Code No. 5163 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) II – Semester (Suppl.) Examination, January 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 is focal length? 2
2 Define absolute maximum B.M. 2
3 The degree of static indeterminacies of a 2-hinged arch and a 3 hinged arch are _____ and _____ respectively. 2
4 What is analogous column? 2
5 Explain Bow's notation in graphic statics. 2
6 State and explain Eddy's theorem. 3
7 The cable of a suspension bridge of 200m span and central dip 15 m has its supports at the same level. Calculate the length of cable. 3
8 What is counter bracing? Explain. 3
9 List out the assumptions in portal method and cantilever method. 3
10 A Warren truss of 30 m span has 5 panels, draw the influence diagram for the interior diagonal chord. 3

PART – B (5x10 = 50 Marks)

11 The wheel loads shown in Fig. 1 roll over a beam of span 15 m. Find the max. bending moment @ 5 m section from the left end. Also, determine the position and magnitude of absolute max. B.M in the girder. (10)

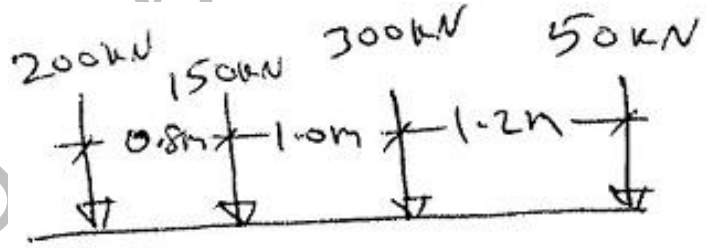

fig-1

12 Two wheel loads of 60 kN and 40 kN spaced at 6 m apart cross a girder of span 16 m with 40 kN load leading. Draw the maximum B.M.D. (10)

13 A uniform 2-hinged parabolic arch of span 60 m and rise 6 m carries a u.d.l. of 40 kN/m over its middle 20 m length. Calculate the horizontal thrust in the arch and also draw B.M.D. for the arch. Take $I_x = I_c \sec^{-}$. (10)

14 A suspension bridge with level supports 120 m apart and a central dip of 12 m supports a 3-hinged stiffening girder with a dead load of 25 kN/m. Using influence lines, find the position and magnitude of maximum B.M. in the girder, when a single point load of 150 kN rolls across the girder. (10)

..2

15 Analyse the frame shown in Fig. 2 by the method of Column Analogy. (10)

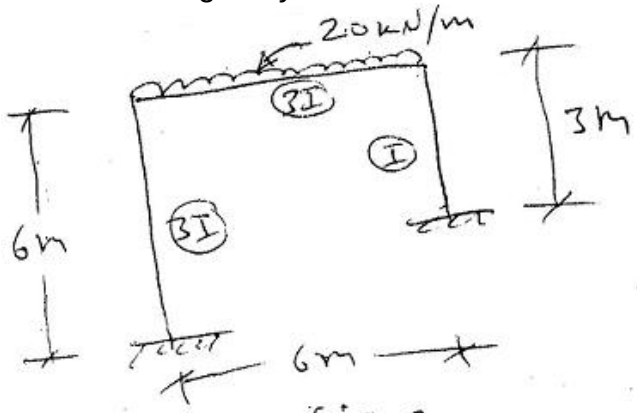

fig. 2

16 Analyse the frame shown in Fig. 3 by Portal method and draw B.M.D. (10)

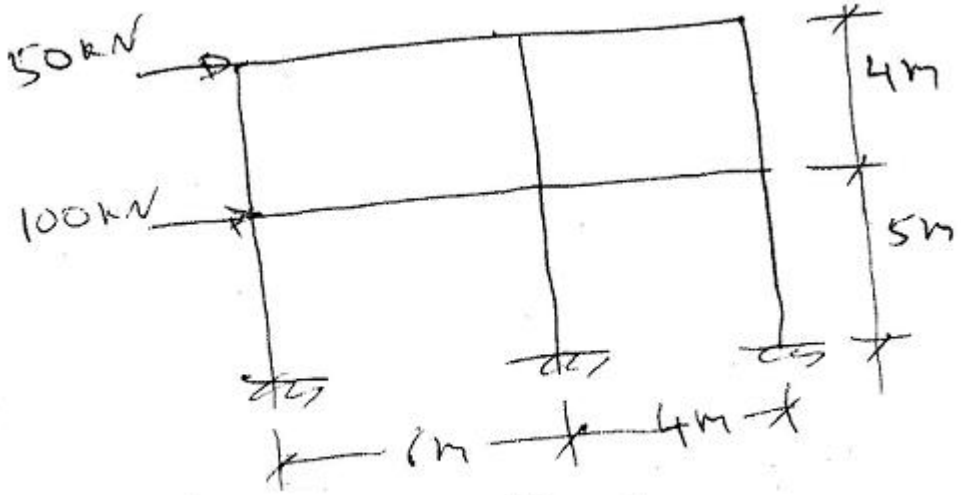

fig. 3

17 Write short notes on: (10)

a) Static and kinematic indeterminacies
b) Construction of enveloping parabola.

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Code No. 5174 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) II - Semester (Suppl.) Examination, January 2016

Subject : Power Plant Instrumentation

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 List out the various methods of power generation. (2)
2 Enumerate the various non-contracting transducers for speed measurement. (3)
3 Mention some major turbine trip condition. (2)
4 What is the necessity of feed water conditioning in thermal power plant? (3)
5 What is meant by “Furnace Draft” in thermal power plant? (3)
6 What is the significance of air / fuel ratio control? (2)
7 Why hydrogen is preferable than air for generator cooling? (2)
8 What is the function of economiser in power plant? (3)
9 What is the function of nuclear reactor control? (3)
10 What is the requirement of CO trimming? (2)

PART – B (50 Marks)

11 With a neat diagram, explain the piping and instrumentation drawing of a boiler? Indicate all control loops that can be established without any redundancy. (10)

12 (a) Briefly, explain smoke density measurement and mention its importance. (5)
(b) Write a note on turbine supervising system with block diagram. (5)

13 For proper combustion of fuel, explain with neat diagram how air – fuel ratio control is achieved in power plant. (10)

14 With a neat diagram, explain the scheme of gland steam exhaust pressure control of turbine. (10)

15 Explain the working principle of Nuclear power plant with relevant diagram. (10)

16 (a) What is the necessity of flame monitoring in boiler? (5)
(b) What is the function of stream circuit in modern steam generators? Explain. (5)

17 (a) Explain the Boiler feed water control scheme with a neat sketch. (6)
(b) What is the importance of instrumentation in thermal power plant? (4)

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Code No. 5178 / S

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Suppl.) Examination, January 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 Explain how an antenna radiates power into free space and list out the properties of an antenna. 3

2 Define Antenna radiation pattern. Draw and explain its parameters. 3

3 Compare the loop antenna with short dipole. 2

4 Evaluate the directivity of an isotropic radiator. 3

5 List some applications of helical antenna. 2

6 What are the various differences between binomial and linear arrays? 2

7 Write the excitation coefficient of 5 elements binomial array. 2

8 What are the advantages of patch or microstrip antenna? 2

9 At what frequency a wave must propagate for the D region to have an index of refraction 0.5? Given N = 400 electron/cc for D-region. 3

10 State secant law. 3

PART – B (50 Marks)

11 a) Derive Friss transmission formula. 4

b) Calculate the maximum effective aperture of an antenna which is operating at wave length of 5 meters and has a directivity of 75. 3

c) Calculate the radiation resistance of dipole antenna of length λ/8 m. 3

12 a) With a neat sketch explain the working principle of Helical antenna. What are the various modes under which a helical antenna can be operated?

b) Describe the wide band characteristics of Helical Antenna.

13 a) Derive the array factor of n-elements uniform linear array.

b) What is an antenna arrays? What are the reasons for using antenna arrays?

14 a) Draw the structure of three elements Yagi-Uda antenna and explain its working with one folded dipole, one director and one reflector.

b) What are advantages and disadvantages of Lens Antenna?

15 a) Explain why an antenna using a paraboloid reflector is likely to be a highly directive receiving antenna.

b) Determine the directivity of loop antenna whose radius is 0.5 m when it is operated at 0.9 MHz.

16 a) Explain about duct propagation when 100 m high duct is formed in troposphere, calculate the f_{min} to be used for communication.

b) Show that MUF of ionized layer is given by

$$f_{MUF} = f_c\sqrt{1+(D/2h)2}$$

17 a) The observed critical frequencies of E and F layer at Guahati at a particular times are 2.5 MHz and 8.4 MHz respectively. Calculate the maximum electron concentrations of the two layers.

b) A television transmitter antenna has a height of 169m and the receiving antenna has a height of 16m. What is the maximum distance through which the TV signal could be received by space wave propagation? What is the radio horizon in this case?

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Code No. 5183 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Mech./AE) II – Semester (Suppl.) Examination, January 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 List any four graphic standards.

2 Distinguish between interpolation and approximation curves.

3 List the properties of Bezier surface.

4 If the triangle A(1,1), B(2,1), C(1,3) is rotated by a factor 30^0 about the origin, find the new coordinates of the triangle.

5 What is meant by STL file format and mention its application in manufacturing?

6 Write the G-code format for tool length and cutter radius compensation.

7 Distinguish between CNC and DNC.

8 Define the terms i) Accuracy ii) Repeatability and iii) Payload for a robot

9 Distinguish between variant and generative process planning.

10 Define the term rapid prototyping and mention its applications.

PART – B (50 Marks)

11 a) Discuss the concept of parametric and non-parametric representation of a helix. 5
b) A cubic Bezier curve is defined by the control points as (20,20), (60,80), (120, 100), and (150, 30). Find the equation of the curve. 5

12 a) Explain with neat sketches surfaces of revolution and tabulated cylinder. 5
b) Draw the CSG tree for the object shown in figure 1 below : 5

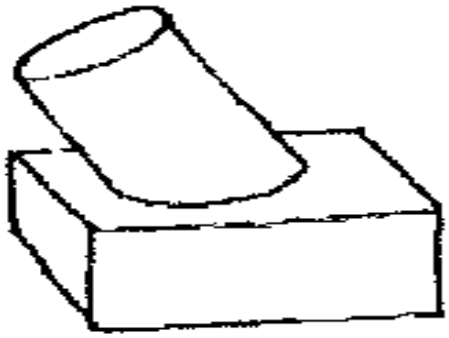

Figure 1

13 The component to be machined is shown in fig. 2. It is assumed that the pocket is through and hence only outside is to be machined as a finish cut of the pocket. The tool to be used is a 20mm diameter slot drill. The setting is done with point A as reference (0, 0, 0) and the reference axes are along X and Y directions. Write NC part program for machining the component.

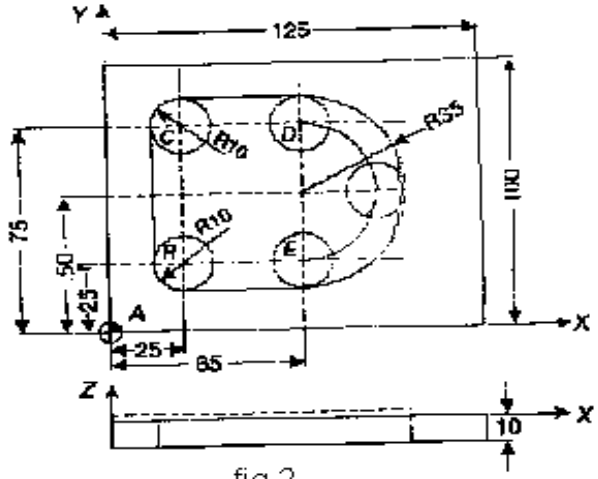

fig.2

14 a) Discuss about adaptive control with optimization with a neat sketch. 5

b) Explain about various types of robot programming methods. 5

15 a) Develop the opitz form code (first 5 digit) with justification for the component shown in fig. 3. 5

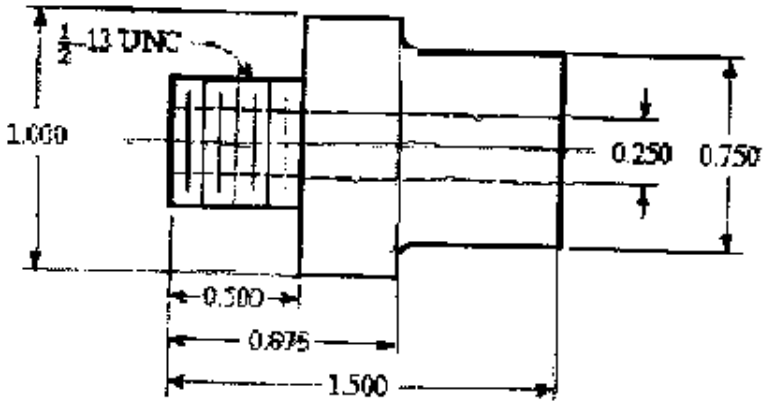

Fig.3

b) Describe with a neat sketch the working principle of a CMM. 5

16 a) Find the transformed coordinates when a square [(1, 1), (2, 1), (1, 2) and (2, 2)] is rotated by 90^{o} anticlockwise about a line passing through one of its vertex (1, 1) and parallel to x-axis. Solve the problem by homogeneous transformations and row notation.

b) What is meant by a machining centre and explain about its features and applications? 5

17 Write short notes on the following :

a) Parametric Representation of a cubic spline

b) Finite element analysis

c) Canned cycles

d) Reverse Engineering

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Code No. 5189 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Prod.) II – Semester (Suppl.) Examination, January 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 (10 x 2 ½ = 25 Marks)

1 What is a design criterion? What are all alternate solutions and alternate designs?
2 Differentiate interpolation, extrapolation and approximation curves.
3 A line rotated by 45^0 in CCW direction about a point P(-1, 1) and translated by (5, 5) units then find concatenated matrix.
4 What are mass properties? Explain.
5 Derive the transformation matrix for an inclined member of a plane truss.
6 Define potential energy and virtual displacement method of FEM.
7 Write the differential operator for axial, truss, and beam elements.
8 Write the stiffness matrix of a frame element (A line element with nodes, each node 3dof of 2 translations in x and y axes and rotation about z axis).
9 Determine the shape functions at a point P inside the triangular element as shown in figure 1.

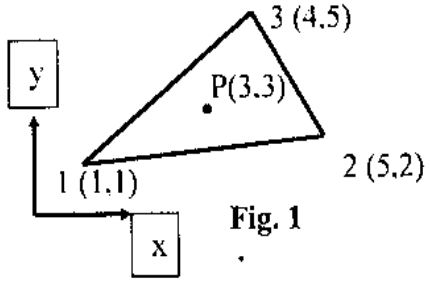

Fig. 1

10 Explain the difference between consistant mass matrix and lumped mass matrix of axial element.

PART – B (5 x 10 = 50 Marks)

11 a) Sketch the Bezier curve with the 4 control points of second order $P_0(2, 2)$, $P_1(2,3)$, $P_2(3, 3)$ and $P_3(3, 2)$ and also find the points on the curve for u=0, 1/4, 1/2, 3/4 1 and give your comments.
b) Write any three characteristic of B-spline and cubic curves each.

12 a) Sketch and explain two analytic surfaces and enumerate the applications of each.
b) Differentiate C-rep from B-rep and give 3 solids generated by each method
c) Explain the mechanical tolerance analysis and Mass properties.

13 For the plane truss shown in fig.2, determine
a) The displacement at node 3.
b) The strain and stresses in elements 1 and 2
c) The reaction forces. Take A = 10^{-6} m^2, E = 100 GPa,

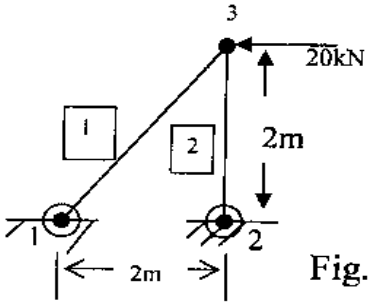

Fig. 2

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14 For the beam shown in fig. 3, determine i) the equivalent load vector and ii) the deflection at the midpoint between node 2 and 3. Take EI = 10^6 N – m^2.

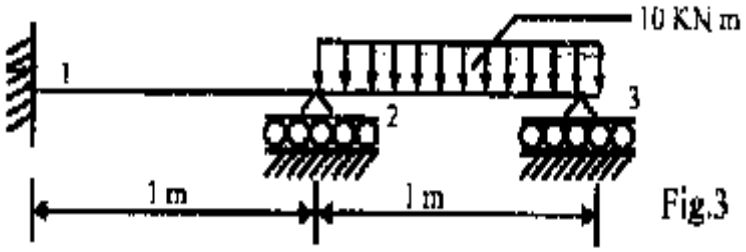

Fig.3

15 Obtain the stiffness and load vector matrices for the axi – symmetric element show in fig. 4.

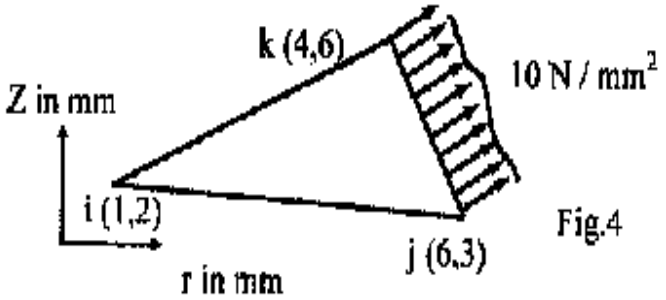

Fig.4

16 a) A quadrilateral finite element has nodes 1(1, 1), 2(6, 1), 3(4, 5) 4(1, 4). Obtain shape functions N_1, N_2, N_3 and N_4.

b) Evaluate the integral of the function $3e^x + x^2 + 1.0 / (x + 2.0)$. Numerically in the interval (-1, +1) and compare the solution by Gaussian quadrature if n = 1, $¶_1 = 0.0$, $w_1 = 2$, for n = 2, $¶_1 = ¶_2 = \pm 0.577, w_1 = w_2 = 1.0$.

c) Differentiate between elimination and penalty approach for treating the boundary conditions.

17 a) What are Eigen values and Eigen vectors?

b) What is convergence? Explain.

c) For the stepped bar shown in fig.5, determine the natural frequencies and mode shapes for the bar shown in figure 5. Take $2A_1 = A_2 = 10^{-8}$ m^2, $°_1 = °_2 = 1000$ Kg/m^3, $E_1 = E_2 = 100$ GPa.

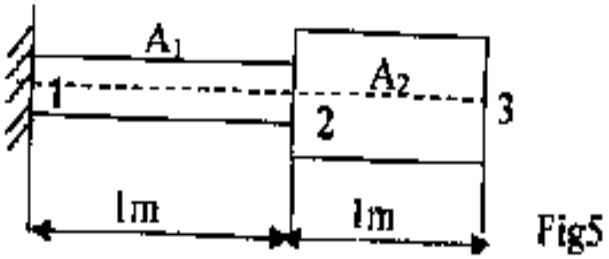

Fig5

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Code No. 5195 / S

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Suppl.) Examination, January 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	What is Bootstrappping compiler?	2
2	Explain role of Lexical Analyzer.	2
3	What is left factoring?	3
4	What is L attribute definition? Give an example.	3
5	State the data structures of symbol table.	2
6	What are the various forms of intermediate code generation?	3
7	Write triple notation for the following statement. X = -a + b * -a + b	3
8	Define Lower.	2
9	State the properties of data flow analysis.	2
10	State error recovery techniques in top down parsing.	3

PART – B (50 Marks)

11	a)	Explain phases of compiler for the following source code. a [index] = 5 + 2 ;	6
	b)	Write short notes on LEX tool.	4
12		Construct L ALR for the following grammar. $S \rightarrow CC$ $C \rightarrow ta \mid d$	10
13	a)	Write SDD notations for the desktop calculator. E : = E + T T : = T * F | F F : = (E) | id	5
	b)	Explain symbol table.	5
14		Explain storage organization in detail.	10
15	a)	Explain principles of code optimization.	5
	b)	Explain Bais blocks.	5
16	a)	Explain non block structured languages.	5
	b)	Explain three address code types.	5
17		Write short notes on : a) Predictive parsers b) Ambigous Grammars	10

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Code No. 5202 / S

FACULTY OF INFORMATICS

B.E. 3/4 (I.T.) II - Semester (Suppl.) Examination, January 2016

Subject : Artificial Intelligence

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

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

PART – A (25 Marks)

1 Define Artificial. Name various Al problem characteristics. (3)
2 What is state space search? (2)
3 Explain Alpha-Beta pruning. (3)
4 Write the rules of inference for propositional Logic. (2)
5 What is truth maintenance system? Give an example. (3)
6 What is frame problem? (2)
7 What is feature vector? Explain briefly. (3)
8 Differentiate between Supervised and unsupervised Learning. (2)
9 What is Non-monotonic reasoning? (2)
10 Explain Semantic analysis in understanding Language string. (3)

PART – B (50 Marks)

11 Explain Best First strategy and explain how it combines DFS and BFS approaches. (10)

12 Explain Monotonicity and write a note on complexity of propositional logic. (10)

13 (a) Differentiate between Expert systems and Traditional systems. (5)

(b) Explain Dempster – Shafer theory. (5)

14 (a) Explain Radial Basis Function Networks. (5)
(b) Write about support Vector machines. (5)

15 Write a detailed note on Natural language processing. (10)

16 Explain forward and backward chaining. Write and explain the working of forward chaining algorithm. (10)

17 Write short notes on any **two** of the following: (10)
(a) Decision Trees
(b) STRIPS planning systems
(c) Bayesian Belief Networks

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