

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) II – Semester (Supplementary) Examination, Nov. / Dec. 2016

Subject : Theory of Structures – II

Time : 3 hours

Max. Marks : 75

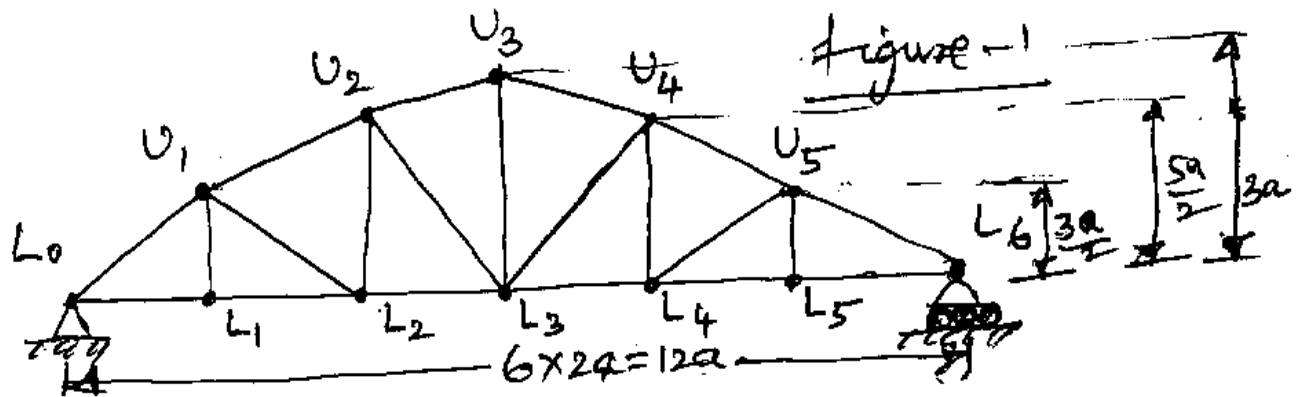
Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.**PART – A (25 Marks)**

- 1 What are stable and unstable structures? 3
- 2 State the properties of stiffness matrix. 3
- 3 State Eddy's theorem. 3
- 4 State Muller-Breslan Principle. 3
- 5 Draw maximum shear force diagram in case of single concentrated load moving on simply supported beam. 3
- 6 Draw ILD for support reaction in case of single concentrated load moving on simply supported beam. 2
- 7 The bending moment at any section of an arch is equal to the _____ intercept between the linear arch and the centre line of the actual arch. 2
- 8 What are the difficulties with direct stiffness method of formulation? 2
- 9 Is there any relation between static and kinematic indeterminacies? If so what? 2
- 10 What is the expression for horizontal thrust in case of cable with supports at different levels? 2

PART – B (50 Marks)

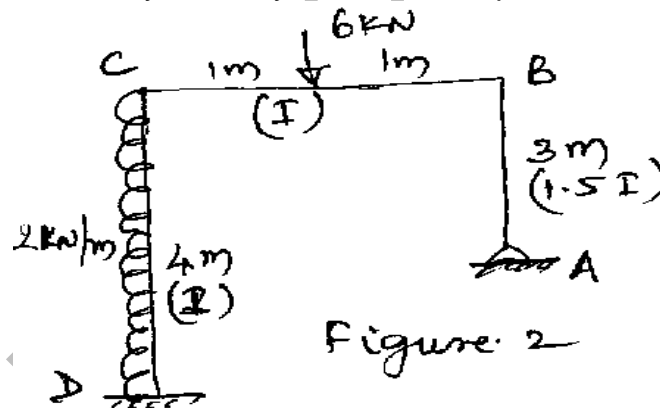
- 11 Plot the maximum bending moment diagram for a simply-supported girder with two loads moving from left to right. The two loads are 3 kN (leading) and 6 kN (following) with a spacing of 6m. The span of girder is 10m. Prove that maximum B.M. occurs under W_2 when W_1 is off the span.
- 12 A two hinged parabolic arch has a span of 25m and central rise of 4.2m. It carries a vertical load of 16 kN at 8m from left support. Compute a) the magnitude of the thrust at the springings, b) the reaction at the supports c) bending moment at 6 m from the left hand hinge d) Draw BMD.
- 13 A suspension bridge cable hangs between two points A and B separated horizontally by 90m and with B 15m above A. The lowest point in the cable is 3 m below A. The cable supports a stiffening girder weighing 10 kN/m run which is hinged vertically below A and B and also at the lowest point of the cable. Calculate the maximum tension which occurs in the cable when a 200 kN load crosses the girder from A to B.

14



Construct the influence lines for the forces in the member $L_0 - U_1$, $L_0 - L_1$ and $U_1 - L_1$ and $U_1 - L^2$ of the through bridge truss shown in figure.1

15 Analyse the portal frame by flexibility method. The portal frame is shown in fig.2



16 Analyse the beam shown in figure 3 by stiffness method, take EI as constant.

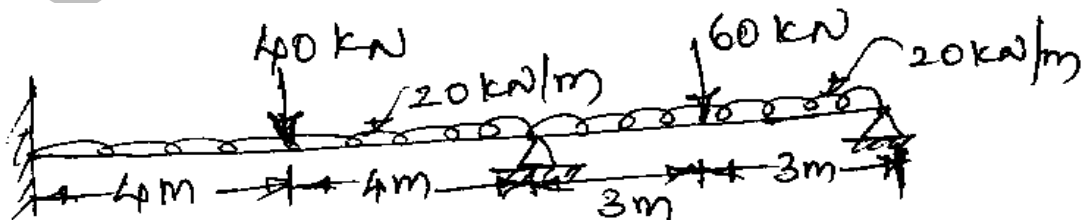


Figure 3

17 A three hinged parabolic arch has a span of 50m and a rise of 5m use influence line diagram to determine a) the maximum horizontal thrust and b) the maximum +ve and -ve BM at the left quarter span section, when two concentrated loads 150 kN and 225 kN spaced 5 m rolls across the span from left to right with smaller load in the lead.

FACULTY OF ENGINEERING**B.E. 3/4 (Inst.) II – Semester (Supplementary) Examination, Nov. / Dec. 2016****Subject : Power Plant Instrumentation****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 | What are non-conventional energy sources for power generation? | 3 |
| 2 | What is meant by water hammering in hydro electric power generation? | 3 |
| 3 | What are the different types of glands used in steam exhaust control for turbines? | 2 |
| 4 | What are the types of non-contact type transducers for speed measurement in TSI? | 3 |
| 5 | Draw the P&I diagram of Excess air control. | 3 |
| 6 | What is meant by “Attemperation” and “Burner tilting up” in combustion control? | 3 |
| 7 | Draw the diagram of heat exchanger used in turbine supervision and control. | 2 |
| 8 | What is shell temperature in stem turbines? | 2 |
| 9 | Explain the basic principle involved in Nuclear power plant. | 2 |
| 10 | What are reliability aspect for nuclear power plant. | 2 |

PART – B (50 Marks)

- | | | |
|----|--|----|
| 11 | Draw the P&I diagram of boiler and explain the importance of I&C in power plants. | 10 |
| 12 | Explain the smoke and dust monitor of on thermal power plant with neat diagram. | 10 |
| 13 | Explain the boiler feed water control system with neat diagram. | 10 |
| 14 | a) Why cooling of generators is required in power generation? | 5 |
| | b) Explain with neat diagram the hydrogen generator cooling system. | 5 |
| 15 | With a neat diagram explain the power generation in Nuclear Power Plant (NPP) and explain the importance of control rods in NPP? | 10 |
| 16 | Write short notes on : | 10 |
| | a) Combined cycle power plant | |
| | b) Condenser vacuum control in turbine monitoring | |
| 17 | Explain with relevant process diagrams the two and three element boiler drum level control. | 10 |

FACULTY OF ENGINEERING**B.E. 3/4 (ECE) II-Semester (Suppl.) Examination, November / December 2016****Subject : Antennas and Wave Propagation****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 Distinguish between broad-side and end-fire arrays. 3
- 2 Write an expression for power radiated by a Hertzian dipole. 2
- 3 Calculate the HPBW of an eight-element end-fire array with spacing between consecutive elements equal to $\lambda/2$. 3
- 4 Define line-of-sight (LOS) propagation. 2
- 5 What is the effect of earth on vertical patterns of an antenna? 3
- 6 Define HPBW and BWFN of an antenna array. 2
- 7 State Friis transmission formula. 2
- 8 What are the E-plane and H-plane patterns? 3
- 9 Define parasitic array. 2
- 10 Distinguish between phase and group velocities of an e.m. wave. 3

PART – B (50 Marks)

- 11 a) Explain the concept of retarded potential. 5
- b) The radiation intensity of a certain antenna is $2 \sin^3 \theta$ (for $0 \leq \theta \leq \pi$) and zero elsewhere. Determine the directivity of the antenna. 5
- 12 Discuss the radiation characteristics of an a.c. element and define its near and far-field. Also obtain the distance at which both fields become equal. 10
- 13 Define effective aperture area of an antenna. Obtain maximum effective aperture area of i) half-wave and ii) short dipole. 10
- 14 What are end-fire and broad-side arrays? Obtain BWFN and HPBW of both of these two types. 10
- 15 a) Define pattern multiplication for antenna arrays using this concept, obtain the pattern of a binomial array of four point sources. 5
- b) Explain the effect of interelement phase shift on beam scanning. 5
- 16 a) Describe the advantages and disadvantages of microstrip antennas. 5
- b) Explain the method of antenna temperature measurement. 5
- 17 a) Briefly discuss about i) duct propagation and ii) sky wave propagation 5
- b) At what frequency, a wave must propagate for the D-region to have a refractive index of 0.5. Take electron density equal to 400×10^{11} for the given region. 5

FACULTY OF ENGINEERING**B.E. 3/4 (M/A.E.) II – Semester (Supplementary) Examination, Nov. / Dec 2016****Subject : CAD / CAM****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (25 Marks)**

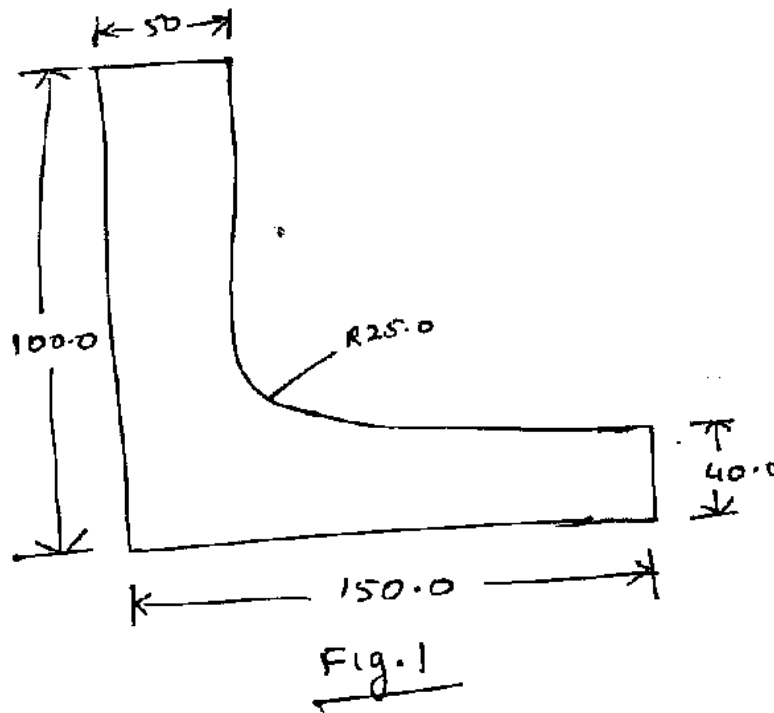
- | | |
|---|---|
| 1 Define CAD and CAE. | 2 |
| 2 What is wire frame modeling? | 3 |
| 3 What are the various 2D transformation used in CAD? | 2 |
| 4 List any four properties of spline curve. | 2 |
| 5 What is finite element modeling? | 3 |
| 6 Explain how CAD data is exchanged. | 3 |
| 7 Differentiate NC and CNC. | 2 |
| 8 In optiz coding. Explain each digit representation. | 3 |
| 9 Sketch polar configuration Robot. | 2 |
| 10 What is reverse Engineering? | 3 |

PART – B (50 Marks)

- | | |
|---|---|
| 11 a) What do you mean by Engineering design? Explain alternate solution. | 5 |
| b) Differentiate parametric and non-parametric representation of curves. Show a circle with parametric and non parametric form. | 5 |
| 12 a) What is Bernstein polynomial for Bezier curve? Write any four characteristics of Bezier curve. | 5 |
| b) A cubic Bezeir curve is described by four control points (0, 0), (2, 1) (5, 2), (6, 1). Find the tangent to the curve at t 0.25. | 5 |
| 13 a) Explain C-rep and B-rep approaches of solid modeling. | 5 |
| b) A rectangle ABCD, A(1, 1), B(5, 1), C(5, 5), D(1, 5) is sealed about C by 5 units in X-axis and 3 units in Y-axis, then find the new co-ordinate of the rectangle. | 5 |

- 2 -

- 14 Write an APT part program to cut the profile as shown in fig.1. The cutter is 6.5 mm dia, cutting speed of 900 rpm, and feed rate of 7.5 mm / min. 10



- 15 a) Discuss the structure of relational database and hierarchical database. 5
 b) Explain IGES structure and STL format in detail. 5
- 16 a) What is adaptive control system? Explain ACC and ACO adaptive control. 5
 b) What is CAQC? Explain various methods in CAQC. 5
- 17 Write short note on :
 a) Rapid prototyping
 b) Group Technology
 c) FMS.

FACULTY OF ENGINEERING

B.E. 3/4 (Prod.) II – Semester (Supplementary) Examination, Nov. / Dec. 2016

Subject : CAD / FEM

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 Enlist various design related tasks performed by CAD system.
- 2 What do you mean by a Geometric model? Explain.
- 3 What is a wire-frame model? Mention its advantages.
- 4 State the desired properties of a solid model.
- 5 Explain the need for concatenation of transformation.
- 6 Write the internal equations of equilibrium for a 3D body subjected to all the possible loads.
- 7 Explain the minimum potential energy principle.
- 8 What are the characteristics of a frame element? Explain.
- 9 What is axisymmetric elasticity? Explain.
- 10 Write a short note on FEA software.

PART – B (50 Marks)

- 11 a) Explain the methods of defining lines and circles in wire frame modeling.
b) Distinguish between the interpolation and approximation approaches used in design of curves.
- 12 a) Fit a Bezier curve and find out its middle point :
 $P_0(1,2)$ $P_2(3,5)$ $P_3(4, 2)$ and $P_4 = P_0$
b) Explain the concept of NURBS.
- 13 a) Discuss the various graphic transformations required for manipulating the geometric information.
b) Perform a 45° of rotation of a triangle A(0,0) B(2,2) and C(6,3) about the origin.
- 14 a) Differentiate between global and local coordinate systems used in FEM.
b) Derive the shape functions for a one dimensional bar element.

- 15 An axial load $P = 500 \text{ kN}$ is applied on a structure consisting of two bars as shown in Fig.1 Determine the following :
- Elemental stiffness matrix
 - Nodal displacements
 - Stress in each bar

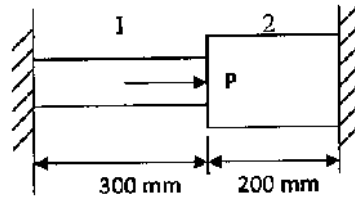


Fig. 1

Steel	Bronze
$A_1 = 1500 \text{ mm}^2$	$A_2 = 2500 \text{ mm}^2$
$E_1 = 200 \text{ GPa}$	$E_2 = 83 \text{ GPa}$

- 16 a) Discuss the Gauss elimination approach of solving FE equations.
 b) Using a 2 x 2 rule, evaluate the integral $\iint_A (x^2 + xy^2) dx dy$ by Gaussian quadrature, where A denotes the region shown in fig.2.

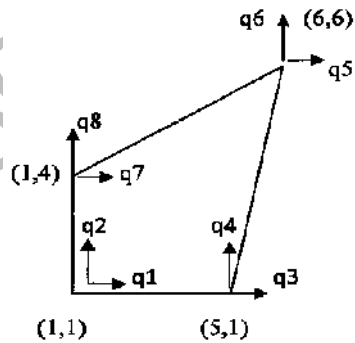


Fig.2

- 17 Determine eigen vectors and eigen values for a stepped bar shown in fig.3, Take $E = 200 \text{ GPa}$ and specific weight as 7850 kg/m^3 . Also draw the mode shapes.

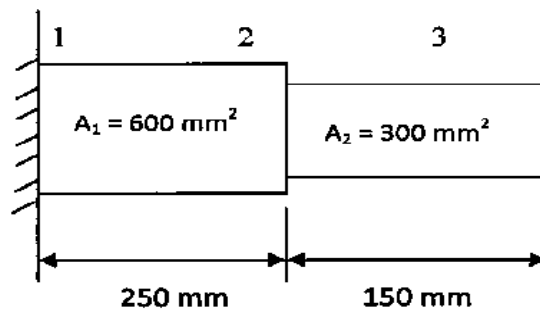


Fig. 3

FACULTY OF ENGINEERING**B.E. 3/4 (CSE) II – Semester (Supplementary) Examination, Nov. / Dec. 2016****Subject : Compiler Construction****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 Distinguish between a Pass and a Phase. 2
- 2 What are cross compilers? Why is bootstrapping required to generate them? 3
- 3 Eliminate left recursion from the given CFG. 3
 - $S \rightarrow Aa \mid b$
 - $A \rightarrow Ac \mid SD \mid \epsilon$
- 4 Define handle. Give an example. 2
- 5 Draw a syntax tree and DAG for the following expression 3
 - $(a*b)+(c-d)*(a*b)+b$
- 6 What is an attribute grammar? 2
- 7 Explain how dynamic allocation is done. 2
- 8 Write LR (0) items for $A \rightarrow (A) \mid a$ 3
- 9 What is an activation record? Discuss its structure. 3
- 10 Define induction variable. 2

PART – B (50 Marks)

- 11 a) Give the output of each phase of a compiler when the given statement is processed $a = b*c/d-e+20$ 6
 - b) Explain the input buffer scheme for scanning the source program. 4
- 12 a) Give the rules to construct FIRST and FOLLOW sets. 4
 - b) Is the given grammar LL(1)? 6
 - $E \rightarrow E + T \mid T$
 - $T \rightarrow T * F \mid F$
 - $F \rightarrow (E) \mid id$
- 13 a) Differentiate between static runtime environments and stack based run time environments. 5
 - b) Discuss symbol table organizations. 5
- 14 a) main() 5
 - {
 - int a[10], i;
 - for (i = 0; i < 10 ; i++)
 - a[i] = i*2;
 - }
 - Convert the following program into 3 address code, and optimize it if required.
 - b) Explain briefly parameter parsing mechanisms. 5

- 15 Describe Data Flow analysis in detail. 10
- 16 a) Discuss code optimization techniques. 5
b) Discuss garbage collection in detail. 5
- 17 Write short notes on any Two of the following : 10
- a) Error Recovery in bottom up parsers.
 - b) LEX
 - c) Basic blocks and their construction

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FACULTY OF INFORMATICS**B.E. 3/4 (IT) II-Semester (Supplementary) Examination, Nov. / Dec. 2016****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 | List the Heuristic and exhaustive searches. | 2 |
| 2 | What is MIN-MAX procedure? Give an example. | 3 |
| 3 | Find the resolvent of the clauses in the set {AVB, ~AVD, CV~B}. | 2 |
| 4 | List the relations used in semantic network and define them. | 3 |
| 5 | Define Baye's theorem. | 2 |
| 6 | Define joint probability and conditional probability. | 3 |
| 7 | Briefly explain about components of learning system. | 3 |
| 8 | Discuss about the Neuron model with diagram. | 2 |
| 9 | What is semantic web? | 2 |
| 10 | What is recursive transition network? | 3 |

PART – B (50 Marks)

- | | | |
|-------|--|---|
| 11 a) | Consider the following English sentence :
"Anything anyone eats is called food. Mita likes all kinds of food. Mango is a food, John eats Pizza. John eats everything Mita eats", translate the sentence into formulae in predicate logic and then to clauses.
Use resolution refutation to prove
"Mita likes Pizza and Burger". | 5 |
| b) | A farmer wants to get lion, a goose, a fox and some rice across the river. There is a boat, but farmer can take only one passenger in addition to himself on each trip or else can take both lion and the rice or both the fox and rice. The goose will eat rice, fox will eat goose and lion will eat fox if it kept unattempted by the farmer. Using state space search. Show how the farmer managed to get everything across the river. | 5 |
| 12 a) | Draw a semantic network representing following knowledge "Every vehicle is a physical object. Every car is a vehicle. Every cat has wheels. Electrical system is a part of car. Battery is a part of electrical system. Pollution system is a part of every vehicle. Vehicle is used in transportation. Suzuki is a car. Use forward reference mechanism to show that Suzuki has battery. | 7 |
| b) | Determine whether the formula $(A \wedge B) \rightarrow (A \rightarrow B)$ is consistent or inconsistent using tableau method. | 3 |
| 13 a) | Explain Different phases in expert system with a neat diagram. | 6 |
| b) | Compare monotonic and non-monotonic systems. | 4 |

- 14 a) Differentiate between supervised and unsupervised learning. 4
b) Construct a feed forward Neural Network for XOR function and explain. 6
- 15 a) Explain about RDF with an example. 5
b) Explain about the sentence analysis phases. 5
- 16 a) Differentiate between informed and uninformed searches. 4
b) Explain about decision tree learning or ID3 algorithm. 6
- 17 Write a short notes on the following :
a) Hopfield network 3
b) Universal networking knowledge 3
c) Entropy and information gain 4
