IV B.Tech. I Semester Supplementary Examinations July 2021
Bridge Engineering
(Civil Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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		Marks	CO	Blooms Level

UNIT–I

1. a) While fixing the bridge alignment, what are the important points to be explained for a good bridge site? — 7M — BT-1

   b) Explain the difference between the road and railway standards while calculating the earth pressure for the design of abutments. — 7M — BT-2

OR

2. Design a box culvert having inside dimensions of 3 m x 3 m. This culvert is subjected to a dead load of 14000 N/m^2 and a live load of IRC Class AA tracked vehicle. Assume the unit weight of soil to be 18,000 N/m^3. The angle of repose of soil is 30°. Use M25 concrete and Fe415 steel. Road width is 7.5 m. Span is 3.3 m. — 14M — BT-3

UNIT–II

3. A reinforced concrete slab culvert is required for a National highway crossing to suit the following data: Width of carriageway: 7.5 m; Width of kerb: 600 mm; Wearing coat: 80 mm; Clear span: 5 m; Width of bearing: 400 mm; Foot paths 1 m on either side; Type of loading: IRC Class AA; Materials: M30 Grade concrete and Fe415 HYSD bars. Design the slab to confirm to IRC: 21-2000 code specifications. — 14M — BT-4

OR

4. Design a T-beam superstructure for a bridge on a national highway. The following details are available: Effective span: 18 m; Live load: IRC class AA (Tracked); Meterials: M40 concrete and Fe415 steel; Spacing of cross girders: 3 m. — 14M — BT-4

UNIT–III

5. A plate girder is to be designed for a Broad Gauge track to suit the following data: Span of the bridge: 15 m; Dead load of track: 10 kN/m; E.U.L.L. for B.M Calculations per track: 1631 kN; E.U.L.L. for shear calculations per track: 1801 kN. Design the plate girder to confirm to the IRC loadings. — 14M — BT-5

OR

6. Design a composite bridge deck consisting of an RCC Slab on steel girders. The span of the bridge is 15 m. Road: Two lane highway; Kerbs: 600 mm on either side; Number of steel girders: 4; Spacing of girders: 2.5 m c/c; Materials: M40 concrete and Fe415 steel

   Other details: Bed level: 150 m; Bed width: 21 m; Stream bund top: 152.50 m; Road top level: 155.50 m; Hard rock level: 148.50 m; wing walls: Return type. — 14M — BT-5

UNIT–IV

7. Write the detailed steps involved in the design of steel rocker bearing. — 14M — BT-1

OR

8. Design an elastomeric unreinforced neoprene pad bearing to suit the following data: Vertical load (sustained): 200 kN; Vertical load (dynamic): 40 kN; Horizontal force: 60 kN; Modulus of rigidity of elastometer: 1 N/mm^2; Friction coefficient: 0.3. — 14M — BT-3

UNIT–V

9. Briefly explain about the various forces acting on the piers and abutments. — 14M — BT-2

OR

10. Verify the stability of the abutment of a bridge with the following details: Top width: 1.5 m; Height: 4 m; Back batter: 1 in 6; Front face of the abutment is vertical; Material: Stone masonary; Unit weight of soil: 18 kN/m^3; Angle of repose: 30o; superstructure: T-beam bridge of span 15 m; Loading: IRC Class AA. — 14M — BT-3

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R-17

Code: 7G671

IV B.Tech. I Semester Supplementary Examinations July 2021

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)

	Marks	CO	Blooms Level

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

Discharge :	0.38m^3 /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 a trapezoidal notch fall for the following data. Assume
    important missing data. Draw the important views on a drawing sheet
    Full supply discharge : 22 m3/sec (US/DS)
    Full supply level : 101m US/100m DS
    Full supply depth : 2 m US/ 2 m DS
    Bed width : 12m US/12m DS
    Bed level : 99 m US / 98 m D/S
    Drop : 1m   70M

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IV B.Tech. I Semester Supplementary Examinations July 2021
Disaster Management
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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			Marks	CO	Blooms Level

UNIT–I

1.	a)	Demonstrate natural disaster and man-made disaster, what are the effects of disasters on environmental health facilities and services.	7M	CO1	L2
	b)	Explicit an account on different approaches to disaster management and relation with human ecology.	7M	CO1	L2

OR

2.	a)	Summarize the concept of first responder with special reference to the role of the government in first response.	7M	CO1	L1
	b)	Discuss various methods for rescuing affected persons in a disaster situation.	7M	CO1	L1

UNIT–II

3.	a)	State epicenter and focus? Create with a neat diagram? Based on depth how many types of earthquake are classified.	8M	CO2	L1
	b)	Explore plate tectonic movements, describe landslides.	6M	CO2	L1

OR

4.	a)	Explicit a note on man-made landslides. State what are the mitigation measures at the time of land-slides?	7M	CO2	L5
	b)	Explore various environmental Impacts of Volcanic Eruptions	7M	CO2	L5

UNIT–III

5.	a)	Describe a flow chart of planetary and extra planetary hazard.	6M	CO3	L3
	b)	Elucidate the consequences of the phenomenon of drought? Summarize briefly.	8M	CO3	L3

OR

6.	a)	Distinguish the difference between natural disaster and man-made disaster.	7M	CO3	L2
	b)	Examine the role of corporate social responsibility as an emerging avenue in managing disasters.	7M	CO3	L2

UNIT–IV

7.	a)	What are the important steps in relief distribution and summarize the different types of damages that occur due to disasters.	8M	CO4	L4
	b)	Illustrate the floods hazards of India in the past years.	6M	CO4	L4

OR

8.	a)	Explicit a note on floods and discuss its types and causes.	6M	CO4	L1
	b)	Summarize briefly the pattern of global population growth in recent years which is causing alarm to environmental experts.	8M	CO4	L1

UNIT–V

9.	a)	List out some guidelines for achieving sustainable development.	6M	CO5	L5
	b)	Explicit the methods to predict natural disasters and discuss the role of technology in disaster management.	8M	CO5	L5

OR

10.	a)	Summarize the different types of damage reports. Identify the different types of rehabilitation.	8M	CO5	L3
	b)	Discuss the role of technology in disaster management.	6M	CO5	L3

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Code: 7G677

IV B.Tech. I Semester Supplementary Examinations July 2021
Finite Element Methods for Civil Engineering
(Civil Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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		Marks	CO	Blooms Level

1. a) Mention the basic steps in Rayleigh- Ritz method | 7M | CO1 | L1

    b) What is the need of Finite Element Analysis and list some applications and software's of FEM? | 7M | CO1 | L1

OR

2. A bar of length 'L' has a cross sectional area, which varied linearly from value '2A' at one end to 'A 'at the other end. End 1 is held against any moment while the bar is stretched by an axial force 'P' is applied at end 2. Obtain the solutions for axial displacements and axial stress distributions and the value of the potential energy based on the following displacement field $u = a_1 + a_2 x$ | 14M | CO1 | L2
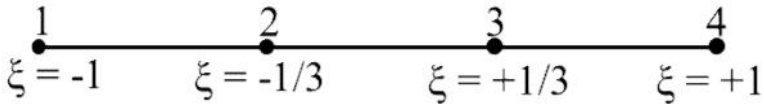
3. For the stepped bar shown in the figure below, determine the nodal displacements, element stress and reactive reactions. Take P = 250 kN, E= 200 GPa, a_1=120 mm^2, a_2 = 150 mm^2 and a_3 = 350 mm^2.
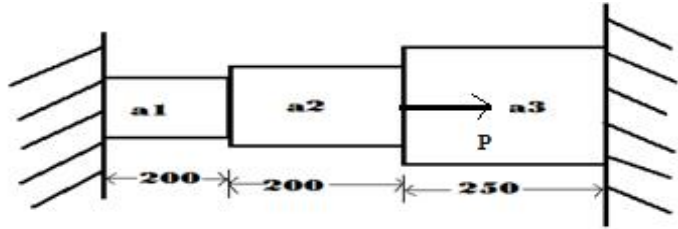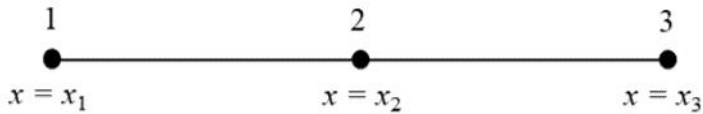

| 14M | CO2 | L2,L4

OR

4. a) For a four noded element shown in natural coordinates in Figure Generate the shape functions and show that $\sum N_i = 1$.

| 9M | CO2 | L3
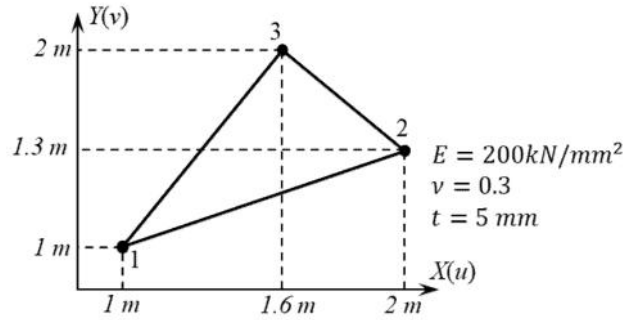
    b) For a one-dimensional three noded element shown in Figure generate the shape function N_1, N_2 and N_3 and show that $\sum N_i = 1$. Given $x_l = 1$, $x_2 = 2$, $x_3 = 4$.

| 5M | CO2 | L3

UNIT–III

5. a) For the triangular element shown in Figure evaluate the stiffness matrix for the element if the element is used for plane stress analysis.

9M CO3 L3,L4

b) If the displacement at nodes 1, 2 and 3 are (0.754, 1.836), (0, 0), (0, 0), then determine the stresses in the element. (Refer above figure)   5M CO3 L4

OR

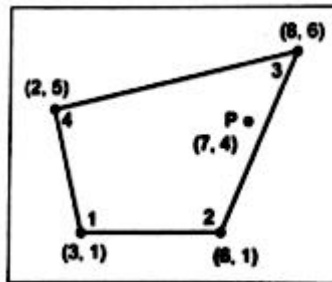6. Evaluate the shape function for a CST element.   14M CO3 L4

UNIT–IV

7. Derive the Jacobian matrix for a linear 4-noded isoparametric quadrilateral element.   14M CO4 L2

OR

8. a) For the isoparametric quadrilateral elements shown in figure determine the local coordinates of the point P which has Cartesian Coordinates (7, 4).

9M CO4 L3

b) What is an iso-parametric, sub-parametric and super-parametric element and explain briefly with examples.   5M CO4 L2

UNIT–V

9. a) What are the conditions of convergence and compatibility requirement?   CO5 L5

b) Obtain the linear relations between Cartesian Coordinates and Natural Coordinates   CO5 L4

OR

10. Evaluate the integral, $I = (a_1 + a_2 + a_3^2 + a_4^3) d$ using Gaussian two-point rule and verify the solution with exact integral.   14M CO5 L4

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IV B.Tech. I Semester Supplementary Examinations July 2021
Human Resource Management
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level

UNIT–I

| 1. | a) | What is HRM? Explain its nature and Scope. | 7M | 1,2 | 1 |
| | b) | Explain HRM Operational Functions. | 7M | 1,2 | 2 |

OR

| 2. | a) | What is Ethics? Enumerate the need of ethical aspects of HRM | 7M | 1, 2 | 4 |
| | b) | Differentiate personnel management and HRM | 7M | 1, 2 | 5 |

UNIT–II

| 3. | a) | Elicit the role of Human Resource Information System in an organization. | 7M | 6, 7 8 | 2 |
| | b) | What are the different factors affecting HRP. | 7M | 6, 7, 8 | 4 |

OR

| 4. | a) | Define Job Description. What items are typically included in the Job Description? | 7M | 6, 7, 8 | 1 |
| | b) | Describe Job Description and its importance. | 7M | 6, 7, 8 | 2 |

UNIT–III

| 5. | a) | What is recruiting? Explain process and factors affecting recruitment. | 7M | 1, 4 | 4 |
| | b) | Write about the importance of internal recruitment methods. | 7M | 1, 4 | 2 |

OR

| 6. | a) | Explain the emerging trends in Employee Selection Process. | 7M | 1, 4 | 2 |
| | b) | Define placement and orientation role in HRM | 7M | 1, 4 | 1 |

UNIT–IV

| 7. | a) | List and briefly explain each of the steps in the Training Process. | 7M | 3, 4,5 | 1 |
| | b) | Explain different methods of training. | 7M | 3, 4, 5 | 2 |

OR

| 8. | a) | Define the process of Career stages and Development | 7M | 3, 4,5 | 1 |
| | b) | List the advantages and disadvantages of training process | 7M | 3, 4, 5 | 1 |

UNIT–V

| 9. | a) | Define compensation? Explain various components of pay structures in India. | 7M | 3, 4, 5 | 1 |
| | b) | List out various types of compensation process | 7M | 3, 4, 5, | 1 |

OR

| 10. | a) | Write a note on Industrial Relations objectives, need and parties involved | 7M | 3, 4, 5 | 3 |
| | b) | Define the need of Performance Appraisal | 7M | 3, 4, 5 | 1 |

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IV B.Tech. I Semester Supplementary Examinations July 2021
Transportation Engineering
(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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		Marks	CO	Blooms Level

UNIT–I

1. a) Discuss the significant recommendations of Jayakar Committee report? Mention how this helped in road development in India. — 7M — 1 — 3

   b) Derive an expression for finding the stopping sight distance at level and at grades. — 7M — 1 — 3

OR

2. a) While aligning a highway in a built up area, it was necessary to provide a horizontal circular curve of radius 325m. Design the following geometric features: (i) Super elevation, (ii) Extra Widening of pavement, (iii) Length of transition curve. — 7M — 1 — 4

   b) What are the various objectives of preliminary survey for highway alignment? Enumerate the details to be collected and the various steps in the conventional method — 7M — 1 — 3

UNIT–II

3. a) Explain the parameters which characterize traffic flow? With neat sketches elaborate how they are related. — 7M — 2 — 3

   b) Vehicle 'A' is approaching from west and vehicle 'B' from south. After collision 'A' skids 600 north of east and 'B' skid 300 south of east. Skid distance before collision for 'A' is 18 m and 'B' is 26 m. The skid distances after collision are 30m and 15 m respectively. Weight of 'A' and B are 4500 and 6000 respectively. Skid resistance of pavement is 0.55 m. Determine the pre-collision speed. — 7M — 2 — 4

OR

4. a) What are the applications of location file, spot maps, collision diagrams and condition diagrams? — 7M — 2 — 4

   b) From an in-out survey consisting of 50 bays, the initial count was 18. The number of vehicles coming in and out of the parking lot for a time interval of 5 minutes is shown below. Find the accumulation, total parking load, average occupancy, and efficiency of parking lot.

Time	5	10	15	20	25	30
IN	7	6	3	3	7	4
OUT	2	4	5	2	8	3

   — 7M — 2 — 5

UNIT–III

5. Explain clearly how the actual crossing manoeurve of traffic is avoided in traffic rotary though the traffic may have to otherwise go in cross directions of radiating roads. — 14M — 3 — 4

OR

6. a) At a right angled intersection of two roads, Road '1'has four lanes with a total width of 12.0 m and Road '2' has two lanes with a total width of 6.6m. the volume of traffic approaching the intersection during design hour are 950 and 843 PCU / hour on the two approaches of Road 1 and 378 and 180 PCU /hour on the two approaches of Road 2. Design the signal timings as per IRC guidelines | 7M | 3 | 3

   b) Explain the advantageous and disadvantageous of rotary. Elaborate the design elements involved for estimation of capacity of it. | 7M | 3 | 3

   UNIT–I

7. a) Explain the plate bearing test procedure and how corrections for *'K'* value may be made for a different plate size and for accounting for worst moisture conditions. | 7M | 4 | 4

   b) A bituminous mix has 47.4% of coarse aggregate and 47.3% fine aggregate. The bulk specific gravity of the coarse aggregate is 2.716 and of the fine aggregate is 2.689. There is no mineral filler. The asphalt content is 5.3% and its specific gravity is 1.03. The maximum specific gravity of paving mix 'G_m' is 2.535 and the bulk specific gravity of the compacted mix, 'G_b' is 2.442. Calculate the voids in the mineral aggregate, the percentage of the air voids in the mix and the percent voids filled with asphalt. | 7M | 4 | 6

   OR

8. a) Discuss the importance of bitumen grading based on viscosity parameters. Bring the importance VG – 30 and VG – 40 bitumen use in highway constructions as per IS 73 2016 guidelines | 7M | 4 | 4

   b) Explain in brief the Marshall method of mix design for arriving mix properties | 7M | 4 | 3

   UNIT–I

9. a) Calculate the stresses at interior, edge and corner regions of a concrete pavement using Westergaards stress equation for the following data:

   Wheel load=4100 kg, Modulus of elasticity of concrete=3.3X10^5 kg/cm^2, Pavement thickness=30cm, Modulus of sub-grade reaction=8kg/cm^3, Diameter of loaded area =25cm, Poisson's ratio of concrete= 0.15. Assume data if any data required. | 7M | 5 | 5

   b) Draw a sketch of flexible pavement cross section and show the component parts. Enumerate the function and importance of each component of the pavement. | 7M | 5 | 4

   OR

10. a) It is proposed to widen an existing 2-lane National Highway section to 4-lane divided road. Design the pavement for new carriageway with the following data as per IRC: 37-2012
    (i) Initial traffic in each direction in the year of Completion of construction = 500 CV/day.
    (ii) Design life   = 15 years
    (iii) Design CBR of sub-grade soil = 4.5%
    (iv) Traffic growth rate   = 8%
    Vehicle Damage Factor (VDF)= 4.0 (standard axles per CV). | 7M | 5 | 6

    b) Show pictorially the position of wheels for calculation of stresses in at interior, edge and corner regions of a concrete pavement. Also explain why the stress at edge region of highway concrete pavement is critical as compare to other locations? | 7M | 5 | 5

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