Hall Ticket Number :										

R-19

Code: 19A154T

III B.Tech. I Semester Supplementary Examinations March/April 2023

Structural Analysis

(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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		Marks	CO	BL

UNIT–I

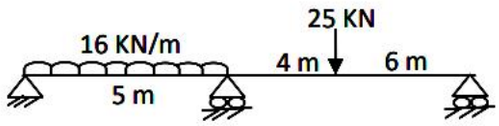
1. A beam AB of uniform section and 6 m span is built at the ends. A u.d.l of 30 kN/m runs over left half of the span and there is an additional concentrated load of 40 kN at right quarter. Determine the fixed end moments at the ends and the reaction. Draw BMD & SFD — 14M CO1 L1

OR

2. A fixed beam AB of length 3m is having moment of inertia $I=3x10^6$ mm^4. the support B sinks by 3mm. if $E=2x10^5$ N/mm^2, find the fixing Moments and draw bending moment diagram. — 14M CO1 L2

UNIT–II

3. Analyze the continuous beam shown in figure by theorem of three moments. Draw SFD & BMD.



14M CO2 L2

OR

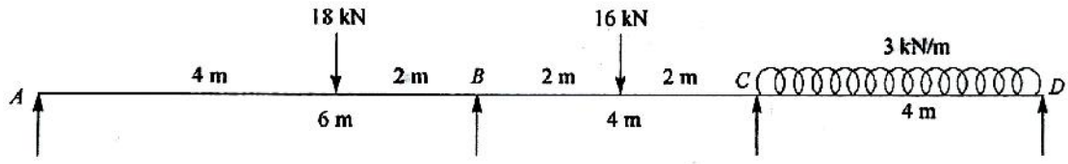
4. A continuous beam ABC of uniform cross section, with span AB and BC as 6m each, is fixed at A and C and supported at B. span AB carries an UDL of 2KN/m and span BC carries a point load of 12KN at its centre. Find the support moments and the reactions. Draw the S.F and B.M diagrams of the beam. — 14M CO2 L2

UNIT–III

5. A continuous beam ABC consists of span AB=3m and BC=4m. the end A is simply supported, while the end C is fixed. The span AB carries a concentrated load of 16kN at the centre of the span and the span CD carries a concentrated load of 24kN at a distance of 1.5m from B. find the support moments and draw the bending moment diagram for the beam. — 14M CO3 L2

OR

6. Analyse the beam in slope deflection method



14M CO3 L4

UNIT–IV

7. Two point loads of 120 kN and 160 kN spaced 5 m apart, cross a girder of 25 m span from left to right with the 120 kN load leading. Construct the maximum shear force and bending moment diagram stating the absolute maximum values. — 14M CO4 L4

OR

8. Construct influence lines for shear force and bending moment to the beam carrying a unit load, also develop expressions for maximum positive shear force and maximum positive bending moment. — 14M CO4 L4

UNIT–V

9. Derive the expression for:
   (i) Strain energy due to axial load. (ii) Strain energy due to bending. — 14M CO5 L4

OR

10. State and prove Castigliano's first theorem. — 14M CO5 L4

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Hall Ticket Number :										

R-19

Code: 19A152T

III B.Tech. I Semester Supplementary Examinations March/April 2023

Soil Mechanics

(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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			Marks	CO	BL
		UNIT–I			
1.	a)	Describe a method for determination of the specific gravity of solids of fine grained soils?	7M	1	L1
	b)	List the different types of soils. write what type of soils available in India	7M	1	L1
		OR			
2.	a)	Differentiate between the dry sieve analysis and the wet sieve analysis why wet sieve analysis is required?	7M	1	L2
	b)	A soil sample has the following data is available from sieve analysis Soil passing 4.75mm sieve = 80%, Soil passing 0.075mm sieve =4%, If the particle size distribution curve varies linearly, Classify the soil as per IS classification.	7M	1	L4
		UNIT–II			
3.	a)	Explain the factors that affect permeability of soils in the field	7M	2	L1
	b)	In a falling head permeability test, the initial head is 40 cm. the head drops by 5cm in 10 min. calculate the time required to run the test for the final head to be at 20 cm. if the sample is 6 cm in height and 50 cm^2 in cross sectional area, calculate the coefficient of permeability, taking area of stand pipe as 0.5 cm^2	7M	2	L3
		OR			
4.	a)	Derive equation for average permeability of a soil deposit consisting of a number of layers. Write the use in soil engineering.	14M	2	L2
		UNIT–III			
5.	a)	Discuss the basis of the construction of Newmark's influence chart and how is it used.	7M	3	L1
	b)	Determine vertical stress at a depth of 3.5m centrally below a surface Circular footing of 2m diameter subjected to a load of 250 kN. Use Boussinesq's theory. How does the stress at the same point changes if foundation surface is square footing of size 2m x 2m	7M	3	L3
		OR			
6.	a)	Write short note on compaction control in the field.	7M	3	L1
	b)	Write short note on relative compaction.	7M	3	L1
		UNIT–IV			
7.	a)	Define the terms compression index, coefficient of consolidation, coefficient of compressibility and indicate their units and symbols	7M	4	L1
	b)	In a consolidation test on a soil the void ratio of the sample decreased from 1.25 to 1.10 when the pressure is increased from 200kPa to 400kPa. Calculate the coefficient of consolidation if the $k=8X10^{-8}$cm/s	7M	4	L3
		OR			
8.	a)	Discuss the spring analogy for primary consolidation?	7M	4	L2
	b)	Distinguish between normally consolidated and over consolidated soils.	7M	4	L2
		UNIT–V			
9.		Describe direct shear test. Discuss the merits and demerits of direct shear test over the tri axial shear test.	14M	5	L2
		OR			
10.	a)	Sketch the stress -strain relationship for dense and loose sand and explain.	7M	5	L2
	b)	Differentiate between unconsolidated undrained test and drained test. Under what conditions are these results used for design purposes?	7M	5	L2

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Hall Ticket Number :										

R-19

Code: 19A153T

III B.Tech. I Semester Supplementary Examinations March/April 2023

Water Resource 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. List out the methods for river training and explain any four of them.

OR

2. Explain in detail about classification of canals

UNIT–II

3. Explain merits and demerits of different type of dams.

OR

4. Describe the measures for control of earth dams?

UNIT–III

5. Explain in detail about different types of spillways.

OR

6. Calculate the length and thickness of floor for a hydraulic structure with 4m water depth on u/s. Take floor length as 3m on u/s and 20m on d/s of wall. Use Bligh's theory.

UNIT–IV

7. What is the necessity of falls? Write various considerations for location of falls.

OR

8. Design impervious floor for a head regulator for a distributor taking off for a branch canal for the following data.
   Discharge of branch canal = 105 cumec
   Discharge of distributor = 15 cumec
   F.S.L. of branch canal = 118.10 m for u/s, 117.90 m for d/s
   Bed width of branch canal = 45 m for u/s, 41 m for d/s
   Depth of water in branch canal = 2.5 m both u/s and d/s
   F.S.L. of distributory = 117.20 m
   Bed width of distributory = 15 m
   Depth of water in distributory = 1.6 m
   Permissible exit gradient = 1/5

UNIT–V

9. List out the types of canal outlets. Explain about pipe outlet.

OR

10. Explain about design principles of siphon aqueduct

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Hall Ticket Number :										

R-19

Code: 19A15FT

III B.Tech. I Semester Supplementary Examinations March/April 2023

Watershed Management

(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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			Marks	CO	BL
		UNIT–I			
1.	a)	Discuss watershed approach –planning, implementation & management	7M	CO1	L3
	b)	Explain briefly socio-economic characteristics of watershed	7M	CO1	L2
		OR			
2.	a)	Explain the basic objectives of watershed management.	7M	CO1	L2
	b)	Explain the importance of watershed management with a neat sketch	7M	CO1	L1
		UNIT–II			
3.	a)	List out the climatic factors that influence the Erosion. Explain them.	7M	CO2	L1
	b)	Explain the various measures to control soil erosion.	7M	CO2	L2
		OR			
4.	a)	Discuss any two erosion control methods	7M	CO2	L2
	b)	Explain (i) Furrowing (ii) ploughing (iii) rock fill dams.	7M	CO2	L2
		UNIT–III			
5.	a)	Define Rain Water Harvesting and justify where it suitable.	7M	CO3	L1
	b)	What are the benefits of Rain water Harvesting	7M	CO3	L2
		OR			
6.	a)	Explain in detail the methods used for artificial recharge	7M	CO3	L3
	b)	Explain the Necessity of Water harvesting	7M	CO3	L2
		UNIT–IV			
7.	a)	What is meant by artificial recharge of water?	7M	CO4	L2
	b)	Write the advantages of artificial recharge of water	7M	CO4	L1
		OR			
8.		Discuss the role of artificial recharge and percolation tanks in the groundwater harvesting	14M	CO4	L3
		UNIT–V			
9.	a)	What is meant by saline and alkaline soils	7M	CO2	L2
	b)	What is micro farming and write a short note on micro-farming	7M	CO2	L2
		OR			
10.		What are the objectives and salient features of sustainable agriculture	14M	CO5	L3

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Hall Ticket Number :										

R-19

Code: 19A151T

III B.Tech. I Semester Supplementary Examinations March/April 2023

Basic Reinforced Concrete Design

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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PART-A

Answer any **one** question carry's **28 marks**

		Marks	CO	BL
1.	Design a simply supported roof slab for a room of 4.5 m x 6 m measuring from inside. Thickness of the wall is 300 mm. The superimposed load exclusive of self-weight is 3. 5 kN/m^2. The slab may be assumed to be simply supported on all four edges with corners held down. Use M20 mix and Fe415 grade steel.	28M	3	3
	OR			
2.	Design an isolated footing of uniform thickness of a RC column bearing a vertical load of 600 KN and having a base of size 500x500 mm. The safe bearing capacity of soil may be taken as 120 KN/m2. Use M_{20} concrete and Fe $_{415}$ steel.	28M	5	3

PART-B

Answer any ***three*** questions each question carry's **14 marks**

3.	a)	Explain stress strain curves for concrete and steel.	8M	1	1
	b)	Define Partial safety factor, Characteristic strength and Characteristic load.	6M	1	1
4.		An RC beam of rectangular section 350 mm x 550 mm effective depth is reinforced with 4 bars of 20 mm diameter out of which 2 bars are bent up near the support section. whereas factored shear force of 400 kN is acting on the beam. Use M_{20} grade concrete and Fe_{415} steel. Design the suitable shear reinforcement.	14M	2	3
5.		Design a beam of span 7m, subjected to UDL of intensity 4KN/m^2 .Use M 30 grade concrete and HYSD bars. Assume any required data.	14M	3	2
6.		Design a short column to carry an axial load of 1600KN.It is of 4m long. Effectively held in position but not in direction at both ends. Use M20 grade concrete and Fe415 steel.	14M	4	2
7.		Check for the limit state of deflection using empirical method for the simply supported rectangular beam with following data. Ast = 4- #20, Asc = 2-#16, Beam Size = 300x650 mm, Effective cover = 50mm, Fe_{415} steel, Span= 12m.	14M	5	2

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Hall Ticket Number :										

R-19

Code: 19A15BT

III B.Tech. I Semester Supplementary Examinations March/April 2023

Prestressed Concrete

(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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			Marks	CO	BL
		UNIT–I			
1.		Elaborate the development of the prestressed concrete over the years.	14M	CO1	L2
		OR			
2.	a)	Define prestressing technique. Mention the differences between prestressed concrete and reinforced concrete.	7M	CO1	L3
	b)	Explain the behavior of the prestressed concrete and reinforced cement concrete.	7M	CO1	L2
		UNIT–II			
3.		Discuss the Loss of pre-stress in pre-tensioned and post tensioned members due to shrinkage and creep of concrete.	14M	CO2	L2
		OR			
4.		A pre-tensioned beam 250 mm wide and 450 mm deep is prestressed by 7 wires of 7 mm diameter initially stressed to 1000 N/mm^2 with their centroid located 100mm from the soffit. Evaluate the percentage loss of stress in the wires with the following data. Relaxation of stress in steel = 4 percent, E_s = 210 kN/mm^2, f_{ck}=45N/mm^2, Creep coefficient =1.6, Total shrinkage strain = 2.8x10^{-4}.	14M	CO2	L4
		UNIT–III			
5.		Obtain the expression for the extreme fiber stresses in straight, bend and parabolic tendons.	14M	CO3	L2
		OR			
6.		A prestressed member with the parameters; Cross-sectional dimensions of the member = 300 mm x 700 mm, A_p = 220 mm^2, f_{ck} = 40 N/mm^2 , f_p = 1550N/mm^2, L = 10 m, carries a udl of 5 kN/m. draw resultant stress at the top and bottom of the mid span section.	14M	CO3	L3
		UNIT–IV			
7.		Explain the design procedure of a rectangular prestressed concrete beam section according to the IS Code.	14M	CO4	L2
		OR			
8.		A prestressed concrete beam of section 300 mm x 600 mm deep is prestressed, by 2 post tension cables of area 600 mm^2 each initially Stressed to 1600N/mm^2. The span of the beam is 10 m. if fck =40 N//mm^2 .Estimate the shear resistance of support section. Use IS 1343 code.	14M	CO4	L3
		UNIT–V			
9.	a)	Explain the term i) End blocks ii) Stress distribution iii) Transmission Zone	6M	CO5	L2
	b)	Write the steps involved in the design of end blocks by Guyon's method.	8M	CO5	L2
		OR			
10.		The end block of post tensioned concrete beam 300 mm x 300 mm is subjected to a concentric anchorage force of 750 kN by a freyssinet system of area 1100mm^2. Discuss and detail the anchorage reinforcement for the end block.	14M	CO5	L3

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