Code No: 14664/CBCS

FACULTY OF ENGINEERING

BE (Civil) VI-Semester (CBCS) (Backlog) Examination, March/April 2021

Subject: Waste Water Treatment (Elective-II)

Time: 2 hours **Max. Marks: 70**

Note: Missing data, if any may be suitably assumed.

PART – A

Answer any five questions. **(5x2 = 10 Marks)**

1 Mention the important factors to be considered in planning for waste water treatment.
2 State the basic steps involved in nitrification.
3 Mention the formula for the computation of volatile suspended solids.
4 State the equation for the calculation of lagoon winter temperature.
5 How volumetric BOD for anaerobic ponds is computed?
6 Why minimum retention times are maintained in maturation ponds?
7 List the important factors to be considered in the site selection of over land flow systems.
8 List the factors that govern the height of groundwater mound in rapid infiltration systems.
9 Mention the assumption behind the continuous flow stirred tank reactor model.
10 Quote the tolerance limit for discharge of industrial effluents into streams.

PART – B

Answer any four questions. **(4x15 = 60 Marks)**

11 (a) Explain the salient features of Denitrification-Nitrification system.
(b) Design a grit chamber to remove particle upto a size of 0.2mm having a specific gravity of 2.65. The average working temperature is 20^{o}C. A flow through velocity of 0.25m/s will be maintained by providing a proportional weir. Determine the channel dimensions for a maximum sewage flow of 15.0 Mld.

12 (a) List the important characteristics of different types of aerated lagoon.
(b) Determine the aerobic flow through type lagoon size and power requirements for a flow rate of 124000 cum/d. Assume influent 5 days BOD as 300 mg/l, effluent BOD as 20 mg/l and detention time as 3 days.

13 (a) Design the anaerobic pond in a waste stabilization pond to treat 2.0 Mld of waste water which has a BOD of 350 mg/l. The design temperature is 30^{o}C and net evaporation rate is 6mm/day.
(b) Design the facultative pond in a waste stabilization pond to tread 1.0 Mld of wastewater which has a design loading of 350 kg BOD/ha-d. The design temperature is 30^{o}C.

14 (a) Determine the hydraulic loading rate and area required for a rapid infiltration system handling a flow rate of 10 Mld. The infiltration rate of the proposed site is 38mm/hr. Adopt an operating cycle of 10 days with an application period of 3 days. Further, assume an application factor of 0.1.
(b) Determine the capacity of the anaerobic sludge digester based on per capita volumetric loading rate and sludge volume reduction in digester. Capacity of the plant is 3 Mld; SS removal efficiency in the primary clarifier is 65%; influent SS concentration is 200 mg/l; moisture content in sludge is 90%; volatile solids destroyed is 65%; digested sludge solids concentration is 8% ; specific gravity of primary sludge is 1.02 while that of digested is 1.04; density of water is 1000 kg per cu.m. and mean cell residence time is 12 days.

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15 (a) Show from first principles that the outflow tracer concentration in a plug flow reactor model is a function of inflow tracer concentration.

(b) Determine the length and number of discharge ports for a multiport diffuser that will provide near field dilution of 10 when discharging at a maximum flow of 4.0 cumec into a river. Under low flow conditions the river water depth is 3.0 m and current speed is 0.45 m/s.

16 A town discharge 1.25 cumec of sewage into a river having a flow rate of 8 cumec during a lean period with a velocity of 0.7m/s. The 5 day Bod of sewage and river at the given temperature are 250 mg/l and 2.0mg/l. The DO contents of effluent and river water prior to mixing are 0.0 mg/l and 9.14mg/l respectively. Find the amount of critical DO deficit, its time and location in the d/s portion of the river. Assume deoxygenation coefficient as 0.174 day-1 and coefficient of self purification as 4.67. Saturation DO at the given temperature is 10.15 mg/l.

17 Design the denitrification step for a complete mixing activated sludge system to treat wastewater from a community of 60000 people. Assume 5 day raw BOD as 360mg/l and average sewage flow as 9000 m^3/d. Assume 30% BOD removal in primary settling and 90% in biological step. Raw TKN is 53 mg/l and 40 mg/l after settling. Winger temperature of mixed liquor is 10^oC. Yield coefficient (Y) is 0.6 Endogenous decay rate constant per unit time (K_d) is 0.07/d (5 day BOD at 15^oC). MLSS is 4000 mg/l. VSS/SS is 0.8. Assume organic nitrogen in effluent as 5 mg/l.

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Code No: 14665/CBCS

FACULTY OF ENGINEERING

BE VI-Semester (CE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Ground Improvement Techniques (Elective-II)

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 List out the different mechanical stabilization methods?
2 The conversion of well graded in situ soil into a poorly graded soil is called “Blending of aggregates”. Answer yes or no and justify your answer?
3 What are the characteristics of a good grout material? Explain.
4 “In cement stabilization method, the water for hydration requirements calculated from the water-cement ratio is adequate for compaction of soil to its MDD”. Answer yes or no and justify your answer?
5 Define suitability number?
6 Comment on effectiveness of vibration methods in in-situ densification of clay?
7 What is meant by stone columns? Explain.
8 What does band drain means?
9 Name types of geo-textiles used in civil engineering?
10 Write a brief note on geo synthetics as reinforcement.

PART – B

Answer any four questions. **(4x15=60 Marks)**

11 (a) Explain the Rothfutch’s method of proportioning of materials in mechanical stabilization of Soils?
(b) Explain the objectives of ground improvement with suitable examples?

12 (a) Write a detailed note on bitumen stabilization?
(b) Briefly explain about compaction and jet grouting. Discuss their advantages and disadvantages?

13 (a) Explain the mechanism of in-situ densification of cohesion less soils in dry, partially saturated and fully saturated states, using vibration method?
(b) Describe “vibro-floatation” technique including its merits and demerits?

14 (a) What are the different thermal and vacuum methods available for densification of cohesive soils? Explain.
(b) Explain in detail about the method of pre-loading. How do vertical drains improve the functioning of preloading techniques?

15 (a) Explain with the help of a flow chart, the various classifications of geo synthetics in details?
(b) Explain the concept of reinforced earth. Describe the reinforced soil wall with the help of a neat sketch?

16 (a) Explain how ‘blasting technique’ is effective in ground improvement? Describe the procedure in brief?
(b) Identify the benefits and factors influencing soil-cement stabilization?

17 Answer any two of the following:
(a) Blending of aggregate
(b) Lime piles
(c) Wick drains

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Code No. 14666 / CBCS

FACULTY OF ENGINEERING

B.E. (Civil) VI – Semester (CBCS) (Backlog) Examination, March/April 2021

Subject: Watershed Management (Elective – II)

Time: 2 hours **Max. Marks: 70**

Note: Missing data, if any may be suitably assumed.

PART – A

Answer any five questions. **(5x2 = 10 Marks)**

1 What is watershed management?
2 Why is the watershed management important?
3. List the different types of watersheds based on sizes.
4 Write about the number of watersheds and their creation in India for the watershed management.
5 What are the different types of erosions?
6 How to access rainwater harvesting potential of an area?
7 Define land capability classification.
8 What are the constraints in agriculture management?
9 What is the important aspect of biomass management?
10 What are acidic and sulphide soils?

PART – B

Answer any four questions. **(4x15=60 Marks)**

11 a) Discuss the watershed concept with the perspective of holistic development of an area.
b) Discuss watershed approach for planning, implementation and management?

12 a) Explain in detail the role of people's awareness, participation and response in the socio economic development of a watershed.
b) Classify the various watershed characteristics and discuss its importance in watershed management.

13 (a) Explain briefly the different types of soil erosions. What are the factors effecting soil erosion?
b) Briefly discuss about the management of forest land and grassland in a watershed.

14 a) Describe the artificial recharge scheme for ground water improvement.
b) Discuss the water quality issues in rain water harvesting.

15 a) What are the challenges associated with community based watershed management?
b) What are the advantages of GIS applications for various problems?

16 a) What is crop husbandry? Discuss briefly the various agro-techniques for improved crop production.
b) What are the different types of saline soils? Discuss briefly about them.

17. Write short notes on:
a) Objectives of watershed management.
b) Dry land agriculture
c) Measures to control erosion.

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Code No. 14674/CBCS

FACULTY OF ENGINEERING

B.E. (EEE) VI-Semester (CBCS) (Backlog) Examination, March / April 2021

Subject : AI Techniques (Elective-II)

Time: 2 hours **Max. Marks: 70**

Note: Missing data, if any may be suitably assumed.

PART – A

Answer any five questions. **(5x2 = 10 Marks)**

1 Define Artificial Intelligence.

2 List the characteristics of ANN?

3 Write briefly about unsupervised learning.

4 Differentiate single layer and multilayer neural networks.

5 Write briefly about membership function?

6 State the fuzzy Demorgan's Laws.

7 Draw the block diagram of fuzzy logic control system.

8 Define the chromosomes and fitness function.

9 Write about the encoding in the genetic algorithms?

10 What are the applications of fuzzy logic?

PART – B

Answer any four questions. **(4x15=60 Marks)**

11 a) Differentiate between hard computing and soft computing techniques.
b) What are the steps involved in training algorithms of perceptron?

12 a) Explain the concept of Artificial Neural Network and its basic model.
b) The input shows 12 points in two dimensional space. Cluster these points using k-means clustering algorithm. The 12 points are given as

No	1	2	3	4	5	6	7	8	9	10	11	12
X	2	3	2	3	6	7	6	7	2	3	2	3
Y	3	3	6	6	3	3	4	4	4	4	7	7

13 a) Explain briefly about defuzzification methods .
b) Let A, B, C are the 3 fuzzy sets defined on the universe of discourse A: $\{a_1, a_2, a_3\}$, B: $\{b_1, b_2\}$, C: $\{c_1, c_2, c_3\}$ respectively.
Let R be a relation on A x B and S be a relation on B x C defined as given below.

$R=\begin{bmatrix} 0.5 & 0.1 \\ 0.2 & 0.9 \\ 0.8 & 0.6 \end{bmatrix}$ and $S = \begin{bmatrix} 0.6 & 0.4 & 0.7 \\ 0.5 & 0.8 & 0.9 \end{bmatrix}$ Find Min Max composition.

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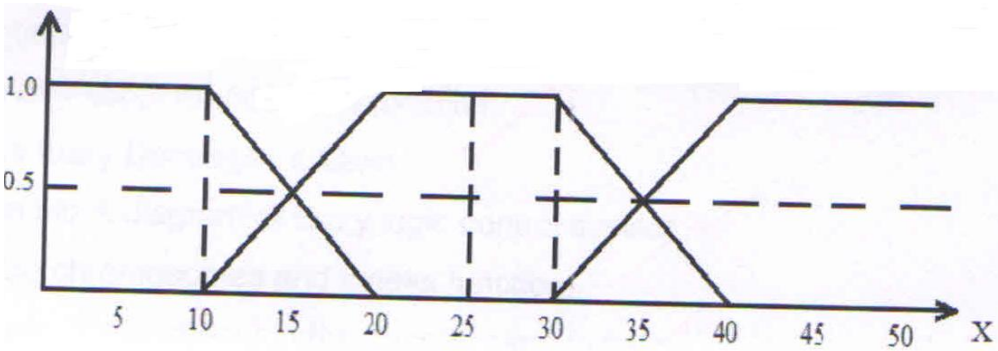
14 a) Explain fuzzification and defuzzification of fuzzyset.
   b) Given the membership function, find the degree of membership values and the expression for them X: 17.5



15 a) Name and describe the main features of genetic algorithm
   b) Explain various crossover method with examples

16 a) Write short notes on the applications of artificial neural network in electrical engineering.
   b) Write short notes on the applications of genetic algorithm in electrical engineering.

17 Write a short notes on
   a) Functional link Network
   b) Fuzzy rule base
   c) Reproduction operators

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Code No: 14675/CBCS

FACULTY OF ENGINEERING

BE VI-Semester (EEE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Electric Distribution System (Elective-II)

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 Define: Demand factor and contribution factor.
2 Find average power loss, if power loss at peak load is 100kw and loss factor is 0.4.
3 List out the advantages of breaker and half bus scheme.
4 What are the voltage levels of primary and secondary distributions?
5 What is an express feeder?
6 Explain briefly about secondary distribution system with line diagram.
7 What is the role of capacitor bank in electrical power distribution system?
8 What are the methods to reduce flickering in distribution system.
9 Mention advantages of SCADA in power distribution.
10 List out merits and demerits of shunt compensation.

PART – B

Answer any four questions. **(4x15=60 Marks)**

11 (a) Explain about different types of distribution transformers.
(b) Explain in detail different rate structures in electrical distribution system.

12 (a) A distribution substation of a company supplying power to a small city experiences an annual peak load of 450kw. The total annual energy supplied to the primary feeder circuit is 10,000,000kw. Find
(i) The Annual average power demand
(ii) Annual load factor
(b) Explain in detail sub transmission system with neat sketches.

13 Explain in detail general total cost equation with and without constraints.

14 Assume that a three-phase 500-hp 50Hz 4160V star connected induction motor has a full load efficiency of 50%, a lagging power factor of 0.75, and is connected to a feeder. If it is desired to correct the power factor of the load to a lagging power of 0.9 by connecting three capacitors at the load, determine the following:
(a) The rating of the capacitor bank, in kvar
(b) The capacitance of each unit if the capacitor are connected in delta, in microfarads.

15 Explain a step by step method to determine the best capacitor location in a distribution system.

16 Explain different bus shames used distribution system.

17 Write a short note on:
(a) Automation in distribution system
(b) Voltage fluctuations in distribution system

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Code No: 14676/CBCS

FACULTY OF ENGINEERING

BE VI - Semester (EEE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Digital Control Systems (Elective-II)

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 Mention the different theorem of Z transformer.
2 Define A/D converter with a neat sketch and mention the types of A/D converters.
3 A control system has the following characteristic equation $P(z)=z^3-1.3\,z^2-0.08Z+0.24=0$ determine the stability of the system.
4 State about state transmission matrix.
5 Write state equation and output equation for discrete and continuous time control systems.
6 State the Routh stability criterions.
7 What are the effects of lead-lag compensator on the system performance?
8 Write a note on transient response analysis.
9 Write state equation and output equation for discrete and continuous time control systems.
10 State the Ackerman's formula.

PART – B

Answer any four questions. **(4x15= 60 Marks)**

11 The input-output of a sampled data system is described by the difference equation y (k+2) +3y (k+1) +4y (k) =r (k+1)-r (k). Determine the pulse transfer function.

12 Write the discretization of continuous time state space equations.

13 Draw and explain the mapping between s-plan to z-plan for the following
(i) constant frequency loci (ii) constant damping ratio loci

14 Explain the design procedure in the ω-plane of lag compensator.

15 (a) Explain about lead compensator along with necessary circuit diagram and equations.
(b) What are the necessary conditions for pole placement.

16 Find the inverse Z transforms of the following functions using integral method

$$Z(s)=\frac{3z^2+2z+1}{z^2-3z+2}$$

17 Examine whether the discrete data system given below.

$$X(K+1)=\begin{bmatrix}0 & 1\\ -3 & -4\end{bmatrix}X(K)+\begin{bmatrix}1\\ -1\end{bmatrix}u(K)$$

Y(K)=[1 0] X(K)
(i) State controllable (ii) Output controllable

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Code No: 14678/CBCS

FACULTY OF ENGINEERING
BE VI - Semester (EIE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Piping & Instrumentation Diagrams (Elective-I)
Time: 2 Hours **Max .Marks: 70**
Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 List out the various P & I Diagrams objectives.
2 Define with example the following:
(i) Discrete Instruments (ii) Tag number
3 What do you mean by inscriptions? Explain
4 Outlined the philosophy aspects of instrumentation installation.
5 Discuss the various conditions to be followed for revision for handling of licensed process of P & IDs
6 State the abbreviations of the following:
(i) LSHH (II) BL (iii) BFW (iv) UFD
7 What do you mean by valve numbering? Explain
8 Differentiate between binary logic diagrams and analog loop diagrams.
9 State and explain smart P & IDs with example.
10 Mention how the approval for preparation of P & IDs shall be obtained.

PART – B

Answer any four questions. **(4x15= 60 Marks)**

11 Explain different types of engineering drawing with relevant examples.

12 With examples, explain interpreting of various P & IDs equipment.

13 (a) List out the various symbol and abbreviations units used for preparation of P & IDs.
(b) Explain the minimum information to be shown on P & IDs.

14 (a) Discuss various sample connections used for preparation of P & IDs.
(b) Explain in detail the designing criteria for utility flow diagrams with relevant examples.

15 (a) Outlined the general requirement for preparation of P & IDs.
(b) Explain in detail the establishment of P & IDs preparation steps.

16 (a) Discuss in detail scope of P & IDs.
(b) What do you mean by steam trap assembly? Explain in detail.

17 Discuss briefly the following:
(a) KKS numbering
(b) Industry codes and standards
(c) Smart P & IDs

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Code No: 14684/CBCS

FACULTY OF ENGINEERING
BE VI-Semester (ECE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Digital Image Processing (Elective-I)

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 Explain the difference between photonic and scotopic Vision.
2 Explain how an image to be sensed by human eye.
3 Explain how fouries transform is useful in image processing.
4 List the properties of DFT.
5 What is gray level slicing?
6 Define histogram.
7 What is meant by restoration?
8 Draw the model of image degradation process.
9 What is run length coding?
10 What is global, local and dynamic con adaptive thrush old?

PART – B

Answer any four questions. **(4x15=60 Marks)**

11 (a) Explain distance measure w.r.to pixels.
(b) Consider the image segment shown below let V= {1, 2} and compute the lengths of the shortest 4-, 8-, m- path between p and q. If a particular path does not exist between these two points explain why?

	3	1	2	1	(q)
	2	2	0	2	
	1	2	1	1	
(P)	1	0	1	2	

12 (a) Derive the basis functions of Haar for N=8 and give its sequence.
(b) Derive the basis functions of Hardmard for N=8.

13 (a) Explain in detail about histogram equalization method of image enhancement.
(b) Draw the block diagram of humomorphic filtering and explain its implementation.

14 (a) What is the use of wieners filter in image restoration. Explain.
(b) Explain periodic noise reduction method.

15 (a) Construct Huffman code for the following table

Gray scale (rk)	0	1	2	3	4	5	6	7
Probability p(rk)	0.09	0.13	0.15	0.10	0.14	0.12	0.110	0.16

(b) Discuss about region based image segmentation technique.

16 (a) Explain in detail the about the fundamental steps involved in digital image processing system.
(b) Compare spatial and frequency domain methods.

17 (a) Explain about geometric transformation.
(b) Write about edge detection.

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Code No: 14685/CBCS

FACULTY OF ENGINEERING
BE VI - Semester (ECE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Data Communication & Computer Networking (Elective-I)

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 What are the uses of computer networks?
2 Define CSMA.
3 Explain bus and star topology.
4 Distinguish between TCP and UDP protocols.
5 What is broadcast routing?
6 What is the ATM AAL layer protocol?
7 What are the functions of MAC sub layer?
8 Differentiate between bridges and routers.
9 What is the difference between symmetric and asymmetric key.
10 Differentiate between public key and private key algorithm.

PART – B

Answer any four questions. **(4x15= 60 Marks)**

11 (a) Explain the protocol architecture of LAN?
(b) Explain the architecture of TCP/IP protocol and compare it with OSI model?

12 (a) Explain the frame structure of HDLC?
(b) Explain IEEE 802.11 architecture and services?

13 (a) Draw the IPV6 header format and explain various fields in it?
(b) Explain about the distance vector routing algorithm?

14 (a) Explain in detail the elements of transport protocols?
(b) Draw and explain the TCP segment header?

15 (a) Explain the architecture and services of E-mail?
(b) Explain the process of encryption and decryption with a neat sketch?

16 (a) Explain the different layers of OSI reference model?
(b) Draw the IPV4 header format and explain in various fields on it?

17 Write short notes on:
(a) DNS
(b) SNMP

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Code No: 14686/CBCS

FACULTY OF ENGINEERING

BE VI-Semester (ECE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Optical Communication (Elective-I)

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 Define refractive index. Give refractive index values for glass and air.
2 Explain the concept of total internal reflection with diagram.
3 Differentiate intra-modal and inter modal dispersion.
4 How is numerical aperture effect optical coupling of signal.
5 Why direct band gap materials are used for optical sources.
6 For a wavelength of 1500nm, what is the band gap energy in eV.
7 What is quantum limit?
8 Write on WDM and its advantage in optical communication.
9 What is splicing and its application in OC.
10 Explain SONET/SDH interfaces.

PART – B

Answer any four questions. **(4x15=60 Marks)**

11 (a) Write the advantages and disadvantages of optical communication. Which wavelengths are used in optical communication and give reasons?
(b) Why is group delay used in optical communication? Derive an expression for group delay.

12 (a) Explain scattering in optical fibers and their contribution to power loss.
(b) Calculate the V number in a multimode step index fiber, a=100 μm, core index of 1.468 and a cladding index of 1.447 at the wavelength of 850nm.

13 (a) Explain Fabry-perot resonator used in laser and derive governing equation for lasing action.
(b) Why are lenses used in interfacing optical source and fiber? What is non-imaging microsphere.

14 (a) How is PIN diode differ from APD. Explain the phenomenon and concept of multiplication factor in APD.
(b) Explain the terms internal and external quantum efficiency of an optical source.

15 (a) Explain the performance parameters for an optical receiver.
(b) Define De Bragg's law and discuss how a laser source is effectively designed to be a single mode source.

16 (a) How is the attenuation of optical signal takes place in fiber. What are the different losses that effect the transmission of optical signal.
(b) Give the considerations on subsystems for P to P link and explain the importance of power and rise time budgets.

17 Write short notes on two of the following:
(a) Compare LED and laser sources.
(b) Write on information capacity in fiber
(c) Write on safety margin in p to link

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Code No. 14699/CBCS

FACULTY OF ENGINEERING

B.E. VI – Semester (CBCS) (MECH.)(Backlog) Examination, March / April 2021

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

Time: 2 hours **Max. Marks: 70**

Note: (Missing data, if any may be suitably assumed)

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1. What is the importance of non-conventional energy sources?
2. What are the limitations of wind energy?
3. How do you classify the various non-conventional energy sources?
4. Explain the basic operation principle of concentrated solar collectors.
5. What is a paraboloidal collector? Explain briefly.
6. What do you understand by angle of attack in wind energy system?
7. Differentiate between tidal and wave power generation.
8. What is pyrolysis of biomass?
9. What is a solar pond?
10. What are the features of OTES systems?

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11. (a) What is the global scenario and importance of non-conventional energy source? Explain in detail.
    (b) What is the criteria for assessing the potential of non-conventional energy sources?

12. (a) Explain in detail the working principles of flat plate collectors and concentric sphere collectors.
    (b) Explain in detail about the Stirling and Brayton engines.

13. Write in detail about Natural and Forced convection.

14. What do you understand by geothermal sources? Explain in detail.

15. Explain the working of OTES with suitable examples.

16. Write in detail about Biomass gasification system in power generation with a neat diagram.

17. (a) Write briefly about dry steam and wet steam geothermal energy systems.
    (b) How does composting help in energy generation.
    (c) What is the principle of photovoltaic cells?

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Code No. 14701/CBCS

FACULTY OF ENGINEERING

B.E. (Prod) VI - Semester (CBCS)(Backlog) Examinations, March / April 2021

Subject: Flexible Manufacturing Systems (E-I)

Time : 2 Hours **Max. Marks: 70**

Missing data, if any may be suitably assumed

PART – A

Note: Answer any Five Questions **(5x2= 10Marks)**

1. Define Group Technology and explain how it benefits in FMS.
2. Explain a simple digraph with a figure.
3. What do you understand by machine diagnostics and maintenance?
4. What is in- house development?
5. What are network databases in FMS?
6. What is Computer Aided Process Planning (CAPP) or work scheduling?
7. What is output data at the end of grouping process in KBGT?
8. What are the different manufacturing costs?
9. What are the five functional units in the physical architecture of FMS? Explain with a sketch.
10. Explain the Kanban System in FMS.

PART - B

Note: Answer any Four Questions **(4x15= 60Marks)**

11. What are the four components of knowledge – based scheduling system? Explain in detail.

12. What are the applications of FMS in manufacturing?

13. Explain the hierarchy of computers within a typical factory and show with the help of a neat sketch the typical FMS control elements.

14. Explain the four extrinsic operating functions of FMS Control.

15. Discuss the case study of FMS database flow for a wire harness system.

16. Write the Rank Order Clustering (ROC) algorithm based on the sorting of rows and columns of machine- part incidence matrix.

17. a) What are the different layouts in FMS?
    b) What are the benefits of JIT?
    c) What do you understand by quantitative analysis in FMS?

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Code No: 14705/CBCS

FACULTY OF ENGINEERING
BE VI-Semester (AE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Material Handling and Earth Moving Vehicles (Elective-I)
Time: 2 Hours **Max .Marks: 70**
Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 Mention the uses of high angle conveyors.
2 What is the difference between Bunkers and Silo's?
3 What is Hoisting?
4 Give the difference between Crawler Mounted and Truck Mounted Cranes.
5 What are the requirements of off road vehicles?
6 Mention the uses of Ditchers.
7 Write the uses of Fork-Lifts.
8 What are the Applications of tractors?
9 What are the components of Dozers?
10 Differentiate Diesel Shovel and Hydraulic Shovel.

PART – B

Answer any four questions. **(4x15=60 Marks)**

11 How the various Drive Pulley arrangements work? Write about them in detail with neat sketches.

12 (a) Explain the different parts of Tower Crane with neat sketch.
(b) Write note on stability of Mobile cranes.

13 Explain different types Land clearing machines with neat sketches.

14 (a) List out various containers and Supports used in material handling.
(b) What are recent trends in tractor design?

15 What are the major components of Dump Trucks? Explain them in detail.

16 (a) Explain in detail automation in the handling of material.
(b) What is Slewing mechanism? Explain with neat sketch.

17 Write short note followings:
(a) Stackers and reclaimers.
(b) Single bucket, multi bucket loaders.
(c) Tree dozer.

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Code No: 14706/CBCS

FACULTY OF ENGINEERING

BE VI-Semester (CBCS) (A.E.) (Backlog) Examination, March / April 2021

Subject : Finite Element Methods (Elective – I)

Time : 2 Hours **Max. Marks: 70**

Missing data, if any may be suitably assumed

PART – A

Note: Answer any Five Questions **(5x2= 10Marks)**

1. Write Governing differential for one dimensional stress analysis.
2. Write general stress-strain relations
3. Define local, global and natural coordinates.
4. Derive the shape functions for 1-D quadratic element with one degree of freedom at each node.
5. Write short note on CST.
6. Write the boundary conditions for one dimensional Heat Transfer problem.
7. Sketch a truss and beam element showing degrees of freedom at each node.
8. Write boundary conditions for beam problem.
9. What do Eigen value and Eigen Vector represent?
10. List five FEA software's used for heat transfer analysis.

PART - B

Note: Answer any Four Questions **(4x15= 60Marks)**

11. a) Explain Basic Concept of solving a problem using FEM.
    b) Write about Rayleigh – Ritz method and its applications

12 Calculate the nodal displacements, element stresses and support reactions in the bar shown in fig. 1. Load P = 70 x 10^3 N is applied as shown. Take E=20 x 10^3 N/mm^2.

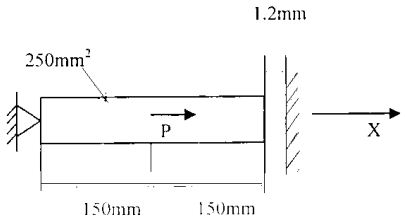
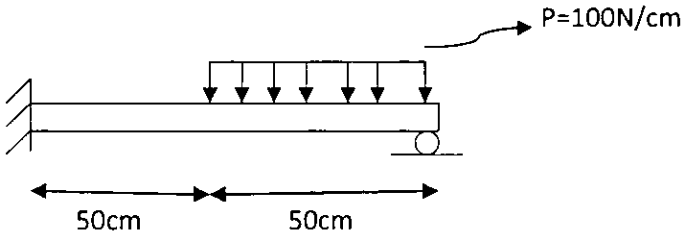


Fig.1

..2

13. Calculate the temperature distribution in fin having length 12cm. and radius 2cm. Assume the tip of the fin to be insulated. Consider two elements. K = 3W/cm ^oC, h = 0.1 W/cm^2 ^oC, T_∞ = 20^oC and base temperature = 160^oC.

14. Calculate the nodal displacements for the beam shown in figure. E = 20 x 10^6 N/cm^2 and 1 = 2500cm^4



15. Write the basic stress – strain relations and derive material matrix for three dimensional analysis

16. a. Derive the element mass matrix for distributed mass system.
    b. Derive the shape functions of two dimensional four nodded element.

17. a. Derive shape functions of one dimensional linear element and one dimensional Quadratic element.
    b. Write material matrix for plane stress and plane strain condition

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Code No: 14711/CBCS

FACULTY OF ENGINEERING

BE VI - Semester (CSE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Graph Theory and its Applications (Elective-II)

Time: 2 Hours **Max .Marks: 70**

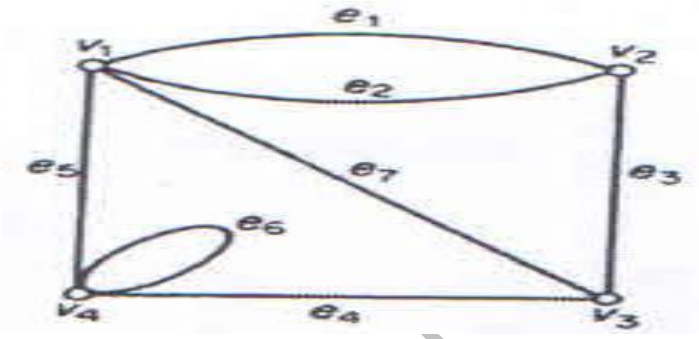
Note: Missing data, if any, may be suitably assumed

PART – A

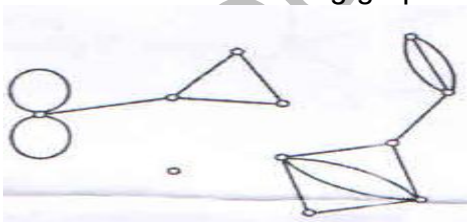
Answer any five questions. **(5x2=10 Marks)**

1 What is a connected graph? Give an example.

2 Find the adjacency matrix of the following graph.

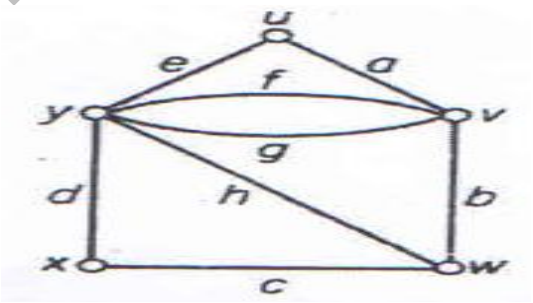


3 What is a block? Find the blocks of the following graph.



4 What is a perfect matching in a graph?

5 Find two spanning sub graph and induced sub graph of the following graph:



6 What is a line graph? Give an example.

7 What are the conditions for a simple graph to be in class-1 and cass-2 graphs?

8 Define a path, cycle and a trail.

9 What is a chordal graph?

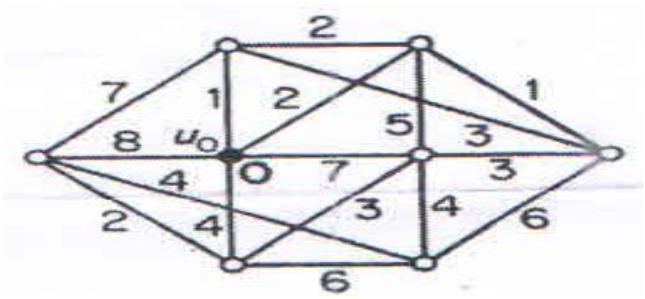
10 Show that k_5 is nonplanar.

..2..

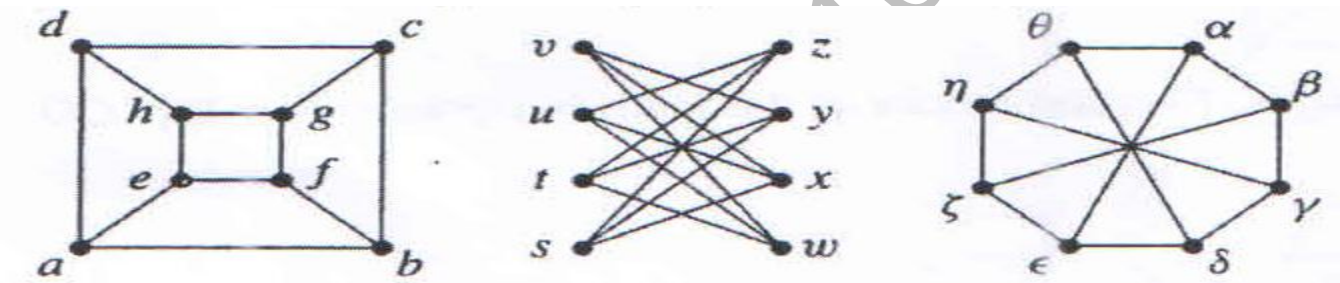
PART – B

Answer any four questions. **(4x15= 60 Marks)**

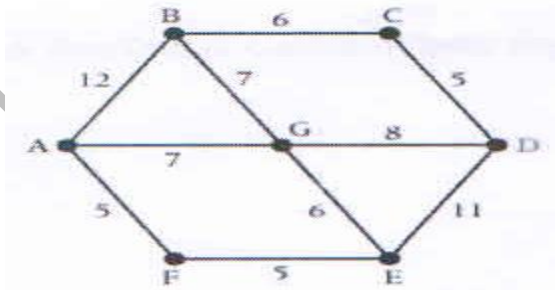
11 Using the Dijkstra's algorithm, find the shortest path of the following graph:



12 (a) Explain the conditions for isomorphism of graphs.
(b) Which of the following pairs of graphs are isomorphic?



13 (a) Explain Fleury's algorithm.
(b) Find optimal tour of the following graph by applying Chinese postman algorithm.



14 (a) Prove that every planar graph can be colored with 5 colors.
(b) If G has at least three vertices, then G is 2-connected if and only if every two vertices u and v are contained in a cycle.

15 (a) Show that a tree has at most one perfect matching.
(b) Write short notes on covering of graphs.

16 (a) Explain the different operations on graphs.
(b) Explain the properties of trees.

17 Explain the following terms with examples
(a) Directed graph
(b) In-degree, Out-degree
(c) Network
(d) Flow
(e) Walk

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Code No: 14713/CBCS

FACULTY OF ENGINEERING
BE VI - Semester (CSE) (CBCS) (Backlog) Examination, March / April 2021

Subject: Advanced Databases (Elective-II)

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 What is distributed databases?
2 What is join?
3 List the various types of distributed databases.
4 List the various factors which are considered while processing a query.
5 Mention the two factors which play an important role in parallel query optimization.
6 List the goals of query optimization.
7 What is tuning of transactions?
8 What is SQL?
9 What is object relational database?
10 Define mobility databases.

PART – B

Answer any four questions. **(4x15= 60 Marks)**

11 Briefly explain the persistent programming languages in objet based databases.

12 Explain about storage of XML data.

13 Explain about evaluation of expressions in query processing.

14 Explain about Intra operation parallelism.

15 Discuss briefly the database issues in mobile computing.

16 (a) Explain about the goals of distributed database system.
(b) Discuss about the concurrency problems in distributed databases.

17 Write note on:
(a) Indexing of spatial data
(b) Tunable parameters

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Code No.14718/CBCS

FACULTY OF ENGINEERING

B.E. VI - Semester (IT) (CBCS) (Backlog) Examination, March / April 2021

Subject: Data Mining (Elective-II)

Time: 2 Hours **Max.Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions **(5x2=10 Marks)**

1 List the various stages of KDD process.
2 Why do we preprocess the data? Give any two reasons.
3 What are different approaches to mining multilevel association rules?
4 Write advantages and disadvantages of Apriori algorithm.
5 Define classification and information gain.
6 Outline the major steps of decision tree classification
7 What is an outlier analysis? Give uses of it.
8 What is clustering? List different methods of clustering.
9 Define multimedia mining.
10 Define precision and recall.

PART – B

Answer any four questions **(4x15=60 Marks)**

11 Draw the architecture of a typical data mining system and explain the role of each component in it.

12 a) Explain briefly Apriori Algorithm. Write its advantages and disadvantages.
b) Using FP-Growth algorithm, compute frequent patterns for the following transactional database with min-sup=60%

Tid	Item List
T100	C,M,S,B
T200	S,M,A,P
T300	A,M,B,P
T400	B,M,S

13 a) Explain about naïve Bayesian classification?
b) Discuss the metrics for increasing classifier performance.

14 What is clustering? Describe different methods of clustering in detail.

15 Explain spatial mining and web mining.

16 Suppose a hospital tested the age and body fat data for 18 randomly selected adults with the following result:

Age	23,23,27,27,39,41,47,49,50,52,54,54,56,57,58,58,60,61
Fat%	9.5,26.5,7.8,17.8,31.4,25.9.27.4,27.2,31.2,34.6,42.5,28.8,33.4,30.2, 34.1,32.9,41.2,35.7

a) Calculate the mean, median, and mode of the age and Fat%.
b) Draw the boxplots for age and Fat%.
c) Normalise the two variables based on z-score normalisation.

17 Write short notes on:
a) Density based classification
b) Prediction
c) Data mining trends

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Code No: 14719/CBCS

FACULTY OF ENGINEERING

BE VI - Semester (IT) (CBCS) (Backlog) Examination, March /April 2021

Subject: Software Quality and Testing (Elective-II)

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 Define quality and software quality assurance.
2 Why the defects are hard to find?
3 What are the categories of debugging?
4 How to implement software quality metrics?
5 What is acceptance testing?
6 Define 3 sigma?
7 What is a test case?
8 What are the tables in the test plans?
9 What is function point?
10 What is test log?

PART – B

Answer any four questions. **(4x15= 60 Marks)**

11 Discuss briefly the components of SQA system?

12 Explain briefly the configuration management activities?

13 (a) Explain different views of software quality.
(b) Discuss briefly the CMMI.

14 (a) Explain in detail eleven steps of software testing process.
(b) Write notes on acceptance testing.

15 Explain the methodology to evaluate automated testing tools.

16 Explain different metrics used in system testing.

17 Write notes on the following:
(a) JUNIT
(b) Load runner

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Code No: 14720/CBCS

FACULTY OF ENGINEERING
BE VI - Semester (IT) (CBCS) (Backlog) Examination, March / April 2021

Subject: Internet of Things (Elective-II)

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 List main components parts of IOT systems.
2 Why do IOT systems have to be self-adaptive, and self-configuring?
3 List the factors involved in defining a business model.
4 Differentiate between open source and closed source.
5 What is XaaS?
6 List few IEEE 802.15 protocols and define them.
7 Define network layer protocols.
8 Write briefly on MAC 802.15.4.
9 What is Z-wave?
10 Name service layer protocols of IOT.

PART – B

Answer any four questions. **(4x15= 60 Marks)**

11 (a) Explain in detail about the business processes in IOT.
(b) Explain IOT real world design constraints.

12 (a) What is state of the art architecture? Explain.
(b) Explain about M2M and IOT analytics.

13 Explain any two network layer protocols in detail.

14 (a) Explain DCCP, DTLS in detail.
(b) Explain any two session layer protocols.

15 Explain in detail about 6Low PAN, MAC 802.15.4.

16 (a) Discuss IOT deployment and operational view with parking lot example.
(b) Explain IOT information view with a neat diagram.

17 Write short note on:
(a) Service and application layer protocols.
(b) Session layer protocols.
(c) Data link layer & network layer protocols.

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Code No. 14133/N

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) II-Semester (New)(Backlog) Examination, March / April 2021

Subject : Water Resources Engineering - I

Time : 2 Hours **Max. Marks: 75**

Missing data, if any may be suitably assumed

PART – A

Note: Answer any Seven Questions **(7x3= 21Marks)**

1. What do you mean by precipitation due to turbulent ascent?
2. Differentiate between shallow and deep well.
3. What are the various methods of surface irrigation?
4. What do you understand by lining of canals
5. Write limitations of Bligh's theory
6. Draw the section of weir and barrage
7. Show that for pipe outlet will be proportional when setting is equal to 0.3
8. What is meant by 'falls' and where are they located.
9. State the difference between aqueduct and super passage.
10. The following data is available at the proposed site of a canal crossing

Item	Drain	Canal
B.L (m)	252.2	248.0
FSL/HSL (m)	253.2	253.0
Discharge (cumecs)	2	400

What is the most appropriate and economical C-D work at the above site and why

PART-B

Note: Answer any Three Questions **(3x18= 54Marks)**

11. (a) Explain the role of water resources in national development.
    (b) Explain the applications of hydrologic in cycle engineering.

12. (a) Explain the various type of irrigation efficiencies
    (b) Design a trapezoidal shaped concrete lined channel to carry a discharge of 100 cumecs at a slope of 25cm/km. The side slope of the channel are 1.5:1. Assume limiting velocity as 1.5m/s and N may be taken as 0.016

13. (a) Explain the causes of failures of weirs founded on permeable foundation
    (b) Explain Khosla's methods of independent variables. How do you apply corrections for (i) thickness of floor and (ii) interference of piles.

..2

14.(a) Differentiate between head regulator and cross regulator.
(b) Design the size and number of notches required for a canal fall with the following particulars
Full supply discharge = 4 cumecs
Bed width = 6.0m
F.S depth = 1.5m
Half supply depth = 1.0mf. Assume any other data if required.

15.(a) Write a note on selection of suitable type of cross-drainage works
(b) With the help of sketch explain the design steps involved in design of vertical drop weir

16.(a) Explain the tipping bucket method of rain gauge
(b) Compare kennedy and Lacey's silt theories.

17.(a) Write a note in the validity and applicability of Darcy's law
(b) Explain the criteria involved in the design of weirs based on Blighs Creep theory
(c) Draw a simple line diagram of a Syphon Aqueduct and correctly depict FSL & Bed levels of canal and drain.

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Code No. 14141

FACULTY OF ENGINEERING

B.E. 3/4 (EEE/Inst./ECE) II-Semester (Backlog) Examination, March / April 2021

Subject : Managerial Economics and Accountancy

Time : 2 Hours **Max. Marks: 75**

Missing data, if any may be suitably assumed

PART – A

Note: Answer any Seven Questions **(7x3= 21Marks)**

1. Explain Time perspective principle.
2. Define Profit.
3. Differentiate between consumer's demand and producer's demand.
4. What do you mean by demand forecasting?
5. Recall production function.
6. What is Break – Even point?
7. Write any two sources of Working capital.
8. Tell about capital budgeting.
9. Show the double entry of any two transactions in a book of record.
10. Define Trial balance.

Part-B

Note: Answer any Three Questions **(3x18= 54Marks)**

11. Explain the fundamental concepts of managerial economics

12. Illustrate various methods of Demand Forecasting.

13. Diagrammatically represent the cost – output relationship in the short –run.

14. Elaborate various sources of working capital.

15. A firm with a required rate of return of 10 percent is considering a project that requires an initial outlay of Rs. 15,500 and the cash inflows are given as follows:

Year	1	2	3	4	5
Cash inflow (Rs.)	3,000	4,000	6,000	5,000	4,000

Calculate the IRR and suggest whether the project is acceptable or not.

16. Differentiate between Capital expenditure and receipts with examples.

..2

17. From the following balances of Gupta, prepare the Trading and Profit and loss a/c as on 31.03.2004.

Particulars	**Amount (Rs.)**
Opening stock	20,000
Salaries	25,000
General expenses	2,000
Rent and Taxes	3,000
Purchases	90,000
Freight Inward	2,500
Advertising	1,500
Sales	1,85,000
Discount allowed	1,800
Discount received	1,000
Adjustments: Closing stock Rs. 18,000	

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Code No: 14158

FACULTY OF ENGINEERING

BE 3/4 (Mech./Prod.) II-Semester (Backlog) Examination, March/April 2021

Subject: Refrigeration and Air Conditioning

Time: 2 hours **Max. Marks: 75**

Note: Missing data, if any may be suitably assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1 Define C.O.P of a refrigerator.
2 Sketch P-V diagram of Bell coleman cycle.
3 Define compressor. What are types of compressors.
4 What is dry and wet compression in vapour compression system?
5 List few substances used as absorbent and refrigerant combination in vapour absorption system.
6 What are the advantages of stem jet refrigeration system?
7 Define (i) wet bulb temperature (ii) humidity ratio.
8 Name few components used in air conditioning systems.
9 Define bypass factor of cooing coil.
10 Define Room Sensible Heat Factor (RSHF).

PART – B

Answer any three questions. **(3x18 = 54 Marks)**

11 (a) What are the desirable properties of refrigerants.
(b) The atmospheric air at pressure 1 bar and temperature -5°C is drawn in the cylinder of the compressor of a bell Coleman refrigerating machine. It is compressed is entropically to a pressure of 5 bar. In the cooler, the compressed air is cooled to 15°C, pressure remaining the same. It is then expanded to a pressure of 1 bar in an expansion cylinder, from where it is then passed to the cold chamber. Find (a) the workdone per kg of air (b)the COP of the plant. For air assume law for expansion $PV^{1.2}$ =constant.
Assume for air C_p=1 kJ/kg and R=0.29 kJ/kg.

12 (a) Explain the performance improvement of simple vapour Compression system by using flash chamber and accumulator.
(b) Explain the working of two stage cascade refrigeration system with a neat sketch.

13 (a) Explain the working of Electrolux refrigerator. Mention its advantages, limitations and applications.
(b) Explain the working of Pulse tube refrigeration system.

14 (a) Define chemical dehumidification.
(b) An air-water vapour mixture enters an adiabatic saturator at 28°C and leaves at 18°C, which is the adiabatic saturation temperature. The pressure remains constant at 1.0 bar. Determine the relative humidity and humidity ratio of the inlet mixture.

15 (a) Explain energy conservation in air conditioning buildings.
(b) What are the different heating and cooling loads of a building considered for air conditioning design?

16 (a) What is the function of filter in air conditioning system? What are types of filters?
(b) Compare vapour compression and vapour absorption system.

17 (a) What is the effect of evaporator and condenser pressure on performance of vapour compression system.
(b) Explain the process of ozone depletion due to refrigerants. What are the zero ozone depletion refrigerants?

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Code No. 14165/N

FACULTY OF ENGINEERING

B.E. 3/4 (A.E) II-Semester(New) (Backlog) Examination, March / April 2021

Subject : Finite Element Methods

Time : 2 Hours **Max. Marks: 75**

Missing data, if any may be suitably assumed

PART – A

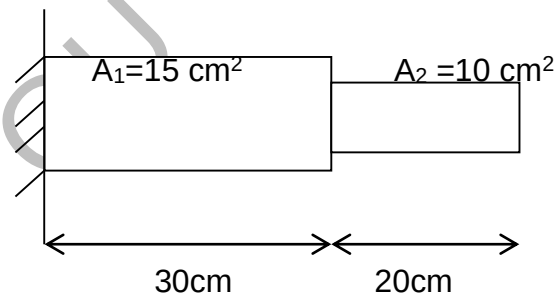
Note: Answer any Seven Questions **(7x3= 21Marks)**

1. Derive the shape functions of 1D linear element.
2. Distinguish between essential and natural boundary conditions.
3. Sketch ID bar, truss and beam elements. Show the degrees of freedom at each node.
4. Derive the transformation matrix for an inclined member of truss element.
5. Establish the Jacobean for a CST(Constant strain Triangle) element.
6. Distinguish between Iso parametric , Sub Parametric and Super Parametric element.
7. List four FEA software's used for dynamic analysis.
8. State the boundary conditions for circular shaft subjected to torsion.
9. Derive consistent mass matrix a distributed mass system.
10. Write a Salient features on Ritz method used in FEA.

PART-B

Note: Answer any Three Questions **(3x18= 54Marks)**

11. Determine the Eigen value and Eigen vectors for the stepped bar shown in figure. E=200Gpa, ρ = 7650 kg/m^3 1



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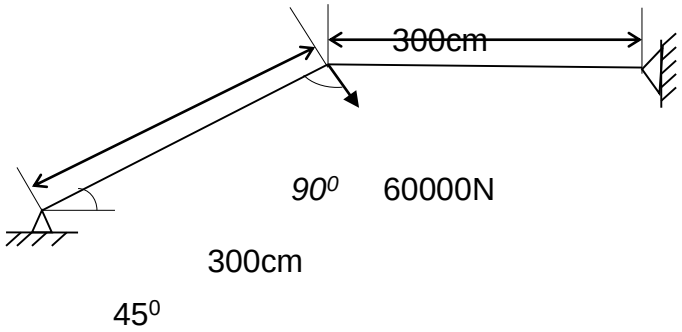
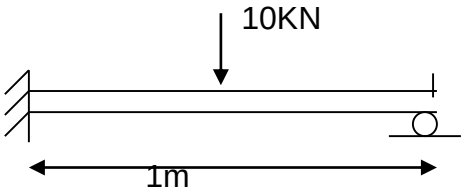
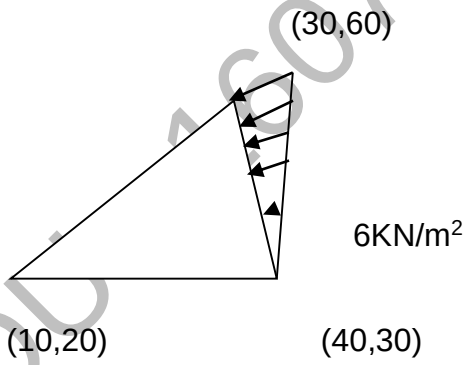
12. For the two bar truss shown in figure , determine the displacements and stress in the elements. Area of cross-section is 10cm2 and young's modulus is 10x106N/cm2.



13. Calculate the nodal displacements for the beam shown in figure. E=20 $X10^6$ N/cm^2 And I =2500cm^4 .



14. The triangle shown in figure is subjected to a distributed load. Evaluate the Equivalent nodal loads for the element. Take thickness as 10mm.

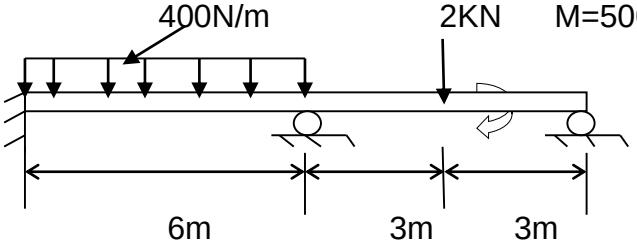


Dimensions of plate are in cm

15. Derive the strain displacement matrix [B] for triangular element.

16. a) Derive the transformation matrix for an inclined member of truss element.
    b) Differentiate between the lumped and consistente mass.

17. For the beam shown in figure, write (a) the assembled stiffness matrix and force vectors. (b) Boundary conditions.



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Code No. 14172

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II-Semester (Backlog) Examination, March / April 2021

Subject : Web Programming and Services

Time: 2 hours **Max. Marks: 75**

Note: Missing Data, if any, may be suitably be assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1 What is web server? List of functions of Web server.
2 List the differences between URL and URI.
3 Write java script function to validate email-id.
4 What is the purpose of XML?
5 List out the methods under servlet interface.
6 Explain deployment descriptor with example
7 What are JSP implicit Objects?
8 Differences between Rowset and Resultset
9 What is CLI?
10 What is Dot Net Remoting?

PART – B

Answer any three questions. **(3x18 = 54 Marks)**

11 a) Write a XHTML program to create student registration form and validate username should take 10 alphanumeric values, password should take minimum four characters, phone number must take 6 digits only
b) Describe functions of HTTP phases.

12 a) Create a dynamic web page using jsp. Which illustrates the usage at action and scripting tags.
b) Write in detail steps required to deploy a J2EE application.

13 a) Explain detail mechanism secure web application
b) What is filter? Explain the life cycle methods of filters and write a filter to authenticate the user.

14 a) Explain different types of statements in JDBC with suitable example
b) Explain Dot net framework architecture with neat diagram.

15 Write short notes on
a) Service Oriented Architecture
b) Connection Pooling.
c) Session handling mechanism

16 a) What is connection pooling? Explain how it is dealt?
b) What is Session tracking? Write a program to track a session using HTTP session object?

17 Write short notes on
a) Java Mail API
b) Discuss FRAME, FORM and TABLE tags of XHTML
c) XML parsers

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Code No. 14178

FACULTY OF ENGINEERING

B.E. 3/4 (IT) II - Semester (Backlog) Examination, March / April 2021

Subject : Artificial Intelligence

Time: 2 hours **Max. Marks: 75**

Note: Missing Data, if any, may be suitably be assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1 List the heuristic and exhaustive search techniques.
2 State Dempster shafer theory.
3 Show that the statement "If it is humid it will rain and since it is humid today it will rain" is a valid argument.
4 Determine whether the formula $(A \wedge B) \wedge (\sim A \wedge \sim B)$ is consistent or inconsistent using tableau method.
5 What is skolemization?
6 What are the limitations of an expert system?
7 Define SVM with neat diagram.
8 Give the expression for sigmoid function.
9 Compare 'ISA' and 'INST' relationships.
10 Give an example of defining data in XML.

PART – B

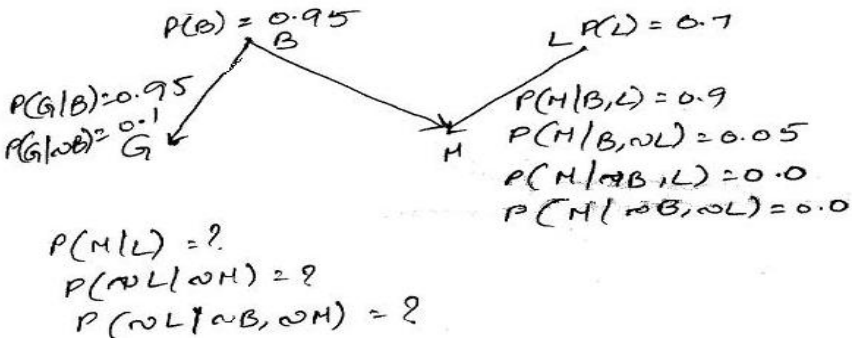
Answer any three questions. **(3x18 = 54 Marks)**

11 Consider a state space where start state is numbered as '1' and the successor function 'n' for state numbered as 'n' returns two states numbered as '2n' and '2n+1'. Suppose the goal state is 13. Draw search tree and list the order in which nodes will be visited using following searches.
   a) Breadth first search
   b) Depth first search

12 Write and explain A* algorithm with relevant example.

13 "There are 75 students in IT. All the students with 60% or more marks get the placement. Sandeep is the top student in IT. Top students score 70% and more marks". Translate these sentences into formula in predicate logic and then to clauses. Use resolution refutation to prove "Sandeep gets placed".

14 Compute the joining probability P(G, M, B, L) from the given Bayesian Network.



15 Discuss briefly about the applications of neural networks. Describe the architecture and learning rule of perception.

16 Construct the feed forward network for XOR-function.

17 Write short notes on :
   a) Extended semantic networks
   b) Parses
   c) Entropy

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