Code: 7G671

IV B.Tech. I Semester Regular Examinations February 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 canal regulator for the following data. Draw important views on a separate drawing sheet and assume if any necessary data

    Discharge of parent channel : 125 m^3/sec

    Discharge in distributor : 32 m^3/sec

    FSL of parent channel : 218m US / 217.80 DS

    Bed width of parent channel : 52m US /49 m DS

    Depth of water in parent channel : 2.5m US/2.5m DS

    Depth of water in distributor : 1.5m

    Bed width of distributor : 15m

    FSL of distributor : 217m   70M

OR

2. Design a siphon aqueduct (type-III) for forming the canal through an RCC through with the following data:

    Discharge of the canal : 32 cumecs

    Bed width of the canal : 20 m

    Depth of water in the canal : 1.4 m

    Bed level of the canal : +260.50m

    High flood discharge of the drainage : 300 cumecs

    High flood level of the drainage : +261.00 m

    Bed level of the drainage : +258.50 m

    General ground level : +260.50 m

    Canal free board : 1.0 m

    Canal side slopes both inside and outside are 2: 1 in embankment

    Top width of the bank on left side is 5m carries a road way while the top width on the right bank is 3m.

    The foundations of abutments and respective wing-wall and returns both on the u/s and d/s side are taken to the respective scour depth levels assuming silt factor as 1.0. Hard soil fit for foundation is available below at +256.50m.

    Limiting velocity in the drainage not to exceed 2.5 m/sec.

    The velocity in the canal trough is not to exceed twice the normal velocity in the canal. Find out the loss of head in the canal due to the crossing by total energy line method. Similarly find out the H.F.L of the drain u/s of the structure, keeping the normal H.F.L of the drain at the d/s side returns of the drainage barrel   70M

*****

IV B.Tech. I Semester Regular Examinations February 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)

****

			Marks	CO	Blooms Level

UNIT–I

			Marks	CO	Blooms Level
1.	a)	Explain briefly about how hazards can become a disaster and Summarize the concept of disaster.	8M	CO1	L2
	b)	Illustrate the differences between hazard and disaster.	6M	CO1	L2

OR

			Marks	CO	Blooms Level
2.		Explain the following terms in an uneducated person:			
		a) Disaster			
		b) Risk			
		c) Vulnerability			
		d) Hazard	14M	CO1	L1

UNIT–II

			Marks	CO	Blooms Level
3.	a)	Illustrate the effects of the volcanoes on the environment. List out various materials comes out from volcanic eruptions.	7M	CO2	L3
	b)	State epicenter and focus? Create with a neat diagram? Based on depth how many type types of earthquake are classified.	7M	CO2	L3

OR

			Marks	CO	Blooms Level
4.	a)	Write a short note on earthquakes. List out various materials comes out from volcanic eruptions	7M	CO2	L5
	b)	Demonstrate natural disaster and manmade disaster, what are the effects of disasters on environmental health facilities and services.	7M	CO2	L5

UNIT–III

			Marks	CO	Blooms Level
5.	a)	Discuss the role and functions of a Disaster Manager, health effects of global environmental change.	7M	CO3	L3
	b)	Explain urban disasters and climate change with suitable examples.	7M	CO3	L3

OR

			Marks	CO	Blooms Level
6.		List different disaster impacts and explain any four with the help of a case study.	14M	CO3	L2

UNIT–IV

			Marks	CO	Blooms Level
7.	a)	What are the steps involved in risk communication?	7M	CO4	L4
	b)	What are the drought control measures adopted across the globe?	7M	CO4	L4

OR

			Marks	CO	Blooms Level
8.	a)	Illustrate various mitigation measures to be taken at the time of earthquakes.	7M	CO4	L3
	b)	Elaborate the activities of panchayat raj institutions during disaster.	7M	CO4	L3

UNIT–V

			Marks	CO	Blooms Level
9.	a)	Discuss the important steps in relief distribution.	5M	CO5	L3
	b)	Sustainability, comment on this term and generally write how you can apply sustainability in your daily life with at least 5 examples.	9M	CO5	L3

OR

			Marks	CO	Blooms Level
10.	a)	Identify the different types of rehabilitation post disaster.	6M	CO5	L5
	b)	Discuss about the positive and negative impacts of construction of dams.	8M	CO5	L5

*****

Code: 7G677

IV B.Tech. I Semester Regular Examinations February 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)
****

		Marks	CO	Blooms Level

UNIT–I				

1. a) Explain the step wise procedure involved in Finite Element method. — 5M CO1 L1

   b) Using Rayleigh – Ritz method find displacement of the bar shown in Fig. Assume u = $a_1 + a_2 x$, A = 100 mm^2, E = 2 x 10^5 N/mm^2.
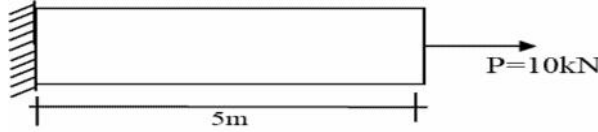

   — 9M CO1 L1

OR

2. a) Define Plane Stress and Plane Strain Condition with example. — 7M CO1 L2

   b) List out the equivalence and difference between Rayleigh- Ritz method and finite element method. — 7M CO1 L2

UNIT–II				

3. a) Derive the stiffness matrix for a one-dimensional axial bar element. — 9M CO2 L2,L4

   b) Explain Local and Global Coordinate Systems — 5M CO2 L3

OR

4. Using finite element method, derive the displacement matrix. Also find member strain and stress, for the steel specimen shown in fig. 10. c/s area at (1) – (1) is equal to = 425 mm2, c/s area at (2) – (2) is equal to = 125 mm2.
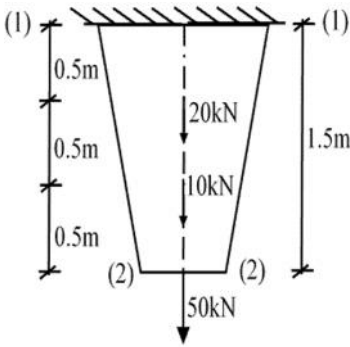
   — 14M CO2 L3

UNIT–III				

5. a) For the plane stress element shown in figure. Evaluate the stiffness matrix. Assume modulus of elasticity E = 210x10^3 N/mm^2, poisson's ratio μ= 0.25 and element thickness t=10 mm. The coordinates are given in mm.
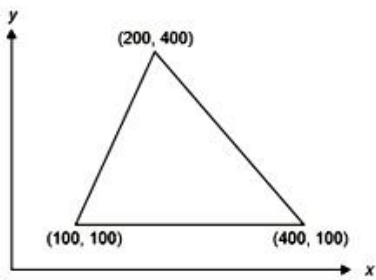
   — 9M CO3 L3,L4

	b)	Derive the [D] matrix for the problem of plane stress	5M	CO3	L3

OR

|					
6.	a)	Derive the shape functions and nodal load matrix for three noded triangular element	9M	CO3	L4
		Write down the shape functions for four noded rectangular elements using natural coordinate system	5M	CO3	L4

UNIT–IV

7. a) Fig. shows a three noded bar element in Cartesian and natural coordinates. If the element is isoparametric, find the Jacobian matrix and global derivatives of shape function, and hence make the [B] matrix.
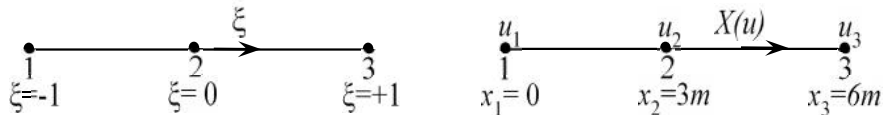
			9M	CO4	L4
	b)	Discuss the advantages of isoparametric Element	5M	CO4	L4

OR

8.	a)	Derive the jacobian matrix for four noded quadrilateral element.	9M	CO4	L3
	b)	What is an iso-parametric, sub-parametric and super-parametric element and explain briefly with examples.	5M	CO4	L3

UNIT–V

9.		Derive iso- parametric formulation for 4 noded quadrilateral elements?	7M	CO5	L5

OR

10.		Explain the different solution techniques for static loads in FEM?	14M	CO5	L5

*****

IV B.Tech. I Semester Regular Examinations February 2021
Foundation 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)
****

		Marks	CO	Blooms Level

UNIT–I

1.	How do you prepare a soil investigation report? Explain in detail.	14M	CO1	L1

OR

| 2. | Explain the methods of soil exploration with neat sketches. | 14M | CO2 | L2 |

UNIT–II

| 3. | Describe any two theories of earth pressure. | 14M | CO1 | L2 |

OR

| 4. | Calculate the factor of safety with respect to cohesion, of a clay slope laid at 1 in 2 to a height of 12 m, if the angle of internal friction $\emptyset$ = 10 degrees, C = 25 kN/m^2 , what will be the critical height of the slope in this soil? | 14M | CO3 | L2 |

UNIT–III

| 5. | Explain the factors governing the selection of types of foundations. | 14M | CO2 | L3 |

OR

| 6. | A strip footing 1.5m wide, depth 2 mtrs rests on the surface of a dry cohesive soil having $\emptyset$ = 0 degrees, c=20 KN/m^2 and =1.90 tons/m^3 . If the water table rises temporarily up to the surface due to flooding, calculate the percentage reduction in the ultimate bearing capacity of the soil. Assume N_c = 5.7, Nq=1, N$^{\gamma=0.}$ | 14M | CO4 | L3 |

UNIT–IV

| 7. | Explain the procedure involved in the standard penetration test with sketch. | 14M | CO2 | L2 |

OR

| 8. | a) | Compare the merits and demerits of Terzaghis method and Skemptons method of calculating bearing capacity of soils. | 7M | CO3 | L2 |
| | b) | Briefly explain types of failure in soil (i) General shear failure (ii) Local shear failure | 7M | CO3 | L2 |

UNIT–V

| 9. | How do you estimate the pile load capacity by pile load test? | 14M | CO2 | L2 |

OR

| 10. | Explain the method of determining group capacity of piles by any two methods. | 14M | CO2 | L2 |

*****

IV B.Tech. I Semester Regular Examinations February 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)
****

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Define the nature and scope of Human Resource Management	7M	1, 2	1
	b)	What are the different functions of HRM	7M	1, 2	4
		OR			
2.	a)	What is HRM? Explain about Competitive Challenges influencing HRM.	7M	1, 2	4
	b)	Differentiate Personnel Management and HRM	7M	1, 2	5
		UNIT–II			
3.	a)	Define HRP. Explain HRP need and importance in an organization.	7M	6, 7, 8	1
	b)	Explain about different Barriers to HRP.	7M	6, 7, 8	2
		OR			
4.	a)	Define job analysis. Explain the different methods of JE and its process	7M	6, 7, 8	1
	b)	Define Job Design and its importance in an organization.	7M	6, 7, 8	1
		UNIT–III			
5.	a)	If you are the HR Manager, what type of recruiting methods is using to recruit for Manufacturing and for services industry?	7M	1, 4,	2
	b)	Define process of recruitment.	7M	1, 4,	1
		OR			
6.	a)	What is recruitment? List out the process of recruitment.	7M	1, 4,	4
	b)	"A well-thought-out orientation program is essential for all new employees, whether they have experience or not". Explain why you agree or disagree with the above statement.	7M	1, 4,	2
		UNIT–IV			
7.	a)	List and briefly explain about Training Methods	7M	4, 5	1
	b)	What is the need of training an employee in an organization?	7M	4, 5	4
		OR			
8.	a)	Is an employee should train. If yes list out the advantages and disadvantages of training.	7M	4, 5	4
	b)	Define different career stages.	7M	4, 5	1
		UNIT–V			
9.	a)	Define what Employee Compensation is and list out the factors influencing Employee Compensation.	7M	3, 4, 5	1
	b)	Explain the need of IR with respect to HRM	7M	3, 4, 5	2
		OR			
10.	a)	Describe the pros and cons of any four Performance Appraisal tools.	7M	3, 4, 5	2
	b)	Explain different methods of Performance Appraisal.	7M	3, 4, 5	2

*****

R-17

Code: 7G673

IV B.Tech. I Semester Regular Examinations February 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)
****

		Marks	CO	Blooms Level

UNIT–I

		Marks	CO	Blooms Level
1. a)	Briefly outline the highway development in India and explain the necessity followed by objectives of highway planning.	7M	1	3
b)	The speeds of overtaking and overtaken vehicle are 80 and 60 kmph respectively. If the acceleration of the overtaking vehicle is 2.5kmph per second, calculate the safe passing sight distance for (i) One- way traffic, (ii) Two –way traffic	7M	1	4

OR

		Marks	CO	Blooms Level
2. a)	Determine the length of different categories of roads in a state in a India by the year 2001, using Third Road Development formula and the following data: Total area of the state = 80,000sq.km Total no. of towns as per 981 census = 86 Overall road density aimed at = 82 km per 100 sq.km area	7M	1	4
b)	A vertical summit curve is formed when an ascending gradient of 1 in 25 meets another ascending gradient of 1 in 100. Find the length of the summit curve to provide the required sight distance (SSD and OSD) for a design speed of 80kmph.	7M	1	3

UNIT–II

		Marks	CO	Blooms Level
3. a)	Explain the relationship between speed, travel time, volume, density and capacity.	7M	2	3
b)	A fixed time 2 – phase is to be provided at an intersection having a North – South and an East – West where only straight – ahead traffic is permitted. The design hour flows from the various arms and their saturation flows are given below			

	North	South	East	West
Design Hourly flow(q) in PCU/hr	800	400	750	1000
Saturation flow (s) in PCU/hr	2400	2000	3000	3500

For question 3.b): 7M, CO 2, Blooms Level 4

OR

		Marks	CO	Blooms Level
4. a)	What are the various types of traffic marking commonly used? What are the uses of each?	7M	2	3
b)	Two vehicles A and B of equal weight, approaching from cross roads (at right angles) collide with each other. They skid through distances 30m and 20m before collision and 20m and 35m after collision. If the directions of skidding vehicles A and B after collision are 45^0 and 130^0 with original path respectively, calculate the original speeds of the two vehicles before the applications of brakes. Assume f= 0.55.	7M	2	4

UNIT–III

		Marks	CO	Blooms Level
5. a)	With a neat sketch explain the conflict points in case of four leg and three legged uncontrolled intersections. Bring out the salient features for the design for reducing the collision	7M	3	6
b)	Discuss about importance of channelization. Explain how it is provided at different at grade intersections with neat sketches.	7M	3	4

OR

6. a) The width of approaches for a rotary intersection is 12 m. The entry and exit width at the rotary is 10 m. Table below gives the traffic from the four approaches, traversing the intersection. Find the capacity of the rotary.

Approach	Left turn	Straight	Right turn
North	450	700	320
South	360	350	400
East	245	420	510
West	345	530	560

7M 3 4

   b) Explain grade separated intersection, the advantageous and limitations.   7M 3 3

UNIT–IV

7. Why is it important for highway engineer to study the behavior of soil? What are the desirable properties of sub-grade soil? Enumerate the identification and classification tests of soils.   14M 4 6

OR

8. a) Discuss the desirable properties of road aggregate along with its specifications for suitability in road constructions   7M 4 3

   b) Explain the test procedure for conduct of CBR test for determination of soil sub-grade strength   7M 4 3

UNIT–V

9. a) Explain the design factors considered in flexible pavement.   7M 5 3

   b) Design the size and spacing of dowel bar at the expansion joint of CC pavement having thickness of 25cm. $E = 3 \times 10^5$ kg/cm^2, $\mu = 0.15$, design wheel load 5100kg, joint spacing 2.5cm, $Fs = 1000$ kg/cm^2, $Ff = 1400$ kg/cm^2, $Fb = 100$ kg/cm^2 and $k = 7.1$ kg/cm^3. Assume other data suitably as per IRC   7M 5 6

OR

10. a) Explain the design of flexible pavement using CBR and GI method   7M 5 4

   b) A concrete slab 7.5 m long, 3.5 m wide and 25 cm thick, is subjected to a temperature differential of 10.5 °C. Assuming that $k = 50.0$ MN/m^3 and $t = 9 \times 10^{-6}$/° C. Determine the maximum curling stress in the interior, edge and corner of the slab. Take the radius of contact as $a = 150$ mm   7M 5 5

*****

Code: 7G676

IV B.Tech. I Semester Regular Examinations February 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)
****

				Marks	CO	Blooms Level

UNIT–I

1.	a)	Explain the various types of IRC loadings in the design of highway bridges.	7M		BT-1
	b)	Explain the various steps involved in the design of railway bridge in detail.	7M		BT-2

OR

2.	Design a box culvert with the following particulars: Inside dimensions: 3.5 m x 3.5 m; Live load: IRC Class AA; Density of Soil: 18kN/m^3; Angle of repose: 30°; Materials: M25 concrete and Fe415 grade steel.	14M	BT-3

UNIT–II

3.	Sketch the typical reinforcement details for the deck slab of a reinforced concrete culvert with a clear span of 6.0m. Assume width of roadway is double lane.	14M	BT-4

OR

4.	Design a RCC T-beam girder for a national highway bridge to suit the following data: Clear width of Roadway: 7.5 m, width of kerbs: 600 mm; Effective span: 20m; Live load: IRC Class AA tracked; Thickness of wearing coat: 80 mm; Number of main girders: 4; Materials: M20 Grade concrete and Fe415 bars	14M	BT-4

UNIT–III

5.	A plate girder is to be designed for a B G track to suit the following data: Span of the bridge: 20 m; Dead load of track: 7.5 kN/m; E.U.L.L. for B.M Calculations per track: 1964 kN; E.U.L.L. for shear calculations per track: 2168 kN. Design the plate girder to confirm to the IRC loadings.	14M	BT-5

OR

6.	Design a composite bridge super structure and substructure with the following data: Span: 18 m; Number of lanes: Two; Live load: IRC class AA; Materials: M20 Grade concrete and Fe415 bars; Top level of road embankment: 1000 m; Bed level of the stream: 992 m; HFL of the stream: 994.5 m; Top level of the stream bund: 995 m; Hard soil for foundation is available at 900 m.	14M	BT-5

UNIT–IV

7.	Design a mild steel rocker bearing for transmitting the superstructure reactive load of 1200 kN. Allowable pressure on bearing block: 3.8 MPa; Permissible bending stress (0.66 f_y): 165 MPa; Permissible bearing stress: 100 MPa; Permissible shear stress: 100 MPa.	14M	BT-3

OR

8.	What are the steps involved in the design of elastomeric pad bearing? Explain in detail with equations.	14M	BT-1

UNIT–V

9.	Explain different types of piers with neat sketches.	14M	BT-2

OR

10.	a)	Write about general features of abutments.	7M		BT-2
	b)	Draw the sketch of abutment showing typical details along with its structural components.	7M		BT-1

*****