

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (Civil) II - Semester (Old) Examination, December 2019**

**Subject : Water Resources Engineering AND Management – I**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part-A & any five questions from Part-B.**

**PART – A (25 Marks)**

- |    |  |   |
|----|--|---|
| 1  | Write few disadvantages of recording rain gauges.                                      | 2 |
| 2  | Enumerate various canal lining materials.  | 2 |
| 3  | Draw the section of weir and barrage.  | 2 |
| 4  | Discuss the various considerations according to which the location of fall is decided. | 2 |
| 5  | Write functional requirements of a multi-purpose project.                              | 2 |
| 6  | Define unit hydrograph.  | 3 |
| 7  | Discuss the drawbacks of Kennedy's theory.   | 3 |
| 8  | List out the various assumptions in Bligh's creeps theory.                             | 3 |
| 9  | Explain the difference between aqueduct and super passage.                             | 3 |
| 10 | Enumerate the steps involved in project formulation and evaluation.                    | 3 |

**PART – B (50 Marks)**

- |    |   |    |
|----|---|----|
| 11 | a) Draw a neat sketch of hydrological cycle in qualitative representation and explain it.   | 5  |
|    | b) Rain gauge station X did not function for a part of a month during which a storm occurred. The storm produced a rainfall of 84, 70,96 mm at three surrounding stations A,B & C respectively. The normal annual rainfalls at the station X, A, B and C are 770, 882, 736, 994 mm. Estimate the missing storm rainfall at station 'X'. | 5  |
| 12 | Explain the following irrigation efficiencies.  | 10 |
|    | a) Water conveyance efficiency.   |    |
|    | b) Water usage efficiency.  |    |
|    | c) Water distribution efficiency  |    |
|    | d) Water consumption efficiency   |    |
|    | e) Water storage efficiency   |    |
| 13 | a) Briefly explain the design principles of vertical drop weir.   | 5  |
|    | b) Draw a neat sketch with the various components of diversion head works. State the function of each component briefly.  | 5  |

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- 14 a) Briefly explain the design principles of a trapezoidal notch fall. 5  
b) Define flexibility, proportionality, sensitivity and derive the relation between them. 5
- 15 Explain the following.  
a) Farmer's participation in water management. 5  
b) Requirements of a good outlet. 5
- 16 Write short notes on the following.  
a) Balancing depth of cutting. 5  
b) Yield of an open well. 5
- 17 a) With the help of a neat sketch, explain khosla's method of independent variables and also explain necessary corrections applied. 5  
b) A tube well fully penetrates a confined aquifer of thickness 38m and coefficient of permeability as 40m/day. Determine the radius of well if yield require is 42 l/s under a drawdown of 3.8m. Use radius of circle of influence as recommended by "Sichardt". 5

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## FACULTY OF ENGINEERING

B. E. 3/4 (Civil) II – Semester (Backlog) Examination, December 2019

Subject: Water Resources Engineering - I

Time: 3 hours

Max. Marks: 75

**Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.**

### PART – A (25 Marks)

1. Define the term Recurrence interval. 2
2. Explain the term coefficient of transmissibility. 3
3. Mention the drawbacks in Kennedy's theory. 2
4. Derive the expression for balancing depth of a canal. 3
5. Differentiate between a weir and a barrage. 2
6. List the measures to be adopted for averting failure of a weir due to uplift pressure. 2
7. State the criteria to be considered in the selection of number of notches in case of a trapezoidal notch fall. 2
8. When a canal escape is useful? 3
9. Define afflux. 2
10. State the relationship between afflux and head loss through siphon barrels. 4

### PART – B (50 Marks)

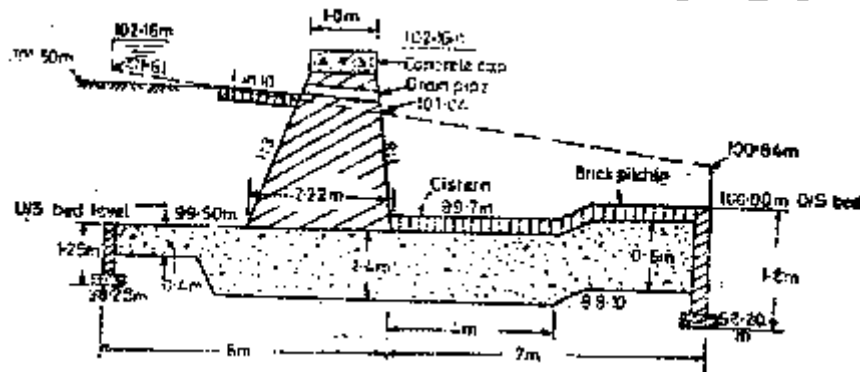
11. (a) Explain the factors affecting the infiltration. 4
- (b) Rainfall of 45 mm and 58 mm occurred successively over the basin continuously for 12 hours each. Compute runoff due to storm assuming a constant base flow of  $100\text{m}^3/\text{s}$  and a loss rate of  $0.1\text{ cm/h}$ . 6

Time (hr)	3	9	15	21	27	33	39	45	51
UH ordinates (cumec)	0	301.4	816.7	517.5	351.5	214	168.5	102.1	76

Time (hr)	57	63	69	75	81	87	93	99	105
UH ordinates (cumec)	55.5	40	29	19.1	14.6	8.6	3.2	0	0

12. (a) The total thickness of a confined aquifer is 20.0 m and it is assumed that the well penetrates into the full depth of the aquifer. Calculate the coefficient of the transmissibility for a discharge of  $1.5\text{m}^3/\text{min}$ ,  $h_1 = 58.0\text{ m}$  at  $r_1 = 120.0\text{ m}$  and  $h_2 = 58.9$  at  $r_2 = 160.0\text{ m}$ . Adopt the well diameter as 30.0 cm. 6
- (b) Differentiate between storage coefficient and specific yield. 4

13. (a) Explain the factors affecting duty. 4
- (b) Compute the depth and frequency of irrigation required for a crop with the following data. 6
- Root zone depth is 100 cm, field capacity is 22%, wilting point is 12%, apparent specific gravity of soil is 1.5, consumptive use in 25 mm/d, and efficiency of irrigation is 50%. Assume 50% depletion on available moisture before application of irrigation water at field capacity.
14. (a) Write a note on contour canal alignment. 2
- (b) Design an irrigation canal by Kennedy's theory to carry a discharge of 50 cumecs. Assume  $n$  as 0.0225,  $m$  as 1.5 and  $B/D$  ratio a 9.6. 8
15. (a) Compute the thickness at the toe of the body wall for the figure given below. 6



- (b) Explain the design principles to be followed in the computation of bottom width of a vertical drop weir. 4
16. (a) Design the size and number of notches required for a canal drop having full supply discharge of 20 cumec, bed width of 14.0 m and full supply depth of 1.9 m. 5
- (b) Design a semi-modular pipe outlet for a discharge of 0.05 cumec on a distributary having a full supply depth of 0.6 m with a working head of 0.5 m. 5
17. Design the bottom slab of a canal siphon for the following data: 10
- Drainage: High flood discharge is 100 cumec, HFL is 114.45 m, DBL is 1112.50m
- Canal: Full supply discharge is 100 cumec, FSL is 113.00 m, CBL is 110.00 m, bed width is 20.0 m, and side slopes are 0.5:1
- The clear width of siphon barrels is 6.0 m, height of the barrel is 1.85 m, with a pier width of 1.25 m.
- The top and bottom slabs have a thickness of 0.8 m.

**FACULTY OF ENGINEERING****B.E. 3/4 (EE/INST.ECE) II – Semester (Backlog) Examination, December 2019****Subject: Managerial Economics & Accountancy****Time: 3 hours****Max. Marks: 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (25 Marks)**

- |  |   |
|--|---|
| 1. Define opportunity cost principle.                      | 3 |
| 2. What is demand forecasting?                             | 2 |
| 3. Define Arc elasticity method.                           | 3 |
| 4. What do you mean by perfectly competitive market?       | 2 |
| 5. Expand the term BEP.                                    | 2 |
| 6. Differentiate between fixed and variable cost.          | 3 |
| 7. Write about Journal and Ledger posting?                 | 2 |
| 8. What is Petty cash book?                                | 2 |
| 9. Define capital budgeting.                               | 3 |
| 10. State different types of discounted cash flow methods. | 3 |

**PART – B (50 Marks)**

11. What is managerial economics? How it is useful to engineers?
12. Write about the significance of Price and Income Elasticity of Demand.
13. Analyze about various cost concepts.
14. What is capital management? Write about its significance.
15. From the following balances of Gupta, prepare the Trading and Profit and loss a/c as on 31.0.2004.
- | <u>Particulars</u> | <u>Amount(Rs.)</u> |
|--------------------|--------------------|
| 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:*
1. Closing stock Rs.18,000
16. State the assumptions and limitations of Break-even Analysis.
17. The initial cash outlay of a project is Rs.30,000 and it can generate cash inflow of Rs.10,000, Rs.20,000 and Rs.40,000 over 3 years. Assume a 10% discount rate. Calculate Payback and NPV.

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**FACULTY OF ENGINEERING****B.E. 3/4 (M/P) II - Semester (Backlog) Examination, December 2019****Subject : Refrigeration and Air Conditioning****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A. Answer any Five questions from Part-B.****PART – A (25 Marks)**

- 1 Define coefficient of performance (COP). 2
- 2 Explain the designation system for any two refrigerants. 3
- 3 State the purpose of flash chamber and accumulator in vapour compression system. 3
- 4 What are the applications of low temperature refrigeration? 2
- 5 Define Peltier and Thompson effect. 2
- 6 List the desirable properties of refrigerant absorbent pair. 3
- 7 When is dehumidification of air necessary and how it is achieved? 3
- 8 List the classification of air conditioning system. 2
- 9 What factors affect the air conditioning load? 3
- 10 What are the basic requirements of air conditioning systems used in textile industries? 2

**PART – B (50 Marks)**

- 11 The atmospheric air at pressure of 1 bar and temperature  $-5^{\circ}\text{C}$  is drawn in the cylinder of the compressor of a Bell-Coleman refrigerating machine. It is compressed isentropically to a pressure of 5 bar. In the cooler, the compressed air is cooled to  $15^{\circ}\text{C}$ , pressure remain same. It is then expanded to a pressure of 1 bar in an expansion cylinder, from where it is passed to the cold chamber. Find a) the work done per kg of air b) the COP of the plant.  
For air assume law of expansion  $pV^{1.2} = C$ , law for compression  $pV^{1.4} = C$ . Assume for air  $C_p = 1 \text{ kJ/kg K}$  and  $R = 0.29 \text{ kJ/kg K}$ . 10
- 12 A vapour compression refrigerator uses R-12 as refrigerant and liquid evaporates in the evaporator at  $-15^{\circ}\text{C}$ . The temperature of this refrigerant at the delivery from the compressor is  $15^{\circ}\text{C}$  when the vapour is condensed at  $10^{\circ}\text{C}$ . Find the COP if the liquid is cooled by  $5^{\circ}\text{C}$  before expansion by throttling.  
Take specific heat for superheated vapour as  $0.64 \text{ kJ/kg K}$  and for liquid as  $0.94 \text{ kJ/kg K}$ . the other properties of refrigerant as follows. 10

Temperature	Enthalpy kJ/kg		Entropy kj/kg K	
	liquid	vapour	liquid	vapour
-15	22.3	180.88	0.0904	0.7051
10	45	191.76	0.1750	0.6921

- 13 a) Explain with neat sketch the working of Li-Br vapour absorption refrigeration system and list the major field applications of this system. 5
- b) Discuss the importance of figure of merit related to of thermo-electric refrigeration system. Explain its effect on COP of the system. 5

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- 14 a) 800 m<sup>3</sup>/min of recalculated air at 22<sup>o</sup>C DBT and 10<sup>o</sup>C dew point temperature is to be mixed with 300 m<sup>3</sup>/min of fresh air at 30<sup>o</sup>C DBT and 50% RH. Determine the enthalpy, specific volume, humidity ratio and dew point temperature of the mixture. 5
- b) Draw a neat diagram of air conditioning system required for winter season, Explain its working of different components in the circuit. 5
- 15 An air conditioned room is maintained at 25<sup>o</sup>C DBT and 50% RH whose sensible heat load is 11.5kW and latent heat load is 7.5kW when the outside conditions are 35<sup>o</sup>C DBT and 28<sup>o</sup>C WBT. Return air from the room is mixed with the outside air before entering the cooling coil in the ratio of 4:1 and return air from the room is also mixed after the cooling coil in the ratio 1:4, the cooling coils has the bypass factor of 0.1. The air way be reheated, if necessary, before supplying to the conditioned room. Assuming apparatus dew point 8<sup>o</sup>C, determine : a) supply air condition to the room b) refrigeration load and c) quality of fresh air supplied. 10
- 16 a) Describe the performance of vapour compression system with T-S and p-h diagram both sub-cooling and superheating. 5
- b) How CFCs and other refrigerants cause the Global warming and Ozone depletion? Explain the importance of alternate refrigerants. 5
- 17 a) Explain with neat sketch the working of steam jet refrigeration system. 5
- b) Explain functions of humidifier, blower, grills and duct for air conditioning system. 5

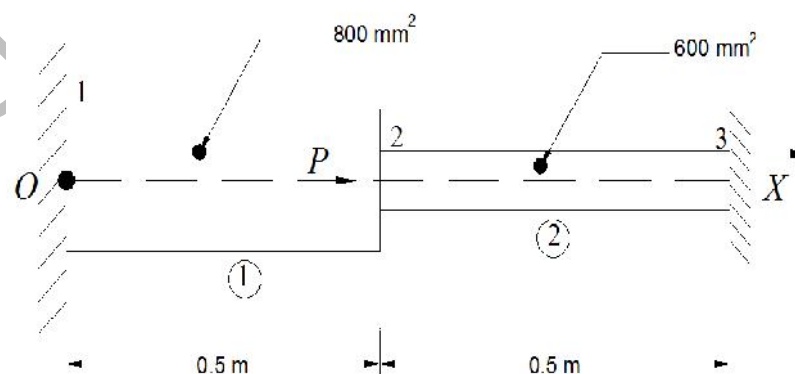
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**FACULTY OF ENGINEERING****B.E. 3/4 (AE) II – Semester (Old) Examination, December 2019****Subject: Finite Element Analysis****Time: 3 Hours****Max.Marks: 75****Note: Answer all questions from Part-A and any five questions from Part-B****PART – A (25 Marks)**

- 1 Remember the term Finite element, Enlist two advantages, limitations and applications of FEM.
- 2 Recall and reproduce the compatibility equations of elasticity.
- 3 Formulate the transformation matrix for a plane truss element inclined at  $30^\circ$  with the horizontal.
- 4 Distinguish between a shape function and Hermite shape function? Sketch the hermite shape function for a beam element.
- 5 Distinguish between plane stress and plane strain condition with neat sketches and equations.
- 6 Illustrate through neat sketches the difference between sub-parametric, super-parametric, iso-parametric and axisymmetric elements..
- 7 Evaluate the integral  $(3x^2+x^3)dx$  between the limits -1 to +1 by gauss quadrature method.
- 8 Distinguish between essential boundary conditions and natural boundary conditions with respect to heat transfer analysis in FE. Reproduce the equations.
- 9 Formulate the consistent mass matrix for a beam element
- 10 Recall convergence criteria in FE problems.

**PART – B (5x10 = 50 Marks)**

- 11 Determine the nodal displacements, element strain, stresses, strain energy and reactions for the stepped bar shown in Fig.1.  $E = 200 \text{ GPa}$ ;  $P = 50 \text{ kN}$ ;  $\alpha = 20 \times 10^{-6} \text{ per } ^\circ\text{C}$ ;  $T = 50^\circ\text{C}$ .

**Fig.1**



- 12 Calculate the deflection and slope of the beam shown in Fig.2. at 1 m from the right support.  $E = 200 \text{ GPa}$ ;  $P = 50 \text{ kN/m}$ ;  $I = 4 \times 10^{-6} \text{ m}^4$ .

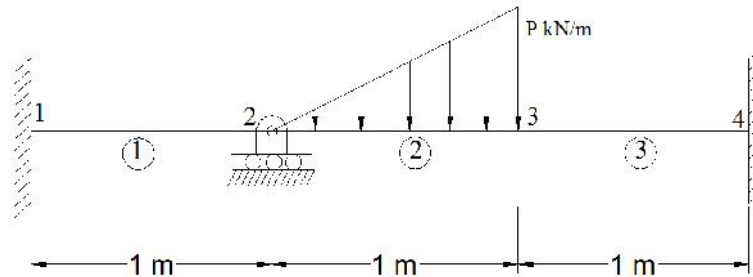


Fig.2

- 13 A long cylinder of ID 80 mm and OD 120 mm snugly fits in a hole over its full length. The cylinder is then subjected to an internal pressure of 2 MPa. Using two elements on the 10 mm length, as shown in Fig.3, calculate the displacements at the inner radius.

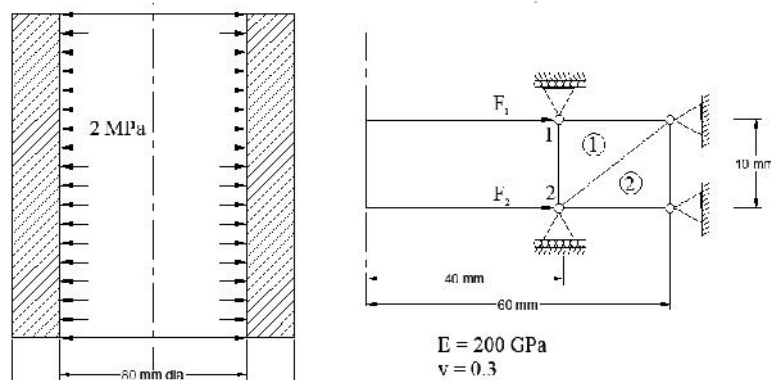


Fig.3

- 14 For the composite wall idealized by the 1D model shown in Fig.4 determine the interface temperatures. For element 1  $K_{xx} = 5 \text{ W/m}^0\text{C}$ ; element 2  $K_{xx} = 10 \text{ W/m}^0\text{C}$ ; element 3  $K_{xx} = 15 \text{ W/m}^0\text{C}$ . The left and right ends maintain a constant temperature of 200 and 600 degree centigrades respectively.

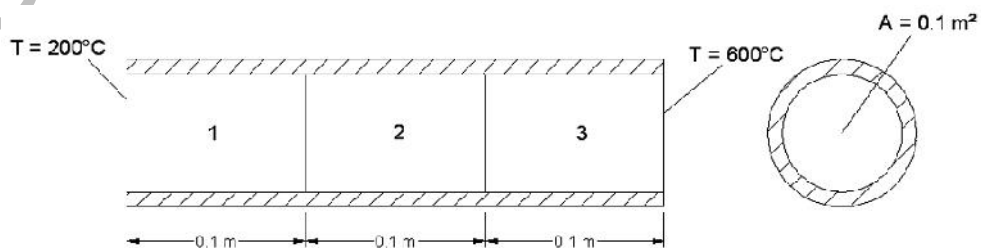


Fig.4

- 15 Calculate the shape functions at point P(30,30) of a triangular element whose coordinates are 1(0,0), 2(80,10), 3(40,90). Calculate the  $[B_T]$  matrix,  $[D_T]$  matrix,  $[K_T]$  matrix. The triangular element is made up of 10 mm thick plate,  $K = 75 \text{ W/mK}$ .
- 16 Determine the natural frequencies and displacements of the stepped bar shown in Fig.5. Sketch its mode shapes also.  $A_1=400\text{mm}^2$ ;  $A_2=200\text{mm}^2$ ;  $\rho_1 = 7200\text{kg/m}^3$ ;  $\rho_2 = 8500\text{kg/m}^3$ ;  $E_1 = 1.5 \times 10^5 \text{ N/mm}^2$ ;  $E_2 = 200\text{GPa}$ ;  $L_1 = L_2 = 0.2\text{m}$ ;  $P = 50 \text{ kN}$ .

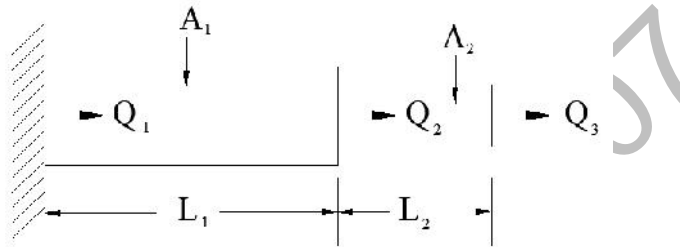


Fig.5

- 17 a) Evaluate the integral  $3x^2 + x^3$  between the limits -1 to +1 using Gauss quadrature, Use two point formula.
- b) Reproduce the shape functions of a 4 Noded Quadrilateral element (with linear interpolation function) and for a 2 Noded 1D Quadratic bar element.
- c) Reproduce the simplest 3D element and label its nodes, field variables and degrees of freedom in detail.

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## FACULTY OF ENGINEERING

**B.E. 3/4 (A.E) II-Semester (Backlog) Examination, December 2019**

**Subject : Finite Element Methods**

**Time : 3 Hours**

**Max. Marks: 75**

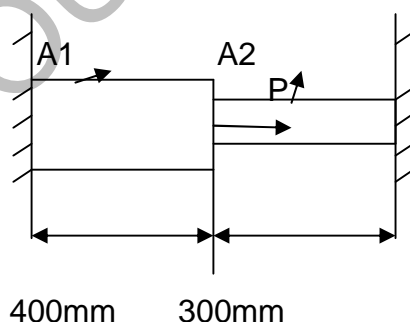
**Note:** Answer all questions from Part-A & any five questions from Part-B.

### Part – A (25 Marks)

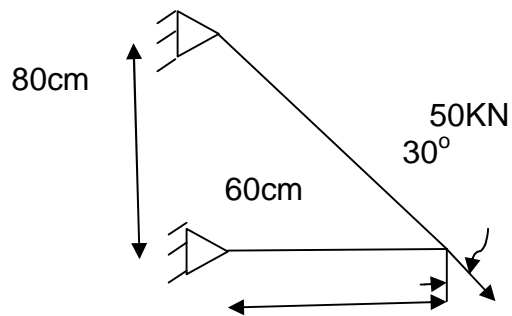
1. List the various steps involved in solving a problem by finite element method.
2. Write the governing differential equation for one dimensional heat transfer problem.
3. Define local, global and natural coordinates and shape functions.
4. State the shape functions for 3 - noded quadratic line element.
5. Write the essential and natural boundary conditions with respect to one dimensional heat transfer problem.
6. Write shape functions of a constant strain triangle (CST) element.
7. Sketch the elements (a) one dimensional bar element. (b) truss element (c) beam element.
8. In a plane truss element , the direction cosines are  $L=0.6$  and  $m=0.8$  and the length of the element is 500mm . If the nodal displacements are  $q_1=q_2=0.2$  mm and  $q_3=q_4=0.4$ mm. Calculate the stress taking  $E =100$ GPa.
9. What do Eigen value and Eigen vectors represent in dynamic analysis?
10. List the two FEA software's used for heat transfer analysis.

### Part – B (50 Marks)

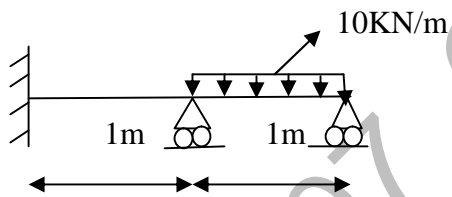
11. Derive the shape functions and element stiffness matrix for one dimensional bar element. 10
12. Calculate the nodal displacements, element stress and support reactions for the bar shown in figure.  $A_1=2400\text{mm}^2$ ,  $A_2=1800\text{mm}^2$ ,  $P=10\text{KN}$ ,  $E=200\text{GPA}$ . 10



13. Calculate the temperature distribution in a fin whose diameter =2cm, length = 10cm. Assume the tip of the fin to be insulated. Consider two elements.  $K=3\text{W/cm}^\circ\text{C}$ ,  $h = 0.1 \text{ W/cm}^2^\circ\text{C}$ ,  $T_\infty = 20^\circ\text{C}$  and base temperature =  $100^\circ\text{C}$ . 10
14. Calculate the nodal displacements, stresses and support reactions in the truss shown in Figure  $E= 20 \times 10^6 \text{N/cm}^2$ . 10



15. Formulate the finite element model of Eigen value problem for stepped bar from first principle. 10
16. (a) Define Iso-parametric element. 3  
 (b) Derive the shape functions of four noded master element. 5  
 (c) Define a Constant strain Triangle. 2
17. Find the deflection and shear force for the beam shown in figure  $E=200\text{Gpa}$ ,  $I=4\times 10^6\text{mm}^4$ . 10



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**FACULTY OF ENGINEERING**  
**BE 3/4 (CSE) II – Semester (Backlog) Examination, December 2019**

**Subject : Web Programming and Services**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

- 1 What is frame? Divide a window into 3 frames horizontally/vertically with an example? (3)
- 2 What is regular expression? Give any three operators of regular Expression. (2)
- 3 How session management can be done in servlet? (3)
- 4 What is multi-tier architecture? (2)
- 5 Differentiate between servlets & JSP. (3)
- 6 List the life cycle methods of filter & different types of filters. (3)
- 7 What is connection pooling? What is its purpose? (2)
- 8 Differentiate between statement and prepared statement. (3)
- 9 What is common type system? (2)
- 10 What is web service framework? (2)

**PART- B (50 Marks)**

- 11 a) Explain about java script data types and control structures. (4)  
b) Write a simple program for java script which illustrate control structures. (6)
- 12 Write in detail the steps required to deploy a J2EE application. (10)
- 13 a) Explain how we can create dynamic web pages with JSP with suitable example. (5)  
b) Explain in detail different JSP elements. (5)
- 14 Write the steps for connecting to database through JDBC with an example. (10)
- 15 a) What is CLR? Give the architecture of CLR? (6)  
b) Write short notes on .Net Remoting (4)
- 16 a) Explain in detail about servlet collaboration. (5)  
b) Explain about Jsp user defined tag extensions. (5)
17. Write a program to send a mail using Java mail API. (10)

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**FACULTY OF ENGINEERING****B. E. 3/4 (IT) II – Semester (Backlog) Examination, December 2019****Subject: Artificial Intelligence****Time: 3 hours****Max. Marks: 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (25 Marks)**

- |  |   |
|--|---|
| 1. State Turing test.  | 2 |
| 2. Define BFS & DFS.   | 3 |
| 3. List the main components of expert system architecture.         | 3 |
| 4. Explain resolution refutation.                                  | 3 |
| 5. Define ANN.   | 2 |
| 6. Define a decision tree.   | 2 |
| 7. Explain the significance of frames in knowledge representation. | 2 |
| 8. Define skolemization.   | 3 |
| 9. List a few applications of Expert Systems.                      | 3 |
| 10. Define OWL.  | 2 |

**PART – B (50 Marks)**

- |   |     |
|---|-----|
| 11. (a) Obtain the resolution proof for the proposition “Angle B is equal to Angle C” from the following axioms:  | 5   |
| (i) If a triangle is equilateral then it is isosceles.  |     |
| (ii) If a triangle is isosceles then two sides AB & AC are equal.   |     |
| (iii) If AB & AC are equal then angle B and angle C are equal.  |     |
| (iv) ABC is an equilateral triangle.  |     |
| (b) Write the steps to convert the formula in propositional logic into CNF.   | 5   |
| 12. There are two jugs, a 5-gallon (5-g) and other 3-gallon (3-g) with no measuring marker on them. There is endless supply of water through tap. The task is to get 4-gallon of water in the 5-g jug. Describe the state space and production rules and find the solution path.  | 10  |
| 13. (a) Differentiate between Expert systems and Traditional systems.   | 3   |
| (b) Describe Bayesian Network. Sketch a Bayesian Network to illustrate its construction for an example problem.   | 7   |
| 14. Explain Supervised and Un-Supervised learning with an example for each. List the pros and cons of each approach.  | 10  |
| 15. Explain A*, “Algorithm with an example and describe admissibility in A*.”   | 10  |
| 16. Draw a semantic network representing the following knowledge using prop links and answer the query “Does a parrot breathe”?   |     |
| Every human, animal and birds are living things who can breath and eat. All birds can fly. Every man and woman are humans who have two legs. A cat has fur and is an animal. All animals have skin and can move. A giraffe is an animal and has long legs and is tall. A parrot is a bird and is green in color. John is a man. | 10  |
| 17. Write notes on:   | 5+5 |
| (a) Support Vector Machine.   |     |
| (b) Dempster – Shafer theory.   |     |

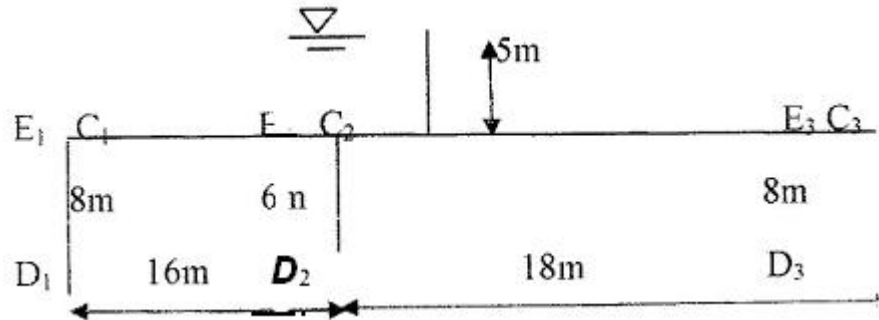
**FACULTY OF ENGINEERING****B.E. (Civil) VI – Semester (CBCS) (Suppl.) Examination, December 2019****Subject: Water Resources Engineering – II****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions from Part-A and any five questions from Part-B****PART – A (10x2 = 20 Marks)**

- 1 Differentiate between Alluvial and Non-Alluvial canals
- 2 What is a regime channel?
- 3 Write the functions of a canal head regulator
- 4 Distinguish between a weir and a barrage
- 5 Determine the exit gradient for a permeable foundation having head of water as 4m, depth of d/s pile as 5m and  $\gamma = 4.53$ .
- 6 Write the limitations of Bligh's creep theory
- 7 What is flexibility of an outlet? Write its expression.
- 8 Explain the necessity of lining of canals.
- 9 What is level crossing in cross drainage?
- 10 What is inlet and outlet of a cross drainage work?

**PART – B (5x10 = 50 Marks)**

- 11 a) Write about the classification of irrigation canals. 5  
 b) Design a regime channel for a discharge of 50 cumecs and silt factor 1.1 using Lacey's theory. Take the side slopes of the canal as  $\frac{1}{2} : 1$ . 5
- 12 Design a vertical drop weir using Bligh's theory for the following data:
  - i) Design flood discharge = 3000 cumecs
  - ii) High flood level before construction = 200 m
  - iii) Full supply level of canal = 199 m
  - iv) Average bed level of river = 193 m
  - v) Retrogression of bed = 0.5 m
  - vi) Lecey's silt factor = 1
  - vii) Safe exit gradient =  $\frac{1}{6}$
  - viii) Coefficient of creep = 10
  - ix) Minimum d/s water level = bed level = 193m
  - x) Allowable flux = 1m. 10

- 13 a) Explain the piping failure and failure due to rupture of floor for permeable foundation. 5
- b) The line diagram of a typical diversion head is given below. Take floor thickness as 1 m. Determine the uplift pressure at key points. Apply necessary corrections taking  $E_1 = 100\%$ ,  $E_2 = 72.5\%$ ,  $E_3 = 35\%$ ,  $D_1 = 76\%$ ,  $D_2 = 61.5\%$ ,  $D_3 = 24.2\%$ ,  $C_1 = 66.5\%$ ,  $C_2 = 52\%$ ,  $C_3 = 0\%$ . 5



- 14 a) What is a canal fall? What is its necessity? Discuss the various factors to be considered while selecting the location of a fall. 5
- b) Explain different types of outlets of canals. Write the requirements that should be fulfilled by an outlet. 5
- 15 a) What is a cross drainage work? What are the factors to be considered for selecting a suitable type of cross drainage work? 5
- b) With the help of sketches, describe the features and working of an aqueduct and a super passage. 5
- 16 a) Explain the different ways in which the irrigation canals can be aligned. 5
- b) Explain the features and functions of divide wall and fish ladder of a diversion headwork with sketches. 5
- 17 Write short notes on: 10
- Kennedy's silt theory
  - Silt excluders and silt ejectors
  - Vertical or Sarda type fall.

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**FACULTY OF ENGINEERING****B.E. (EEE) VI - Semester (CBCS) (Suppl.) Examination, December 2019****Subject : Renewable Energy Technologies****Time : 3 hours****Max. Marks : 70****Note: Answer all questions from Part-A. Answer any Five questions from Part-B.****PART – A (20 Marks)**

- |    |  |   |
|----|--|---|
| 1  | Why do we need to think about renewable energy systems?                                    | 2 |
| 2  | List out the advantages of fuel cells.   | 2 |
| 3  | Define : Solar constant, azimuthal angle, air-mass.  | 2 |
| 4  | Explain the contractual details of vertical axis wind turbine.                             | 2 |
| 5  | List out the advantages of wind electric pumping system.                                   | 2 |
| 6  | Explain the working principle of wave energy conversion machine.                           | 2 |
| 7  | Draw the Thailand type biogas plant diagram.   | 2 |
| 8  | What are the factors on which the optimum capacity of solar energy storage system depends? | 2 |
| 9  | List out the required characteristics of a pyranometer.                                    | 2 |
| 10 | Draw the china type bio-gas plant and brief it.  | 2 |

**PART – B (5 x 10 = 50 Marks)**

- |    |   |     |
|----|---|-----|
| 11 | a) Discuss about MCFC in detail with neat diagram, required chemical equations, advantages and disadvantages and applications.            | 5   |
|    | b) Discuss in detail about Polarization in fuel cells.  | 5   |
| 12 | a) Explain the working principle of the following solar water heater systems :<br>i) Pressurised      ii) Anti-freeze      iii) Auxiliary | 5   |
|    | b) Discuss the application of Solar Energy.   | 5   |
| 13 | a) Derive the expression for maximum power developed due to wind.   | 5   |
|    | b) Discuss about environmental aspects in wind energy generation.   | 5   |
| 14 | a) With necessary diagrams explain in detail about hybrid OTEC system.  | 5   |
|    | b) With necessary diagrams explain in detail about fossil super heated system.  | 5   |
| 15 | a) With necessary diagrams explain in detail about double stage digestion process.  | 5   |
|    | b) Draw the diagram for the R.C.C. biogas manure plant diagram and brief it.  | 5   |
| 16 | Write short notes on the following :  |     |
|    | a) Small scale pyrolysis system      b) Biomass conversion technology   | 5+5 |
| 17 | a) With necessary diagram explain about regenerative fuel cell system.  | 5   |
|    | b) Discuss in detail about any two solar measuring devices.   | 5   |

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**FACULTY OF ENGINEERING****B. E. (Inst.) (CBCS) VI – Semester (Supplementary) Examination, December 2019****Subject: Electronics Instrumentation Systems****Time: 3 hours****Max. Marks: 70****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (10 x 2 = 20 Marks)**

1. Define Active and Passive Transducers with examples. 2
2. Draw the schematic of R-2R resistive ladder. 2
3. Explain the principle of automatic zeroing. 2
4. Compare True RMS meter with an average responding meter. 2
5. What is the difference between a wave analyzer and a harmonic distortion analyzer? 2
6. State the applications of spectrum analyzer. 2
7. What is the function Relay Switched Attenuator? 2
8. Describe radio receiver. 2
9. Brief about the magnetic material used for tape. 2
10. Give an example of Automatic Instrumentation. 2

**PART – B (5 x 10 = 50 Marks)**

11. (a) Draw the circuit of Isolation Amplifier with suitable diagram. Mention types and specifications of Isolation Amplifier in detail. 5
- (b) With suitable diagram explain ADC successive approximation. 5
12. Explain the following in detail related to digital meters: 10
  - (i) Scaling and checking modes.
  - (ii) Input signal conditioning and counting errors.
13. (a) With necessary diagrams discuss Harmonic distortion Analyzer. 5
- (b) Explain in detail about Wave Meter. 5
14. With necessary diagrams explain in detail about IEEE 488 interface bus. 10
15. (a) Explain in detail about possibilities and limitations of improving Deflection Sensitivity of CRT. 5
- (b) With necessary diagrams explain in detail about digital storage oscilloscope. 5
16. (a) In a video cable, a particular channel program is selected at 88.5 MHz. Explain how you measure its harmonics using Spectrum Analyzer. What are different harmonic frequencies for the above channel? 5
- (b) Determine detection sensitivity of a CRO, given that with usual notation,  $1 = 1.5\text{cm}$ ,  $L = 30\text{ cm}$ ,  $d = 5.5\text{ mm}$ ,  $V_d = 5\text{V}$  &  $V_a = 1000\text{V}$ . 5
17. Write short notes on the following:
  - (a) Dual slope ADC. 5
  - (b) IEEE 488 interfacing Bus. 5

**FACULTY OF ENGINEERING****B.E. (ECE) VI – Semester (CBCS) (Suppl.) Examination, December 2019****Subject: Managerial Economics and Accountancy****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions from Part-A and any five questions from Part-B****PART – A (10x2 = 20 Marks)**

- 1) Define managerial economics
- 2) Differentiate risk and uncertainty
- 3) What are the types of demand
- 4) Explain demand function.
- 5) Production function – Explain.
- 6) What is Break-even point?
- 7) What is fixed capital?
- 8) What is pay back period?
- 9) Write about book-keeping accountancy.
- 10) How prepaid expenses given in adjustments are dealt in final accounts?

**PART –B (5x10 = 50 Marks)**

- 11 a) Explain the scope of managerial economics 5  
b) What are factors influencing demand 5
- 12 a) Discuss the external economies of scale 5  
b) Elaborate the features of perfect competition 5
- 13 a) What is law of variable proportion explain 5  
b) Write the concepts of accounting in detail. 5
- 14 From the following data calculate: 10  
a) Break-even point in units  
b) Break-even point in Rs.  
c) P/v ratio  
selling price per unit Rs.100 variable cost per unit Rs. 60 fixed cost Rs.1,00,000
- 15 A project require an investment of Rs. 50,000 and are expected to generate Net cash flows as under. 10

Year	1	2	3	4	5	6
Rs.	10,000	12,000	18,000	25,000	8,000	4,000

Calculate pay back period and NPV.
- 16 Prepare a Bank Reconciliation Statement as on 31-12-2016 10
  - a) Cash book balance as on 31-12-2016 Rs.1,75,000
  - b) Cheques amounting to Rs. 80,000 issued on 28-12-2016 not presented for payment
  - c) Cheque deposited Rs.60,000 on 25-12-2016 were not credited before closing date.
  - d) Interest on investment Rs.4,000/- was collected and credited by bank.
  - e) Bank charges debited in pass book Rs.60/-

..2..

17 Prepare Trading and profit and Loss account and balance sheet as on 31-12-2011.

10

**Trial Balance**

Particulars	Rs.	Particulars	Rs.
Purchases	16,000	Capital	10,655
Discount	1,300	Sales	30,000
Wages	6,500	Loan	3,000
Travelling expenses	500	Sundry creditors	2,100
Salaries	2,000		
Carriage inwards	275		
Insurance & rent	150		
Commission	825		
Cash at bank	2,750		
Sundry expenses	355		
Interest on loan	100		
Buildings	4,000		
Machinery	2,000		
Opening stock	5,750		
Sundry debtors	3,250		
	45,755		45,755

**Adjustments:**

- 1) Closing stock Rs.6,000
- 2) Rent outstanding Rs. 60.

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**FACULTY OF ENGINEERING****B. E.VI – Semester (CBCS)(M/P)(Suppl.) Examination, December 2019****Subject: Metrology & Instrumentation****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part – A & any five questions from Part-B****PART – A (10 x 2 = 20 Marks)**

1. Sketch angular square gage.
2. State the form tolerances.
3. State the role of wires in thread measurement.
4. Sketch and state a balance bridge circuit.
5. Why thermocouples tube protection is used?
6. State form tolerances of machined component.
7. State the role of slip gage while using a comparator for measurement.
8. Sketch four different types of lay of surface finish.
9. Sketch the laws of thermo electricity.
10. Sketch the four applications of TMM component inspection.

**PART – B (50 Marks)**

11. (a) Explain Taylor's principle for gage design for tolerance measurement. 5  
(b) Sketch plug gage and indicate the limitation in its testing of internal features. 5
12. (a) Explain operation of back pressure gaging with neat sketch. 5  
(b) State five instruments used for measurement of straightness. 5
13. (a) State general geometric tests conducted on machine tools. 5  
(b) Explain double flank testing of gear components with a sketch. 5
14. (a) Explain the ramp signal response for first order instrument. 5  
(b) Explain the limitations of strain measurement using strain gage resistance method. 5
15. (a) Explain with neat sketch the vibration measurement using accelerometer. 5  
(b) Explain the working of pirani gage with neat sketch. 5
16. (a) What are systematic and random Errors of measurement system? 5  
(b) Find the change in the resistance for 1 micro-strain in the strain gage for the following data:  
gage factor = 2.0;  $R_g = 120$  ohm 5
- 17 (a) Explain the working of vibrometer with diagram. 5  
(b) Explain with sketch the setup to measure bending stress only using Balance Bridge circuit. 5



**FACULTY OF ENGINEERING****B.E. VI-Semester (CBCS) (CSE) (Suppl.) Examination, December 2019****Subject : Computer Networks and Programming****Time : 3 Hours****Max . Marks: 70****Note:** Answer all questions from Part–A & any five questions from Part -B.**PART- A (20 Marks)**

1. Define Computer Network.
2. What are choke packets?
3. How networks differ? Explain
4. What is the purpose of ARP?
5. What are the service primitives?
6. What is DNS?
7. Compare connection oriented and connectionless service.
8. Explain socket options.
9. List the Elementary socket system calls
10. Define Multimedia

**Part - B (5X10 = 50 Marks)**

- 11 a) What is Routing? Explain any two routing algorithms in detail? (7M)  
b) What is congestion control? List the general principles? (3M)
- 12 a) Discuss Tunneling with neat diagram. (4M)  
b) Explain IP protocol in detail. (6M)
- 13 Explain advanced socket system calls in detail. (10M)
- 14 a) Mention neatly about service primitives of a Berkeley socket interface. (4M)  
b) Explain crash recovery in detail. (6M)
- 15 Explain SMTP and MIME. (10M)
- 16 a) Distinguish between Leaky bucket algorithm and Token bucket algorithm. (4M)  
b) Compare OSI model and TCP/IP model. (6M)
- 17 Write short notes on: (3+4+3M)
  - a) Multiplexing in Transport layer
  - b) FTP
  - c) Socket address

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**FACULTY OF ENGINEERING****B. E. VI – Semester (CBCS) (I.T.) (Suppl.) Examination, December 2019****Subject: Embedded Systems****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part – A & any five questions from Part-B****PART – A (10 x 2 = 20 Marks)**

- |     |   |   |
|-----|---|---|
| 1.  | Give 8051 micro controller architecture.                                | 2 |
| 2.  | Describe serial data input-output interface to a 8051 micro-controller. | 2 |
| 3.  | Write the instruction types of 8051                                     | 2 |
| 4.  | Why timers are required? Give examples.                                 | 2 |
| 5.  | Draw and explain the structure of PSW of 8051.                          | 2 |
| 6.  | List the features of CAN bus  | 2 |
| 7.  | List the applications of sensors.                                       | 2 |
| 8.  | What is amplification   | 2 |
| 9.  | What are semaphores   | 2 |
| 10. | Write the difference between Super scalar processor and VLIW processor  | 2 |

**PART – B (5 x 10 = 50 Marks)**

- |    |   |    |
|----|---|----|
| 11 | (a) Describe embedded system design process.                                | 5  |
|    | (b) Describe the SFRs that handle the interrupts in 8051 micro- controller. | 5  |
| 12 | (a) Explain how Interrupts are serviced in 8051 architecture.               | 5  |
|    | (b) Explain Jump and Call instructions with examples.                       | 5  |
| 13 | (a) Write the 5-stage pipelining mechanism in Advanced Processors.          | 5  |
|    | (b) Explain SHARC architecture.   | 5  |
| 14 | (a) Explain Information Coding/Processing.                                  | 5  |
|    | (b) Explain On-board automobile sensors                                     | 5  |
| 15 | (a) Describe the features of a Real Time Operating system.                  | 5  |
|    | (b) What is Multitasking? Explain how it is handled in RTOS?                | 5  |
| 16 | Describe the main features of Micro C/OS-II RTOS. What is a target system?  | 10 |
| 17 | (a) Write about Memory architectures in SoC.                                | 5  |
|    | (b) Explain System Level Interconnections.                                  | 5  |

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