Hall Ticket Number :

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R-17

Code: 7G677

IV B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Finite Element Methods for Civil Engineering

(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. Explain briefly about advantages and disadvantages of FEM.   14M

OR

2. Explain briefly about Plane Strain condition and derive an expression for Plane Strain Condition.   14M

UNIT–II

3. Determine the Stiffness matrix for a bar element by using direct method.   14M
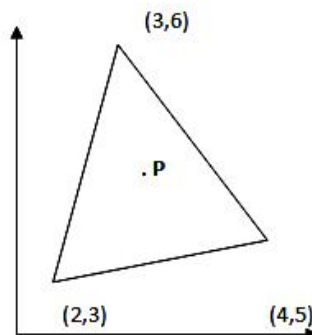
OR

4. Explain briefly about the difference between Global co-ordinate system and Natural co-ordinate system.   14M

UNIT–III

5. Derive the element stiffness matrix for a 3 noded triangular element.   14M

OR

6. The nodal coordinates of the triangular element are shown in Fig. 2. At the interior Point P, the X co-ordinate is 2.6 and $N_1 = 0.4$. Find N_2, N_3 and the Y coordinate at Point P.

    14M

UNIT–IV

7. Explain briefly about Iso-parametric elements.   14M

OR

8. Derive the Jacobian matrix, strain displacement matrix and stiffness matrix for a 8-noded Iso-parametric quadrilateral element.   14M

UNIT–V

9. Find the integral I= $(2x^3 + 5x^2 + 6)$ dx using Gaussian quadrature method with 2 point scheme. The Gauss points are +or- 0.5774 and the weights at two points are equal to unity. The limits for integral are -1 to 1.   14M

OR

10. Derive an expression for one point Gaussian approximation.   14M

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IV B.Tech. I Semester Supplementary Examinations Nov/Dec 2022
Transportation Engineering
(Civil Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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UNIT–I

1. a) Explain the function of various components of a structure with a neat sketch?   8M
   b) Briefly explain the objects and necessity of the highway planning?   6M

OR

2. a) Explain the design of super elevation?   7M
   b) Briefly describe about the necessity of extra widening?   7M

UNIT–II

3. a) Explain the term traffic volume and discuss about the objects of carrying out traffic volume studies?   7M
   b) Briefly explain the different vehicular characteristics?   7M

OR

4. a) Explain the different types of parking survey and effects of improper parking in the town? 7M
   b) Sketch any four types of mandatory signs used to control road traffic?   7M

UNIT–III

5. List the various forms of intersections considered for traffic control and explain them briefly with neat sketches?   14M

OR

6. a) Define channelization and explain with neat sketches?   7M
   b) Briefly explain the purpose of providing channelization?   7M

UNIT–IV

7. a) Explain the specifications of materials and construction steps for bituminous surface course?   7M
   b) Write short note on:
      i) prime coat ii) tack coat iii)seal coat   7M

OR

8. a) Draw a sketch of flexible pavement cross section and show the component parts?   7M
   b) Enumerate the functions and importance of each component of the pavements?   7M

UNIT–V

9. a) Explain the characteristics of an ideal airport layout?   7M
   b) Discuss briefly about the data required for the airport site selection   7M

OR

10. a) Explain the typical airport layout and label its components?   7M
    b) Explain the various assumptions considered to determine Basic runway length?   7M

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Code: 7G671

IV B.Tech. I Semester Supplementary Examinations Nov/Dec 2022
Design and Drawing of Irrigation Structures
(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any One* question from the following (1 x 70 = 70Marks)
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	Marks	CO	Blooms Level

1. Design a sluice (tank sluice with tower head) taking off from a tank with a following data:

Discharge :	0.38m³ /sec
Top width of the bund :	2.0 m
Side slopes :	2: 1
Top level of the bank :	+68.00
Ground level at the site :	+62.50
Sill of the sluice at off-take is :	+62.00
Maximum water level in the tank :	+66.00
Full tank level is :	+65.00
Average low water level is :	+63.00
Good hard soil for foundation is available at :	+ 61.50

   Details of canal below the sluice

Bed level :	+62.00
F.S.L :	+62.50
Bed width :	1.80m
Side slopes : 1.5:1 with top bank at + 63.50m	

   Draw the longitudinal section. Assume any suitable data.   70M

OR

2. Design and draw the surplus work of a tank forming part of a chain of tanks. The combined catchment area of the group of tanks is 30 km² and the area of the catchment intercepted by the upper tanks is 19 km². Water will be stored in the tank to a level of +12.00 meters above MSL limiting the submersion of foreshore lands up to a level of +12.75 meters above MSL. The general ground level at the proposed site of work is +11.00 meters, and the ground level below the proposed surplus slopes off till it reaches +10.00 meters in about 6 meters distance.

   The tank bund has a top width of 2 meters at level +14.50 with 2:1 side slope on either side. The tank bunds are designed for a saturation gradient of 4:1 with 1-meter clear cover. The foundations are of hard gravel at a level of 9.50 meters near the site of work.   70M

END