a) Compare the Bezier and B spline curves and derive the parametric equations of both.
b) What are the manipulation curve fitting techniques used in wire frame modeling? [5+5]

4.a) What is the difference between the B spline and Coon's surface ? Explain.
b) An ellipse wit semi major axis a=1 and semi minor axis b=5 is o be rotated, the axis of revolution passes through center of the ellipse and lies in the plane xy. Revolve this curve about x axis through $2\prod$ to obtain a surface revolution. Calculate the surface point at $\theta = \prod/2$ and $\Phi = \prod$. [5+5]

**OR**

5.a) With suitable example briefly explain about the C rep modeling and B rep modeling.
b) Differentiate between the linear sweep and rotational sweep. [5+5]

6.a) What are the major components of NC machine? Explain in detail
b) What are the advantages of computer assisted part programming over manual part programming. [5+5]

**OR**

7.a) Briefly explain functions of CNC and DNC systems.
b) What are the four types of statement in APT langaguge? [5+5]

8.a) What factors must be considered in selecting a classification and coding system

b) Discuss with examples of the following.
i) Mono code ii) Poly code iii) Mixed code. [5+5]

**OR**

9.a) Discuss a variant process planning system.

b) Explain the enterprise resource planning and capacity requirements planning. [5+5]

10.a) Explain principal components of FMS.

b) Discuss various attributes of guidance and AGV systems. [5+5]

**OR**

11.a) Sketch and explain elements of machine vision system.

b) What are benefits of CIM? [5+5]

**--ooOoo--**

**R13**

Code No: 117DY

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**INFORMATION SECURITY**
**(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) List and explain about different security services defined by X.800? [2]
b) Briefly define Caesar cipher? Apply Caesar cipher technique for a given plain text: network security and cryptography? [3]
c) Explain briefly about the different block cipher modes of operation – CFB, OFB, CTR? [2]
d) Which of the four different stages involved in each round of AES? Explain it with neat diagrams. [3]
e) What are the four requirements were defined for Kerberos? [2]
f) What are the basic uses of message authentication? [3]
g) What is meant by Secure Electronic Transaction? [2]
h) Explain about confidentiality and message Integrity? [3]
i) Explain about Logic bombs and Trojan Horses? [2]
j) What is Digital Immune System? [3]

**Part-B (50 Marks)**

2.a) Briefly define substitution technique. Apply play fair cipher technique for a given keyword: monarchy.
b) Briefly explain Vernam cipher with an example. [5+5]

**OR**

3.a) Write a short notes on Playfair Cipher. Construct a Playfair matrix with the key "largest" and encrypt the message "Must see you over Cadogan West".
b) With a neat diagram, explain about a model for network security. [5+5]

4.a) With a neat diagram, explain briefly about the data encryption standard algorithm? And Briefly discuss about the strength of data encryption standard algorithm?
b) Explain in detail about public key cryptosystems. [5+5]

**OR**

5.a) With a neat diagram, explain about the multiple encryptions (Triple DES with two and three keys)?
b) What is the difference between Double and Triple DES? [6+4]

6.a) In what order should be the signature function and the confidentiality function be applied to a message, and why?

b) Describe the digital certificates? [5+5]

**OR**

7.a) Discuss the techniques of public key certificates for distribution of public keys?

b) X.509 includes three alternative authentication procedure what are these three procedure explain them in brief? [5+5]

8.a) Explain the general format of Pretty Good Privacy Message.

b) Explain Radix-64 format? Compare PGP and S/MIME in Radix-64 conversion. [5+5]

**OR**

9.a) What are the MIME Specifications?

b) Why does PGP generates a signature before applying compression and how it generates signature. Explain? [5+5]

10.a) Discuss briefly about the various components of SET systems?

b) Explain in detail about packet-filtering router with a neat diagram? [5+5]

**OR**

11.a) Explain briefly the 4 techniques used in guessable password.

b) Write short notes on Firewalls? [5+5]

--ooOoo--

Code No: 117EE **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**LINUX PROGRAMMING**

**(Computer Science and Engineering)**

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

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

**Part- A (25 Marks)**

| | | |
|---|---|---|
| 1.a) | What are the responsibilities of a shell? | [2] |
| b) | Mention the functionality of the following commands: find, ls, umask. | [3] |
| c) | What is the purpose of dot and dot dot directories in the file system? | [2] |
| d) | Differentiate between soft linking and hard linking. | [3] |
| e) | Name the advantages of waitpid( ) over wait( ). | [2] |
| f) | Discuss signal( ) and abort( ) system calls briefly. | [3] |
| g) | Give the advantages of using named pipes. | [2] |
| h) | What is the effect of O-NDELAY flag on pipes and fifos? | [3] |
| i) | Give the differences between IPv4 and IPv6. | [2] |
| j) | Explain the system call used to create a shared memory segment. | [3] |

**Part-B (50 Marks)**

2.a) Write an awk script to find the largest of 10 integers.
b) Explain various networking utilities in LINUX with clear syntax, few options and example. [5+5]

**OR**

3.a) With an example script explain the differences between 'while' and 'until' statements.
b) List and explain the various meta characters available in shell programming. [5+5]

4. Discuss the need and importance of lseek( ) system call with its relative merits and drawbacks. [10]

**OR**

5. Write the syntax of the following system calls and explain with an example code.
a) telldir b) mkdir [5+5]

6.a) What are process identifiers? Mention the commands for getting different IDs of calling process.
b) Write a program that demonstrates the use of exit( ). [5+5]

**OR**

7.a) What is a signal? How can it be generated? Also explain kernel's action on signal.
b) Differentiate between reliable signals and unreliable signals. [5+5]

8. Describe various APIs of Message queues that are used for inter process communication. [10]

**OR**

9.a) Give the advantages and disadvantages of IPC_PERM structure.

b) Describe the operations of semctl( ) with a sample C program. [5+5]

10. Explain with a program how to copy file data from server to client using System V IPC mechanism shared memory. [10]

**OR**

11. Explain briefly about the following socket APIs with clear syntax:

a) accept( ) b) connect( ) [5+5]

**--ooOoo--**

Code No: 117BY

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**COMPUTER NETWORKS**

**(Common to ECE, EIE, BME)**

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

**Note:** This question paper contains two parts A and B.

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

## Part- A (25 Marks)

| | | |
|---|---|---|
| 1.a) | How selective repeat protocol resolves issues of stop and wait protocol? | [2] |
| b) | What are the applications of Infrared waves? | [3] |
| c) | Mention some of the physical properties of Ethernet. | [2] |
| d) | Explain the function of repeaters. | [3] |
| e) | What are the metrics used by routing protocols. | [2] |
| f) | How does netid differ from a network address. | [3] |
| g) | Explain briefly about Crash recovery. | [2] |
| h) | Explain about Packet Fragmentation. | [3] |
| i) | What are the basic functions of email systems? | [2] |
| j) | What are the two main categories of DNS messages? | [3] |

## Part-B (50 Marks)

| | | |
|---|---|---|
| 2.a) | Explain about the Coaxial Cable with neat sketch. | |
| b) | What is bit and byte stuffing explain with an example. | [5+5] |
| | **OR** | |
| 3.a) | Explain the frame format of PPP. | |
| b) | Draw the layered architecture of the OSI reference model and write two services provided by each layer of the model. | [5+5] |
| 4.a) | Explain the flow diagram of CSMA/CD. | |
| b) | Explain about the source routing bridge. | [5+5] |
| | **OR** | |
| 5.a) | Explain about channelization protocols. | |
| b) | Explain the categories of standard Ethernet. | [5+5] |
| 6. | Explain about the Distance Vector routing protocol with an example. | [10] |
| | **OR** | |
| 7. | Explain about the Link State routing algorithm. | [10] |
| 8. | Explain about DHCP. | [10] |
| | **OR** | |
| 9.a) | Explain about CIDR. | |
| b) | Explain about RARP. | [5+5] |
| 10. | Explain the various fields of the TCP header with the help of a neat diagram. | [10] |
| | **OR** | |
| 11.a) | Explain about the window management in TCP. | |
| b) | Explain about HTTP request. | [5+5] |

---ooOoo---

Code No: 117DE **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**ESTIMATING AND COSTING**
**(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 are the main items of work? [2]
b) What are the main methods of building estimate? [3]
c) What is lead in earthwork of canal works? [2]
d) What is the area of side sloping surface (s) on both sides of road having length (L)? [3]
e) What is a work over head charge? [2]
f) What is significance of standard schedule of rates? [3]
g) What is length of main straight bar in a beam? [2]
h) Explain item rate contract. [3]
i) What is capitalized value? [2]
j) What is difference between second class brickwork and third class brick work? [3]

## PART-B

**(50 Marks)**

2. Estimate quantities for a Medium income group house (MIG) using centre line method a) earthwork in excavation b) lime concrete in foundation c) 1st class brickwork in superstructure d) plastering. Assume suitable data. [10]

**OR**

3. Explain in detail about approximate methods of estimating. [10]

4. Prepare a detailed estimate for earth work for a portion of a road from the following data. The formation level at starting point is 119m. Formation width of road is 7.5m and side slopes of banking are 2:1. The road is in downward gradient of 1 in 160 up to 180m and then the gradient changes to 1 in 120 downward. [10]

| Distance in m | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R. L. of Ground | 115.5 | 116.75 | 117.25 | 118.20 | 116.10 | 116.25 | 117.25 | 118.30 | 118.10 | 117.80 | 117.25 |

**OR**

5. Explain estimation of earthwork in irrigation channels for different cases in a detailed manner? [10]

6. Prepare analysis of rates for the following item of work.
12mm thick plastering of 1:6 cement mortar – unit 1 cu. m.
Assume materials and labors in the market rate. [10]

**OR**

7. Prepare analysis of rates for the following item of work.
1st class brick work in superstructure of 1:3 lime cement mortar – unit 1 cu. m.
Assume materials and labors in the market rate. [10]

8. Estimate the quantity of steel for any type of RCC slab with an illustrative example and explain the importance of bar bending schedule? [10]

**OR**

9. Explain process of tendering contract for public work. [10]

10. Explain the following terms:
a) Scrap value. b) Market value. c) Book values. d) Annuity. [10]

**OR**

11. Explain detailed specifications of I$^{st}$ class in brickwork. [10]

**--ooOoo--**

Code No: 57006 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**PAVEMENT DESIGN**
**(Civil Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) Discuss in brief about tire pressure, truck factor and growth factor. Two closely separated wheels of load 20kN each and tire pressure 0.7MPa are acting on a pavement section. If the two wheels are replaced by single wheel with the same tire pressure, calculate the radius of tire imprint (idealized as circle) of the single wheel.
b) What are the factors effecting the design of pavements? Discuss in detail. [7+8]

2.a) Explain in detail about Random and Damping vibrations.
b) Discuss in detail about the stress inducing factors in rigid pavements. [8+7]

3.a) Explain Visco-Elastic theory in flexible pavement design.
b) What are the assumptions made in Burmister's layered theory?
c) A plate load test is carried out on sub grade soil using a 300mm radius rigid plate. A load of 5 tonnes resulted in a deflection of 1.2mm. Determine the elastic modulus of the soil, if the Poisson's ratio is 0.5. [7+4+4]

4.a) State the assumptions made in Westergaard's theory and explain the critical load locations for maximum wheel load stresses in cement concrete pavements according to Westergaard's analysis.
b) Calculate the stresses at interior and corner regions of a concrete pavement using Westergaard's original equations on the basis of following particulars.
Wheel load = 4100kg ; Slab thickness = 15cm; Radius of wheel load distribution=15cm; Modulus of elasticity of concrete= $3.0 \times 10^5$ kg/cm$^2$; Poisson's ratio for concrete= 0.15; Modulus of sub grade reaction = 3 kg/cm$^3$. [8+7]

5.a) What are the desirable properties of bituminous mix? Write a short note on resilient modulus and complex modulus of bituminous mixes and state the difference between them.
b) How can the modulus of subgrade reaction of subgrade soil be estimated? State the principle of CBR test on soil. How is the CBR value useful in the design of the thickness of flexible pavements? [8+7]

6. Explain in detail, the mechanistic pavement design of bituminous pavements as per IRC:37-2012. Making use of the following data, calculate the cumulative number of standard axles for design of a flexible pavement.
Initial traffic in each direction after construction = 5000 cvpd; Design life = 15 years
Traffic growth rate as predicted = 8%; Vehicle damage factor = 4.5; Traffic distribution factor = 0.75. [15]

7.a) Write a short note on prestressed concrete pavements. What are the advantages and disadvantages of prestressed concrete pavements?

b) Explain the calibrated mechanistic design process for Rigid pavement. [7+8]

8. State the characteristics of Low Volume Roads. Explain the various pavement design approaches for low volume roads. [15]

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Code No: 57014

**R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, March - 2017**
**INSTRUMENTATION**
**(Electrical and Electronics Engineering)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) With examples explain different classification of Errors in Measurement.
b) Define accuracy and precision of a measuring instrument with suitable examples. [10+5]

2.a) Define aperiodic signals. Write about the mathematical representation of aperiodic signals, with examples and necessary waveforms
b) Describe 'sampling of data'. How is it different from pulse modulation? [10+5]

3.a) Explain the measurement of frequency and phase using CRO.
b) Discuss the advantages and disadvantages of analog and digital type of oscilloscopes. [8+7]

4.a) With a neat block diagram explain the working principle of Microprocessor based ramp type digital voltmeter
b) Explain in the working integrating type DVM. [8+7]

5.a) What is a wave analyzer? Discuss about different types of wave analyzers.
b) Explain the operation of Q meter. [8+7]

6.a) What is a strain gauge? Explain its construction and principle of operation. Derive the expression for the gauge factor of strain gauge
b) Write short notes on photo diode. [10+5]

7. Explain the angular velocity measurement by
a) AC tachometers generators b) Photoelectric tachometer c) Stroboscope. [5+5+5]

8.a) Explain the flow direction measurement using hot wire anemometer. Give a neat sketch.
b) Discuss the method of measuring high temperatures. [8+7]

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Code No: 57024 **R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, March - 2017**

**CAD/CAM**

**(Common to ME, AE, AME)**

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

**Answer any Five Questions**
**All Questions Carry Equal Marks**

- - -

1.a) Discuss the stages in the product life cycle and the importance of each stage.
b) What is the function of a frame buffer? [8+7]

2.a) Make a comparative study of hidden surface removal algorithms.
b) Show that transformation matrix for a reflection about the line Y = - X is equivalent to a reflection relative to the Y – Axis, followed by a counter clock wise rotation of $90^0$.[7+8]

3.a) What is the advantage of parametric form of curves and surfaces in designing curves and surfaces?
b) What are the Boolean operations used in solid modeling? [8+7]

4.a) What are the commands and their sequence to create 2D and 3D wire frame models of a spur gear?
b) How do you set the dimension variables for Aligned dimensioning, unilateral dimensioning and Chain dimensioning. [8+7]

5.a) What are the axes of a 4 axes machining centre?
b) Write a manual program for step turning operations using G90 cycle for the component given in figure 1. All the dimensions are in mm only. [7+8]

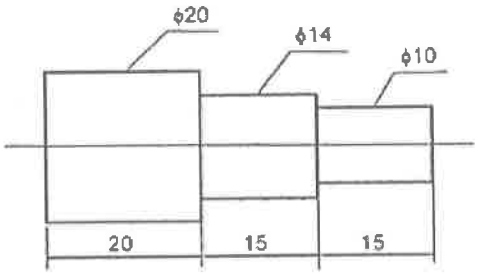

Figure 1

6.a) Compare variant and generative process planning methodologies.
b) Two components are shown in Figure 2. Do they belong to the same part family? Discuss. [7+8]

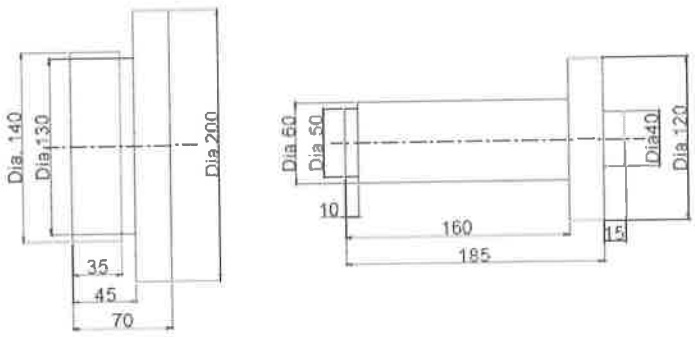


**Figure 2**

7.a) What is the significance of quality control in CIM?

b) Write a short note on non-contact non-optical inspection techniques. [7+8]

8.a) Describe in detail about manufacturing systems classification scheme.

b) Enumerate the various factors involved in the Selection of Machine Tools and its related equipment in the manufacturing system. [7+8]

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