

**FACULTY OF ENGINEERING**

**B.E. (Mech.) VI-Semester (CBCS) (Main) Examination, December 2020**

**Subject : Non-Conventional Energy Sources (Elective-I)**

**Time : 2 hours**

**Max. Marks :70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

- 1 Discuss the statistics of wind energy in India.
- 2 Describe prospects of fossil fuels in India.
- 3 Define solar declination angle.
- 4 State the principle of solar photo voltaic cell.
- 5 Describe various applications of solar energy.
- 6 Discuss the principle involved in wind energy conversion.
- 7 Describe the disadvantages of Geothermal energy in India.
- 8 Define anaerobic digestion.
- 9 Discuss the limitations of wave Energy.
- 10 Discuss the disadvantages of OTEC power plant.

**PART – B**

**Note: Answer any four questions**

**(4 x 15 = 60 Marks)**

- 11 a) Discuss various renewable energy sources with statistics, merits.  
b) Describe demerits of non renewable sources and their prospects in India.
- 12 a) Explain the working of solar water heater.  
b) Explain various solar concentrators with neat sketches.
- 13 a) Explain the working principle of synchronous generator.  
b) Formulate the torque coefficient of a wind turbine.
- 14 a) Classify geothermal energy sources and explain them in brief.  
b) Explain construction and working of up-draft gasifier with neat sketch.
- 15 a) Explain Claude cycle OTEC power plant with neat sketch.  
b) Explain the working of wave energy conversion device with neat sketch.
- 16 a) Discuss the prospects and limitations of tidal energy in India.  
b) Describe the adverse effects of OTEC power plants.
- 17 a) Explain various biomass chulhas available for rural India.  
b) Classify Wind turbines with neat sketches.

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**FACULTY OF ENGINEERING**

**B.E. (Mech.) VI-Semester (CBCS) (Main) Examination, December 2020**

**Subject : Modern Machining & Forming Methods**

**Time : hours**

**Max. Marks : 70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

1. How unconventional forming methods have been classified?
2. What are the advantages of water jet machining over abrasive jet machining?
3. What is the role of dielectric medium in EDM process?
4. What are the advantages of hot machining?
5. Briefly explain the principle involved in PAM.
6. What are the types of materials used for LBM production?
7. What is the effect of standoff distance in explosive forming?
8. What is High Energy Rate Forming?
9. Differentiate between compression and radial draw forming.
10. For what type of materials spinning process is adopted?

**PART – B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

11. A). Explain the process parameters in USM process.  
b). Discuss the effects of the following parameters on MRR and accuracy in  
AJM.
  - i) Abrasive grain size
  - ii) Jet Velocity and
  - iii) Standoff distance
12. a). What are the functions of electrolyte used in ECM? What factors need  
to be considered while selecting it?  
b). Discuss the process parameters of WEDM, mention the WEDM  
process limitations

13. a). Describe with the help of a sketch, the construction of an electron gun used in EBM process.
- b). Explain the working principle and applications of Ion etching process.
14. a). Explain principle of Guerin rubber forming process. Write its applications.
- b). Explain the principle of electro-hydraulic forming with a simple sketch.  
How does it differ from explosive forming?
15. a). Explain the methods of tube spinning technique.
- b). Differentiate between stretch draw forming and rotary stretch forming.
16. a). What do you understand by the term LASER? How is a laser beam produced?
- b). Explain with a neat sketch the principle of hydro forming process.  
List its advantages and applications.
17. Write short notes on:
- a. Types of transducers used in USM;
- b. High speed machining;
- c. Water hammer forming

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**FACULTY OF ENGINEERING**  
**B.E. (CBCS) (Prod) VI – Semester (Main) Examination,**  
**December 2020**

**Subject : Flexible Manufacturing System**

**Time: 2 Hours**

**Max. Marks : 70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

1. What do you mean by FMS? Define.
2. What are the advantages of FMS?
3. Explain what is product design flexibility?
4. Discuss about simulation modeling process.
5. Explain different database systems.
6. What is bipartitegraph? Explain
7. What is the significance of scheduling in FMS?
8. What are different types AGV's?
9. How is Scheduling done in FMS?
10. Explain about the applications of FMS?

**PART – B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

11. What are the basic components of FMS? Explain in detail
12. What are Intrinsic operating Functions?
13. What are the different types of Layouts in FMS? Explain
14. a) Explain about Rank order Clustering method?  
 b) Consider a problem of 5 machines and 6 parts. Try to group them using Rank Order clustering Method.

	PART NUMBER					
	1	2	3	4	5	6
M/C ID	1		1		1	
2		1	1			
3	1			1		
4		1	1		1	
5	1			1		1

15. Explain in detail about Knowledge based system for Group Technology?
16. Discuss various FMS applications in sheet metal fabrication and Aerospace Industries.
17. Write short notes on
  - a) AS/RS in FMS
  - b) FMS layout
  - c) Artificial Intelligence and expert systems in FMS

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Code No. 2714/CBCS

**FACULTY OF ENGINEERING**

**B.E. VI-Semester (CBCS) (A.E.) (Main) Examination, December 2020**

**Subject : Material Handling and Earth Moving Vehicles (E-I)**

**Time: 2 Hours**

**Max. Marks: 70**

**PART-A**

**Note: Answer any five questions.**

**(5 X 2 = 10 Marks)**

1. What are the uses of the Re-claimers
2. Write the significance of Half Gantry Crane?
3. Write the short note high angle conveyors.
4. Compare the Mechanical grader and Hydraulic Grader
5. Differentiate Diesel Shovel and Hydraulic Shovel
6. Mention any four off-road Vehicles
7. Write short note on Fork - lifts
8. What are various flexible handling devices?
9. What are the components of Dozers?
10. What are various hauling equipments?

**PART – B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

11. How the various Drive Pulley arrangements work? Write about them in detail with neat sketches
12. a) What is Crane and give the classification of them.  
b) Explain the working of Crawler Crane with a neat sketch
13. a) Give the classification of Rippers. Mention their uses.  
b) Explain the Hydraulic Control Unit of Towed Scraper.
14. a) Write a short note on Hydraulic Mechanism of Hydraulic Shovel  
b) Write a short note on tractors and trailers
15. Explain the working of wagon loader, wagon tippler with neat sketch.
16. a) What is Slewing mechanism?  
b) Distinguishes between Diesel Shovel and Hydraulic Shovel.
17. a) What is ditcher? How it works explain it in detail  
b) What are recent trends in tractor design?

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**FACULTY OF ENGINEERING****B.E. VI Semester (CBCS) (A.E) (Main) Examination, December 2020****Subject: Finite Element Methods (Elective – I)****Time: 2 Hours****Max. Marks: 70****PART – A****Note: Answer any five questions.****(5 x 2 = 10 Marks)**

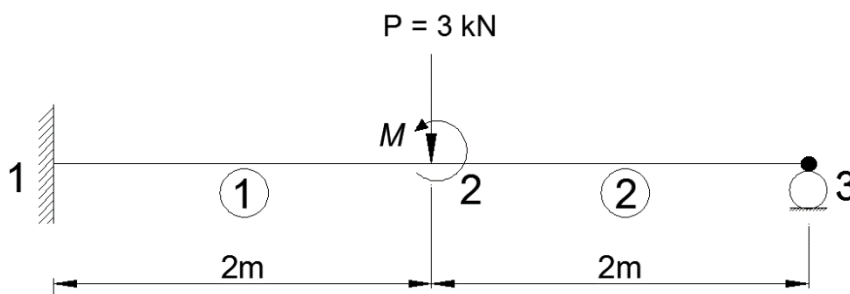
1. Distinguish between Initial Value Problems and Boundary Value Problems
2. Write the reason why are polynomial type interpolation function preferred over trigonometric functions
3. Calculate the area of a circle by FEM
4. Recall the locations at which nodes are to be placed during discretization in FE
5. Recall the governing equation for 3D heat transfer problems
6. Show the Strain displacement matrix for a 4 noded Quadrilateral element
7. Write Model the transformation matrix for a planar truss
8. Show the stiffness matrix for a beam
9. Enlist any four analysis software based on FEM
10. Distinguish between Eigen values and Eigen vectors

**PART – B****Note: Answer any four questions.****(4 x 15 = 60 Marks)**

11. Using Rayleigh Ritz method obtain an approximate solution for the differential

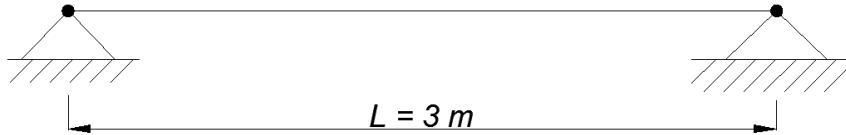
equation  $\frac{d^2 y}{dx^2} - 10x^2 = 5$ ,  $0 \leq x \leq 1$  with the boundary condition  $y(0) = y(1) = 0$

12. Formulate the stiffness matrix for a 1D axial bar element from first principles.
13. For a planes stress condition, evaluate the element stiffness matrix for the 2D element 1(0, 0) 2(6, 0) 3(3, 5)  $E = 200$  GPa,  $\mu = 0.3$ ,  $t = 10$ mm
14. Determine the nodal displacements and slopes for the beam shown in Fig. Find the moment at the mid-point of element (1).  $E = 200$  GPa;  $I = 5 \times 10^4$  mm<sup>4</sup>;  $M = 6$  kNm.



15. Formulate the element stiffness matrix for a 2D plane truss

16. Determine the natural frequencies of a simply supported beam shown in Fig. i)  
Use 2 beam elements with consistent mass matrix  $\rho = 5000 \text{ kg/m}^3$ ;  $E = 100 \text{ GPa}$  ;  
 $I = 2000 \text{ mm}^4$ ;  $A = 250 \text{ mm}^2$



17. (a) Recall Convergence criteria  
(b) Reproduce Thermal conductivity matrix and load vector of a 1D fin  
(c) Explain FE software general procedure

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**FACULTY OF ENGINEERING**  
**B.E. (CSE) VI-Semester (CBCS) (Main) Examination, December 2020**

**Subject : Graph Theory and its Applications**

**Time : 2 Hours**

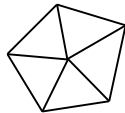
**Max. Marks: 70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

- 1 What is perfect matching?
- 2 Explain first theorem of graph theory.
- 3 What is a cut vertex?
- 4 What is bipartite graph?
- 5 Give examples of class 1 and class 2 graphs.
- 6 Find chromatic number of the “wheel” graph.



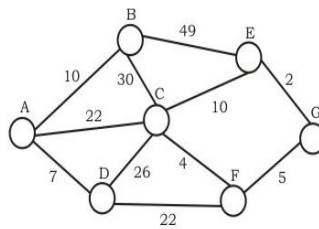
- 7 What is the difference between Independent set and covering.
- 8 What is Euler's formula?
- 9 What is planar graph?
- 10 What is a degree sequence?

**PART-B**

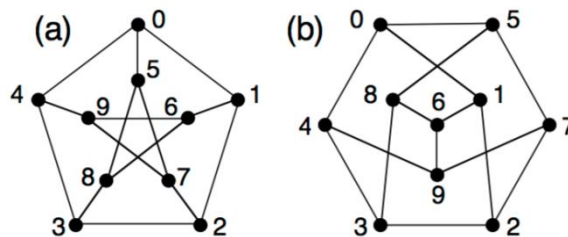
**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

- 11 Using the algorithm of Kruskal, find a shortest spanning tree in the following graph.



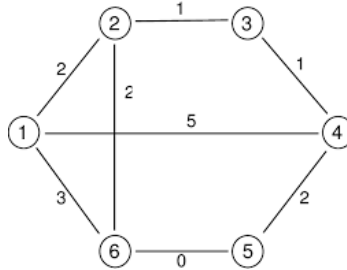
- 12 Prove that the following graphs are isomorphic or not





..2..

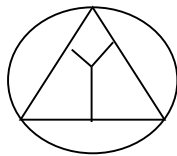
- 13 (a) Explain Fleury's algorithm.  
 (b) Find optimal tour by using Chinese postman problem.



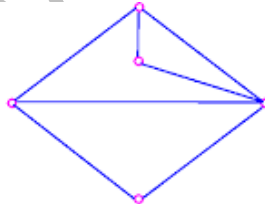
- 14 Describe how the Hungarian method can be used to find a maximum matching in a bipartite graph.

- 15 (a) Explain Gupta-vizing theorem.

- (b) Determine chromatic number of the following graph.

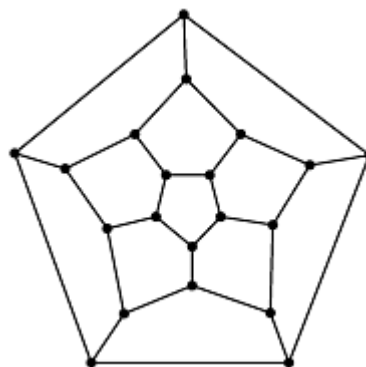


- 16 (a) Explain Euler's Formula. Give the dual graph for the following planar graph. Check whether it is self dual or not.



- (b) Write short note on Eulerian Directed graphs.

- 17 (a) What is Clique? Write the sum of degrees theorem.  
 (b) Find Hamiltonian cycle and Euler circuit for the following graph.



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**FACULTY OF ENGINEERING**

**BE VI Semester (CBCS) (CSE) (Main) Examination, December 2020**

**SUBJECT: ADVANCED DATABASES (ELECTIVE-II)**

**Time: 2 Hours**

**Max. Marks:70**

**PART-A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

1. How to declare and define Methods in Structured type in SQL 1999 ? Give example?
2. What is the use of final and notfinal Specifications in SQL?
3. How do you define a default namespace for an XML document ?
4. What is the basic difference between SAX and DOM APIs?
5. What is the main drawback of hash join algorithm?
6. What are the three major components of disk I/O cost? Which of these Components are considered in I/O cost estimation of query processing algorithms?
7. What are the factors that can work against linear scale up in a parallel database systems?
8. What is a Snapshot of a temporal relation? How you compute the Snapshot of a Valid time relation?
9. In case of Mobile databases, why do you prefer a model of Broadcasting data to mobile clients rather than clients requesting data from mobile base stations?
10. What is the average transaction throughput of the system, assuming there is no interference between the transactions?

**PART-B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

11. a) Write SQL statements to create a table of instructor using unnamed row type  
Following are the details about each instructor, which contains composite, multivalued and derived attributes

ID

Name (firstname,middlename,lastname);

Address (Street, city, ,state,pincode);

Street(street\_number, street\_name, apt\_number);

{phone\_number}

date\_of\_birth;

age();

- i) Give an SQL schema definition corresponding to the above details?
- ii) Give constructors for each of the structured types defined above?

b) How are objects IDs and pointers in programming languages are related? Discuss different degrees of permanence of object identity in this context?

12. a) Give the DTD for an xml representation of the following nested –relational Schema Emp=(ename,childrenSet setoff (children),skillsset set of (skills)

Children=(name,birthday)  
Birthday=(day,month,year)  
Skills=(type,examset set of(exams))  
Exams=(year,city)

b) What is the difference between For clause and Let clause in Xquery?

13.a) Write the algorithm for hash join. Give the expressions for number of block transfer and seeks.

b) Estimate the cost of  $r \lt \> s$  using

- i). Sort-merge join
- ii). Block nested loop join

Where r has 1,000 tuples, 20 tuples per block; s has 2,000 tuples, 4 tuples per block; and 22 Blocs of main memory are available

14. a) Describe different parallel sorting techniques?

b) What are the different types of transparencies that are ensured by DDBMS?

15. Explain what application characteristics would help you decide which of TPC-C, TPC-H or TPC- R best models the application?

16. How do you create, access, and query collection valued attributes in SQL? Illustrate with an example?

17. Write short notes on the following:

- a) XML applications
- b) Heuristic query optimization

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**FACULTY OF ENGINEERING****B.E. (I.T) VI – Semester (CBCS) (Main) Examination, December 2020****Subject: Data Mining (Elective – II)****Time: 2 Hours****Max.Marks: 70****PART – A****Note: Answer any five questions.****(5 x 2 = 10 Marks)**

- 1 What are the steps involved in KDD process?
- 2 Explain Nominal and Binary Attributes each with an example
- 3 How Market basket analysis is helpful in data mining?
- 4 What is constraint – Based Association Mining? Name some constraints.
- 5 Explain two steps process of classification
- 6 What are the measures to increase the accuracy of classifiers?
- 7 What are the basic requirements of cluster analysis?
- 8 Differentiate between Agglomerative and Divisive Hierarchical Clustering
- 9 Discuss briefly about mining spatial data
- 10 Define web mining and list different types of web minings.

**PART – B****Note: Answer any four questions.****(4 x 15 = 60 Marks)**

- 11 a) Discuss the architecture of Data Mining System with the help of a neat diagram.  
b) Explain in detail about data similarity and dissimilarity measures for all types of attributes with suitable examples.
- 12 a) Compute all strong association rules for the frequent patterns generated using Apriori algorithm for the following transactional database. Min-sup = 60% and minconfidence = 80%.

TID	Items
T100	{C, M, S, B}
T200	{S, M, A, P}
T300	{A, M, B, P}
T400	{B, M, S}

- b) Explain different methods for improving the efficiency of Apriori Algorithm.
- 13 a) Explain various attribute selection measure used in decision tree induction for classification.  
b) Explain regression in predictive modeling.
- 14 What is partition method of clustering? Explain K-Means Algorithm with suitable example. Plot the graph to illustrate the clusters in each iteration of the algorithm.
- 15 a) Explain major issues in Data mining.  
b) Explain Min-Max and Z-score normalization techniques.
- 16 a) Explain briefly about text mining techniques.  
b) Explain about multimedia data mining.
- 17 Write short notes on the following:
  - a) Trends in data mining
  - b) Web Mining.

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**FACULTY OF ENGINEERING**

**B.E. (IT) VI-Semester (CBCS) (Main) Examination, December 2020**

**Subject : Software Quality and Testing**

**Time : 2 hours**

**Max. Marks :70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

1. Differentiate Software errors and software failures
2. How do you Organize the human components for SQA
3. Can you suggest an imaginary project ideally suitable for the prototyping methodology?
4. What is a CASE TOOL?
5. Write objectives of software quality metrics.
6. Mention the names of quality management standards
7. List the steps for Building a Software Testing Strategy
8. How do you Test Software Changes
9. What is a Client / Server System?
10. When do you use JMetra?

**PART-B**

**Note: Answer any four questions.**

**(4 x 15 = 60 MARKS)**

11. a) Develop and describe interfaces of a salary processing system  
b) Differentiate Software quality assurance vs. software quality control
12. a) Explain the different aspects of verification and qualification for quality assurance activities.  
b) Explain the contribution of CASE tools to the quality of software maintenance.
13. a) State the reasons for limitation characterizing some software quality metrics.  
b) Justify the formulation of a unique quality cost model for software development.
14. a) What are the Eleven – Step Software Testing Process  
b) Write steps to Evaluate Test Effectiveness.
15. a) How do you do Testing of Webbased Systems,  
b) What is Win Runner? Discuss the steps for testing
16. Describe IEEE Software Engineering Standards.
17. a) Describe the tasks involved in establishment of a controlled documents list  
b) Write the steps in Creating Test Documentation.

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**FACULTY OF ENGINEERING**

**B.E. (IT) VI-Semester (CBCS) (Main) Examination, December 2020**

**Subject : Internet of Things (Elective-II)**

**Time : 2 hours**

**Max. Marks:70**

**PART - A**

**Note: Answer any five questions.**

**(5 X 2 = 10 Marks)**

1. Distinguish between M2M and IoT.
2. What are the typical functions of data management in IoT?
3. Describe Functional View of IoT Reference Architecture?
4. Write short notes on interaction and remote control with reference to IoT
5. List the MAC features of IEEE 802.11ah
6. What is Z-Wave?
7. Compare Standard TCP and MPTCP.
8. What is the role of MQTT in IoT?
9. What is OMA and what does it do?
10. Name the service layer protocols of IoT.

**PART - B**

**Note: Answer any four questions.**

**(4 X 15 = 60 Marks)**

- 11.(a) Discuss applications of IoT.  
(b) Describe M2M and IoT Analytics.
- 12.(a) Explain ITU-T Reference Model of IoT with the help of neat sketch.  
(b) Discuss IOT Real-World and Technical design constraints.
- 13.(a) Describe the architecture of Wireless HART with neat sketch  
(b) Explain the working principle of Routing Protocol for Low-Power and Lossy Networks (RPL)
- 14.(a) Discuss the roles of TLS and DTLS in IoT  
(b) Describe AMQP Architecture
15. What is ETSI M2M? With the help of ETSI M2M architectural diagram, explain the function of each and every element.
- 16.(a) Discuss IOT Deployment and operational view with Parking Lot example.  
(b) Explain IoT Information view with neat sketch
17. Write short notes on the following
  - (a) IPv4
  - (b) DTLS
  - (c) 6LoWPAN

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**FACULTY OF ENGINEERING**

**B.E. (Civil) VI – Semester (CBCS) (Main) Examination, December 2020**

**Subject: Watershed Management (Elective – II)**

**Time: 2 Hours**

**Max.Marks: 70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

- 1 What is the main purpose of watershed management?
- 2 What are the main parts of watershed management?
- 3 Write the classification of watershed based on size and shape.
- 4 Write the advantages of watershed management with respect to the economic health.
- 5 Define soil erosion.
- 6 Differentiate between geologic and accelerated erosion of soil.
- 7 What is integrated rain water harvesting methodology?
- 8 List the various components of greenery in watershed management.
- 9 What is crop husbandry?
- 10 What are saline soils?

**PART – B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

- 11 a) Discuss the watershed management as a part of sustainable development.  
b) Explain how the integrated and multidisciplinary approach for watershed management is useful in solving problems.
- 12 a) Explain the physiographic characteristics of watershed.  
b) Write short notes on socio economic characteristics of a watershed.
- 13 a) What are the causes and consequences of soil erosion.  
b) Illustrate the possible soil conservation measures within the perspective of sustainable watershed management practices.
- 14 a) Discuss the various rainwater harvesting methodologies for various locations.  
b) Discuss the important design considerations for roof top rain water harvesting.
- 15 a) Discuss how community participation can be used to make appropriate watershed management plans and implementation?  
b) Describe various applications of GIS in water management.

16 a) What are the different components of sustainable agriculture? Explain them Briefly.

b) What is biomass management? Discuss in detail the various aspects of biomass management.

17 Write short notes on:

a) Afforestation.

b) Artificial recharge scheme for groundwater improvement

c) Reclamation of alkaline soils.

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**FACULTY OF ENGINEERING**

**B. E. VI – Semester (CBCS) (Civil) (Main) Examination, December 2020**

**Subject: Earthquake Resistant Design of Buildings**

**(Elective – II)**

**Time: 2 hours**

**Max. Marks: 70**

**PART – A**

**Note: Answer any five questions.**

**(5 X 2 = 10 Marks)**

1. Explain the two kinds of body waves and how they differ.
2. Explain the terms under damping, over damping and critical damping.
3. When do you expect flexural failure and shear failure of masonry structures
4. State the concept of base isolation.
5. A driver standing at end of a diving board that cantilevers 2m oscillates at frequency 2cps determine the flexural rigidity of the diving board if the weight of the driver is 180N Neglect the mass of the diving board.
6. Distinguish between undamped free vibration and undamped forced vibration.
7. Classify different types of earthquakes.
8. What is response spectrum?
9. Explain briefly estimation of any one seismic parameters.
10. Differentiate between response spectrum and time history analysis.

**PART – B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

11. A platform of weight 20KN is supported by four equal columns which all clamped to the foundation as well as to the platform. A static force of 5KN applied horizontally to the platform produces a displacement of 2.5mm. It is estimated that damping is 5% of critical damping. Determine.
  - (a) Natural frequency
  - (b) Absolute damping co-efficient
  - (c) Logarithmic decrement
  - (d) The no. of cycle and time required for the amplitude of motion to be reduced from 2.5mm to 0.25mm.
12. Explain different inter plate boundaries and fault boundaries.
13. What are the structural and non structural components of a building and how does each affect the performance of the building during the earthquake.
14. State the reasons for the poor performance of masonry building in seismic areas.

15. Design and unreinforced masonry wall from the following data

Unit weight of wall	20kN/m
Prism strength of masonry	7.5 N/mm <sup>2</sup>
Seismic force at roof level	20kN at a height of 4m from base
Length of wall	5m
Height of wall	6m

16. What is meant by damping? Explain various damping device used to reduce seismic force.

17. (a) Write short notes on soft and weak storeys.

(b) Explain the plate tectonic theory and its mechanism.

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**FACULTY OF ENGINEERING**

**B.E. (Civil) VI – Semester (CBCS) (Main) Examination, December 2020**

**Subject: Ground Improvement Techniques (Elective – II)**

**Time: 2 Hours**

**Max.Marks: 70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

- 1 Define “Blending of aggregates”.
- 2 List out the different dynamic techniques used in stabilization.
- 3 Define groutability ratio.
- 4 “in bitumen stabilization, higher the volatile content, better is the stabilization”. Answer yes or no and justify.
- 5 What is the function served by upper-jet in vibro-floatation method?
6. “The static methods of ground improvement are more effective than dynamic methods in cohesionless soils”. Answer yes or no and justify your answer.
- 7 List out the dewatering techniques.
- 8 Differentiate between geo drain and rope drain.
- 9 What is the purpose of using geo-membrane in landfill construction?
- 10 What are the factors affecting the design of reinforced earth?

**PART – B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

- 11 a) Discuss the applications of ground improvement techniques.  
b) What are the steps involved in Rothfuch’s method. Discuss with example.
- 12 a) Write the differences between suspension and solution grouts.  
b) Discuss the construction procedure of cement stabilization.
- 13 Explain the procedure of “Blasting technique”. Discuss its suitability, blasting pattern, merits and demerits.
- 14 a) Explain in detail about the installation and working of a stone column  
b) Explain about the method of pre-loading. How do vertical drains improve the functioning of preloading technique?

- 15 a) Define reinforced earth. Explain its components with a neat sketch.  
b) Compare geo-grids with geo-nets. Mention their applications.

- 16.a) Write a detailed note on soil-Lime reactions.  
b) Describe about compaction piles and their suitability.

17. Write short notes on following

- a) Functions of geo-textiles  
b) Thermal methods

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## FACULTY OF ENGINEERING

B. E. (EEE) (CBCS) VI – Semester (Main) Examination, December 2020

Subject: AI Techniques (Elective – II)

Time: 2 hours

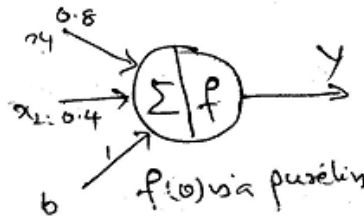
Max. Marks: 70

### PART – A

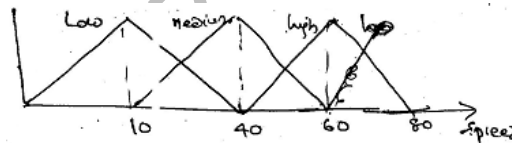
Note: Answer any five questions.

(5 x 2 = 10 Marks)

1. Draw the biological model of a neuron and list the parts.
2. What are the components of soft computing techniques?
3. Given the neural network, find Y.



4. Give the Genetic Algorithms operators used.
- 5.



Find the membership value at a speed of 50.

6. Differentiate between supervised and unsupervised learning.
7. Write the expressions of tangent sigmoid and log sigmoid with graphs.
8. Given the fuzzyser  $A = \left\{ \frac{0.8}{2} + \frac{0.3}{2} + \frac{0.4}{4} + \frac{0.6}{5} \right\}$  find B the complement of A.
9. Give the examples of MaxMin composition operators on a fuzzy set.
10. Draw McCulloch Pitts neural Network.

### PART – B

Note: Answer any four questions.

(4 x 15 = 60 Marks)

11. Given a 4 input, 2 output neural network with delta learning rule and an activation of  $f(x) = \frac{1}{1 + e^{-x}}$  for an input (0011), (0101) (0001) and (0110) and an output (10) (00) (01) and (11). Determine the weights of the neural network.

12. (a) Given two discrete fuzzy sets  $A = \left\{ \frac{1}{2} + \frac{0.5}{3} + \frac{0.3}{4} + \frac{0.2}{5} \right\}$  and

$$B = \left\{ \frac{0.5}{2} + \frac{0.7}{2} + \frac{0.2}{4} + \frac{0.4}{5} \right\} \text{ find } A \cup B, A \cap B, A \text{ and } B.$$

(b) Explain Hebbian learning.

13. (a) Explain why an activation function is required for a neural network. Give the activation functions used with graphical representation.

(b) Explain Roulette Wheel selection in GA.

14. (a) Write notes on the properties of Fuzzy sets.

(b) Explain the GA operator's mutation and crossover with examples.

15. (a) Explain how fuzzy logic is used in speed control of DC motor.

(b) Distinguish between Feed forward and recurrent neural networks.

16. (a) Given two parts  $P_1 = \{2, 7, 8, 4, 6, 3, 1, 5\}$  and  $P_2 = \{1, 4, 7, 8, 6, 2, 3, 5\}$ . What are the off springs produced with, when cuts are made after 3<sup>rd</sup> and 6<sup>th</sup> phases.

(b) Write notes on RBF neural network.

17. (a) Given

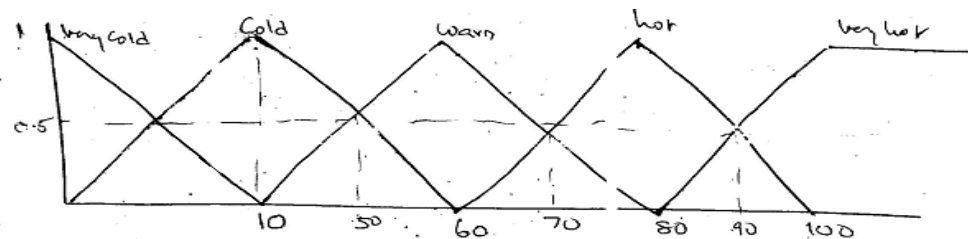
$$R = \begin{array}{c|cc} & Y1 & Y2 \\ \hline X1 & 0.7 & 0.5 \\ X2 & 0.8 & 0.4 \end{array}$$

and

$$S = \begin{array}{c|ccc} & X1 & X2 & X3 \\ \hline Y1 & 0.9 & 0.6 & 0.2 \\ Y2 & 0.1 & 0.7 & 0.5 \end{array}$$

Find ROS using MaxMin components relators.

(b) Given the membership functions graph, find the expression of each membership and determine the value of membership.



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**FACULTY OF ENGINEERING**

**B.E. (EEE) VI - Semester (CBCS) (Main) Examination, December 2020**

**Subject : Electric Distribution System (Elective – II)**

**Time : 2 hours**

**Max. Marks : 70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

- 1 Define Coincidence factor.
- 2 Define Diversified Demand.
- 3 List out the components of distribution system.
- 4 What are the important factors for the selection of location for a substation?
- 5 Write a short note on radial type primary feeder.
- 6 Define the secondary banking.
- 7 List out different types of laterals.
- 8 What are the reasons for voltage fluctuations?
- 9 What are the economic benefits derived from capacitor installation?
- 10 Define Distribution Automation.

**PART – B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

- 11 a) Explain different types of Rate structures.  
b) Assume that the annual peak load of a primary feeder is 2000 kW, at which the power loss, that is, total copper loss, is 80 kW per three phase. Assuming an annual loss factor of 0.15, determine
  - i) The average annual power loss
  - ii) The total annual energy loss due to the copper losses of the feeder circuits
- 12 a) Explain improved form of radial type of sub-transmission system with neat sketch.  
b) Give a detailed analysis of square shaped distribution substation areas and hexagonal shaped distribution substation areas.
- 13 a) Explain the loop type primary feeder.  
b) Derive the total series voltage drop and copper loss per phase on radial feeders with uniformly distributed load.

- 14 a) Derive the voltage drop and power loss of a single-phase two-wire laterals with ungrounded neutral.
- b) Explain the shortcut method to calculate the voltage dips due to a single phase motor start.
- 15 a) Explain the general procedure to determine the best location of the capacitors in distribution system.
- b) Explain the block diagram of a SCADA system.
- 16 a) Explain the Double bus-single breaker scheme with a neat sketch and discuss advantages and disadvantages.
- b) Explain the Radial type of primary feeder with a neat sketch.
- 17 a) Explain the shortcut method to calculate the voltage dips due to a three phase motor start.
- b) Write a short note on the effect of shunt and series capacitor compensation.

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**FACULTY OF ENGINEERING**

**B.E. (EEE) VI - Semester (CBCS) (Main) Examination, December 2020**

**Subject : Digital Control System (Elective-II)**

**Time : 2 hours**

**Max. Marks : 70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

- 1 Obtain the Z-transform of unit step and ramp function.
- 2 Write the state equation and output equation for controllable canonical form.
- 3 Write short notes on stability analysis of closed loop system in the Z-plane.
- 4 A control system has the following characteristic equation  
 $P(Z) = Z^3 - 1.3Z^2 - 0.08Z + 0.24 = 0$ . Determine the stability of the system.
- 5 What are the effects of lead-lag compensator on the system performance?
- 6 Define the terms state, state variable and state space.
- 7 Obtain the Z-transform of  $K^2$ .
- 8 Define controllability and observability and also mention the tests for controllability and observability.
- 9 Define the term transient response.
- 10 What is state observer?

**PART – B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

- 11 Obtain the inverse Z-transform of  $X(Z) = \frac{z^2}{(z-1)^2(z-e^{-aT})}$  by using inversion integral method.
- 12 A discrete time system is described by the difference equation  $y(k+2)+5y(k+1)+6y(k)=u(k)$ ,  $y(0) = y(1) = 0$ ,  $T = 1$  sec a) Determine a state model in canonical form b) Find the state transition matrix c) for input  $u(k) = 1$ ,  $k \geq 1$  find the output  $y(k)$ .
- 13 a) Explain the mapping between S-plane to Z-plane.  
b) Solve the following difference equation using the Z-transform method  
 $C(K+2)-1.5C(K+1)+C(K) = 2U(K)$  where  $C(0) = 0$ ,  $C(1) = 1$
- 14 Write short notes on  
a) Transient response analysis  
b) Steady state response analysis

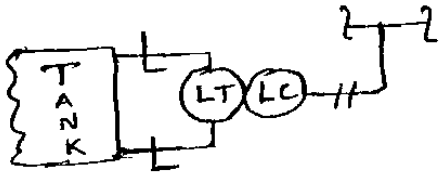
- 15 a) Explain minimum order observer.  
b) Explain the necessary and sufficient condition for design of state feedback controller through pole placement.
- 16 a) What are the methods for computation of state transition matrix. Explain any one method in detail.  
b) Explain the state transition matrix and its properties.
- 17 Define A/D conversion. Explain any one method with a neat sketch and also mention errors in A/D converters.

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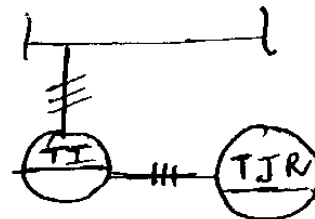
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**FACULTY OF ENGINEERING****B.E. VI-Semester (CBCS) (Inst.) (Main) Examination, December 2020****Subject : Piping and Inst. Diagrams (Elective-II)****Time: 2 Hours****Max. Marks: 70****PART- A****Note: Answer any five questions****(5 x 2 = 10 Marks)**

1. What are the different standards for P&I diagrams?
2. What does the tag DPIC-203 indicate in P&I diagrams?
3. What abbreviations are suggested for denoting types of power supplies in P & I diagrams?
4. What is the full form of KKS numbering system? What is its significance?
5. What is SMART P&ID?
6. Draw the process diagrams for
  - (a) Valves with actuators
  - (b) Pumps
  - (c) Heat Exchangers
  - (d) Compressors
7. What is the minimum information to be shown in piping and instrumentation drawings?
8. What do the following symbols indicate:



(b)



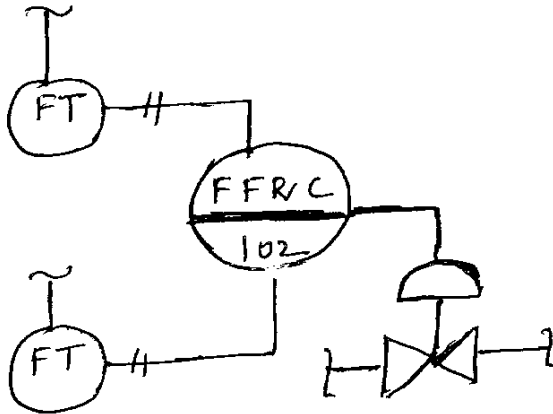
9. Define the following terms
  1. Accessible
  2. Assignable
  3. Shared controller
  4. Transmitter
10. What is the design criteria for Utility flow diagrams? Explain briefly?

**PART – B****Note: Answer any four questions.****(4 x 15 = 60 Marks)**

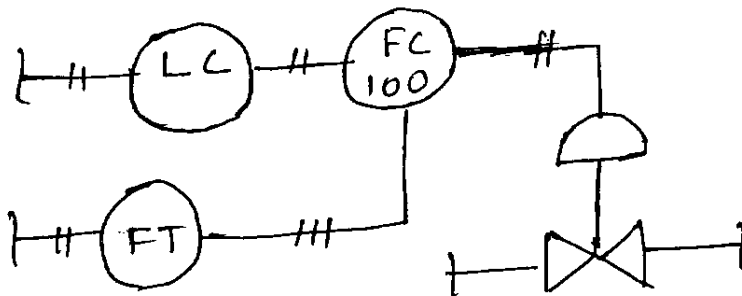
11. What are process flow diagrams and block flow diagrams? Explain with relevant examples.
12. List out the various types of contracts between Licensor and contractor in preparing P & I diagrams.
13. What steps have been established for the purpose of minimizing the revisions and avoiding unnecessary works, in preparing the P & I Diagrams? Explain in detail.

14. Discuss about the design criteria for preparation of P & I diagrams for assembly piping of pumps.
15. What are the basic terms and conditions for approval of P & I diagrams?
16. Draw all the piping and connection shapes used in P & I diagrams?
17. Decode the following diagram and briefly explain the operation:

(a)



(b)



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**FACULTY OF ENGINEERING**

B.E. (ECE) VI-Semester (CBCS) (Main) Examinations, December 2020

Subject : Digital Image Processing (Elective-I)

Time: 2 Hours

Max. Marks:70

**PART-A****Note: Answer any five questions.****(5 x 2 = 10 Marks)**

1. Differentiate Photopic and Scotopic vision?
2. Find the time required in seconds for transmitting a monochrome image of size "2.5x2.5", scanned at 150 DPI and has to be sent at 28KBPS speed.
3. Write any two properties of 2D-DFT.
4. What is the need for transform? Mention the applications of transform.
5. Compute the value of the centre pixel, if median filter is applied?

18	22	33
34		24
22	19	32

6. List the steps involved in frequency domain filtering?
7. What is salt and pepper noise? Which filter is used to reduce the noise and how?
8. When will be a constrained least square filter reduces to an inverse filter?
9. Define Image Segmentation and mention its applications.
10. Define redundancy? Mention types of redundancies.

**PART-B****Note: Answer any four questions.****(4 x 15 = 60 Marks)**

11. a) Explain in detail Image Sensing and Acquisition.
- b) Consider the Image segment shown, Let  $V=\{1,2\}$  Compute the Length of shortest 4, 8 and m-path between p & q.

	5	4	3	1	1(q)
	5	4	0	2	0
	3	2	0	2	4
(p)	2	1	1	3	5

12. a) Obtain K-L transform basis for the following matrix of samples:

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

- b) Mention the properties of HAAR transform and describe the steps to derive HAAR transform.

13. a) Define Histogram? Perform Histogram equalization on the given segment of Image?

10	11	12	11	10
12	12	13	5	4
13	12	5	3	5
13	12	4	3	5
12	4	5	4	4

- b) Explain image sharpening filters in frequency domain.
14. a) What is meant by Image restoration? Explain the model of Image degradation?  
b) Explain about Constrained Least square restoration?
- 15 a) What is Edge detection? Describe the types of Edge detection operations.  
b) Explain Global, local and Adaptive thresholding.
16. a) Discuss in detail Laplacian and Gradient operators.  
b) There are six symbols  $a_1, a_2, a_3, a_4, a_5$  &  $a_6$  having the following probabilities. Compute Huffman code for the symbols

Symbol	probability
a1	0.1
a2	0.4
a3	0.06
a4	0.1
a5	0.04
a6	0.3

17. Write short notes on any two
- Fundamental steps in image processing.
  - Contrast Stretching in Image enhancement
  - Estimation of Degradation functions

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**FACULTY OF ENGINEERING**

**B.E. (ECE) VI – Semester (CBCS) (Main) Examination, December 2020**

**Subject: Data Communication & Computer Networking (Elective – I)**

**Time: 2 Hours**

**Max.Marks: 70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

1. List out the features of TCP/IP model.
2. Briefly describe the functions of MAC sublayer.
3. A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system produces 1000 frames/second?
4. Mention the functional differences between Circuit Switching and Packet Switching.
5. What is the purpose of NAV?
6. List out the design goals of Network layer.
7. Explain transport service primitives.
8. What is fragmentation, list at least two differences between transparent and non-transparent fragmentation.
9. Bring out the difference between symmetric-key and public-key signatures.
10. Describe the importance of MIME.

**PART – B**

**Note: Answer any four questions.**

**(4 x 15 = 60 Marks)**

- 11 a) Explain ISO-OSI model of Network architecture.  
b) Describe X.25 protocol.
12. a) Describe IEEE 802.11 standard.  
b) Bring out the differences between a repeater, bridge and a router.
13. a) Explain Hierarchical routing and Distance Vector Routing.  
b) Describe Classless Inter Domain Routing.
- 14 a) Describe IPv6 protocol and bring out its advantages over IPv4.  
b) Describe ATM networks.
15. a) List out the applications of TCP and UDP. Describe TCP.  
b) Explain the architecture of DNS.

16. a) Describe client and server side of web browser.  
b) With the help of figure illustrate the basic elements of Product- Cipher.
17. Write short notes on any two:
- a) World Wide Web
  - b) Bluetooth
  - c) Authentication protocol.

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**FACULTY OF ENGINEERING**

**B.E. (ECE) VI - Semester (CBCS) (Main) Examination, December 2020**

**Subject : Optical Communication (Elective-I)**

**Time : 2 hours**

**Max. Marks : 70**

**PART – A**

**Note: Answer any five questions.**

**(5 x 2 = 10 Marks)**

- 1 Define total internal reflection.
- 2 Define cutoff wavelength.
- 3 Explain Rayleigh scattering losses.
- 4 Explain acceptance angle of a fiber.
- 5 Explain different types of splicing techniques.
- 6 List the characteristics of light sources required in optical communication.
- 7 How the response time of APD is estimated?
- 8 Define quantum efficiency.
- 9 What are the uses of SONET / SDH?
- 10 Explain connector return loss.

**PART – B**

**Note: Answer any four question.**

**(4 x 15 = 60 Marks)**

- 11 a) Derive the numerical aperture of step index fiber [SI] from Snell's law.  
b) A multimode step index fiber with a core diameter of  $80\mu\text{m}$  and a relative index difference of 1.5% is operating at a wavelength of  $0.85\mu\text{m}$ . If the core refractive index is 1.48, estimate the normalized frequency for the fiber and number of guided modes.
- 12 a) Explain in detail the design optimization of single mode fibers.  
b) Give expression of pulse broadening in graded index fiber.
- 13 a) Explain the structure of DFB laser.  
b) The radiative and nonradiative recombination life times of minority carriers in the active region of a double hetero junction LED are 60nsec and 90nsec respectively. Determine the total carrier recombination life time and optical power generated internally if the peak emission wavelength  $\lambda_s$  870nm and the drive current is 40mA.
- 14 Explain the structure and principle of working of APD.
- 15 a) A transmitter has an output power of 0.1 mW. It is used with a fiber having  $NA = 0.25$ , attenuation of 6dB/km and length 0.5km. The link contains two connectors of 2dB average loss each. The receiver has a minimum acceptable power (sensitivity) of -35dBm. The designer has allowed a 4dB margin. Calculate the link power budget.  
b) What is the significance of a system considerations in point to point fiber links?

- 16 Explain the fiber materials used in fabrication requirements.
- 17 a) Explain the rise time budget analysis with its basic elements that contributes to system rise time.
- b) State the factors on which the power launching capability of source is dependent

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