

Code: 7G651

III B.Tech. I Semester Supplementary Examinations August 2021

Design and Drawing of Reinforced Concrete Structures

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Use of IS 456:2000 and SP 16 Design aided charts books are permitted in the examination hall

PART-A*(Answer any one question)***1x28=28 marks**

- | | Marks | CO | Blooms Level |
|--|-------|----|--------------|
| 1. a) T – beam consists of a flange 1100 mm wide and 120 mm deep. The depth of the beam is 550 mm up to the centre of tension steel and width of the web is 250 mm. Design the T – beam completely for an ultimate moment of 460 kN-m. Use M 25 grade of concrete and Fe 415 grade of steel. Sketch the reinforcement details. | 14M | 3 | 5 |
| b) Design an axially loaded tied column with an unsupported length of 3.1 m. The column is fixed at one end and pinned at the other end. The column has to carry a factored load of 1800 kN. Use M 25 grade of concrete and Fe 415 grade of steel. Sketch the reinforcement details. | 14M | 4 | 5 |

OR

- | | | | |
|--|-----|---|---|
| 2. a) Determine the reinforcement required for a rectangular beam section with the following data:
Width of section = 230 mm, depth of section = 450 mm, factored B.M = 125 kN-m, factored torsional moment = 50 kN-m, factored S.F. = 80 kN. Adopt M 25 grade of concrete and Fe 415 grade of steel. Sketch the reinforcement details. | 14M | 2 | 3 |
| b) A rectangular simply supported beam is having a clear span of 3.5 m and 300 mm x 400 mm in cross section. It is reinforced with 4 bars of 20 mm in diameter. Use M 25 and Fe 415. Calculate the short term and long term deflection of the beam by taking superimposed live load as 15 kN/m and dead load as 10 kN/m. Assume an effective cover as 40 mm. | 14M | 5 | 3 |

PART – B*(Answer any three questions)***3x14=42 marks**

- | | | | |
|--|-----|---|---|
| 3. a) Discuss the assumptions in limit state of collapse in flexure. | 7M | 1 | 2 |
| b) Discuss in what occasions, doubly reinforced sections can be preferred. | 7M | 1 | 2 |
| 4. Simply supported beam of 225 mm wide and 450 mm effective depth carries a u.d.l. of 80 kN/m including its own weight over an effective span of 6 m. The reinforcement consists of 5 bars of 25 mm dia, out of these 2 bars can be safely bent up at 1 m distance from the support. Design the shear reinforcement. Adopt M 20 grade of concrete and Fe 415 grade of steel. Assume width of support as 300 mm. Sketch the reinforcement details. | 14M | 2 | 5 |
| 5. Design an interior panel of slab for a room of 3.5mx5.5m clear dimensions supported on 230mm thick masonry walls all around using IS Coefficients. The corners are held down. Take Live load as 2.0kN/m ² . Use M20 and Fe415. Sketch the reinforcement details also. | 14M | 3 | 5 |
| 6. Design a square column of 300 mm x 300 mm, is subjected to an axial factored load of 1800 kN and factored moments of 28 kN-m and 32 kN-m about the two mutually perpendicular axes respectively. Adopt M 25, Fe 415 and assume an effective cover as 40 mm. | 14M | 4 | 5 |
| 7. Design a square isolated uniform footing for a column of size 300 mm x 300 mm carrying an axial load of 1300 kN. The S.B.C. of the soil is 250 kN /m ² . Use M 25 and Fe 415. Sketch the reinforcement details also. | 14M | 5 | 5 |

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R-17

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III B.Tech. I Semester Supplementary Examinations August 2021

Engineering Geology
(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

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

UNIT-I

1. Describe any two case studies where failure of civil engineering constructions happened due to geological draw backs.

Marks CO Blooms Level

14M CO1 L1

OR

2. Describe the importance of geology from civil engineering point of view with reference to dams.

14M CO1 L1

UNIT-II

3. Explain the merits of studying minerals by their physical properties and interpret physical properties for the minerals Feldspar, Olivine, Hornblende and Muscovite.

14M CO2 L2

OR

4. Discuss in detail about various types of lustre, cleavage and degree of transparency with examples.

14M CO2 L2

UNIT-III

5. Discuss intrusive and extrusive forms of igneous rocks with neat diagrams.

14M CO3 L2

OR

6. Explain all types of folds with a neat sketch.

14M CO3 L2

UNIT-IV

7. Explain various geological controls of groundwater movement in different types of rocks.

14M CO4 L2

OR

8. Discuss the causes and effects of earthquakes and the precautions in seismic areas.

14M CO4 L2

UNIT-V

9. Explain the purposes and effects of tunneling.

14M CO5 L3

OR

10. Explain the factors contributing to the success of a reservoir.

14M CO5 L3

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R-17

Code: 7G653

III B.Tech. I Semester Supplementary Examinations August 2021

Environmental Engineering-I

(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) Discuss the variations in water demand.	7M	1	2
b) Forecast the population by 2030, 2040 and 2050 for a city by arithmetic and geometric methods. Past population details are as follows. 1960(12000): 1970(16500): 1980(24200): 1990(30600): 2000(45000): 2010(56500) and 2020(76500).	7M	1	3
OR			
2. a) Define design period? Draw flow chart of a water supply system?	7M	1	2
b) List the sources of water and explain the quality and quantity aspects of each source of water?	7M	1	2
UNIT-II			
3. a) Discuss the various layouts of distribution networks?	7M	2	1
b) Discuss how to select an intake location? Draw and label a reservoir intake?	7M	2	1
OR			
4. a) List various systems of distribution? Explain them briefly?	7M	2	2
b) Discuss any four tests conducted for determining chemical impurities in water?	7M	2	1
UNIT-III			
5. a) List the conventional water treatment units? Explain the theory of sedimentation?	7M	3	1
b) Design a sedimentation tank for a population of 150000 with a per capita demand of 120 liters. Do the necessary checks.	7M	3	6
OR			
6. a) Explain the process of fixing the coagulant dose at a conventional water treatment unit?	7M	3	2
b) Explain the purpose and methods of disinfections?	7M	3	2
UNIT-IV			
7. a) Summarize the procedure used for estimation of storm water discharge?	7M	4	2
b) List and explain various types of sewers?	7M	4	1
OR			
8. a) Draw and label any three sewer appurtenances?	7M	4	1
b) Explain the stepwise procedure involved in the sewer design?	7M	4	2
UNIT-V			
9. a) Explain the physical and chemical characteristics of sewage?	7M	5	2
b) Discuss the following i)BOD ii)COD	7M	5	2
OR			
10. a) Explain unit operations of various pretreatment units of sewage treatment?	7M	5	2
b) List the features of Trickling filter Vs Activated sludge process?	7M	5	1

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III B.Tech. I Semester Supplementary Examinations August 2021

Managerial Economics and Financial Analysis

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

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

Marks CO Blooms
Level**UNIT-I**

1. Explain the meaning of Managerial Economics and state its relationship with other functional areas in decision making.

OR

2. Answer any two principles of Managerial Economics
(a) Discounting Principle
(b) Incremental Concept
(c) Time Perspective

UNIT-II

3. What is elasticity of Demand and discuss the different types of price elasticity of Demand?

OR

4. Discuss the objectives, assumptions and importance of Break-even analysis.

UNIT-III

5. Explain Price-Output determination under perfect competition in long-run.

OR

6. Discuss the merits and demerits of Public and Private Sector Business Organizations.

UNIT-IV

7. From the following Trail Balance and additional information, you are required to prepare Final Accounts

From Prepare Final Accounts.

Particulars	Dr.	Cr.
	₹	₹
Capial		20,000
Sundry Debtors	5,400	
Drawings	1,800	
Plant & Mtachinery	7,000	
Sundry Creditors		2,800
Wages	10,000	
Purchases	21,000	
Opening Stock	4,000	
Bank Balance	3,000	
Carriage Charges	300	
Salaries	400	
Rent	900	
Sales		31,000
	53,800	53,800

Additional Information:

- (i) Closing Stock ₹ 1,800.
(ii) Outstanding Rent ₹ 300 and outstanding wages ₹ 500.
(iii) Charge Depreciation on Plant & Machinery at 20%.

OR

8. What is Capital Budgeting and how do you calculate the Net Present Value for the project?

UNIT-V

9. Explain any three ratios of the following
- (a) Debtors turn-over ratio
 - (b) Proprietary ratio
 - (c) Fixed assets turn-over ratio
 - (d) Absolute quick ratio

OR

10. With the help of the following ratios regarding XYZ Co, draw the Balance Sheet of the company for the year 2020.

(i)	Current Ratio	:	2.5
(ii)	Liquidity Ratio	:	1.5
(iii)	Net working Capital	:	₹ 3,00,000
(iv)	Stock Turnover Ratio (Cost of sales/closing stock)	:	6 times
(v)	Gross Profit Ratio	:	20 per cent
(vi)	Fixed Assets Turnover Ratio (on cost of sales)	:	2 times
(vii)	Debt Collection Period	:	2 months
(viii)	Fixed assets to shareholders net worth	:	0.80
(ix)	Reserve and surplus to capital	:	0.50

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Structural Analysis-II
(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

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

UNIT-I

1. A parabolic 3 hinged arch carries a UDL of 25 kN/m on the left half of the span. It has a span of 40 m and a central rise of 7 m. Determine the resultant reaction at supports. Find the bending moment, normal thrust and radial shear at a section 15 m from left support. 14M

OR

2. A parabolic two hinged arch of span 60 m and central rise of 6 m is subjected to a crown load of 40 kN. Allowing rib shortening and temperature rise of 20° C, determine horizontal thrust, H. Take moment of Inertia as $6 \times 10^5 \text{ cm}^4$, Area = 1000 cm², $E = 2 \times 10^4 \text{ MPa}$, $\alpha = 11 \times 10^{-6} / \text{o C}$, $I = I_0 \text{ sec}$. 14M

UNIT-II

3. A portal frame ABCD is hinged at A and fixed at D and has stiff joints at B and C. the loading is as shown in Fig.1. Draw the bending moment diagram and deflected shape of the frame. All dimensions are in m. Use Slope deflection method.

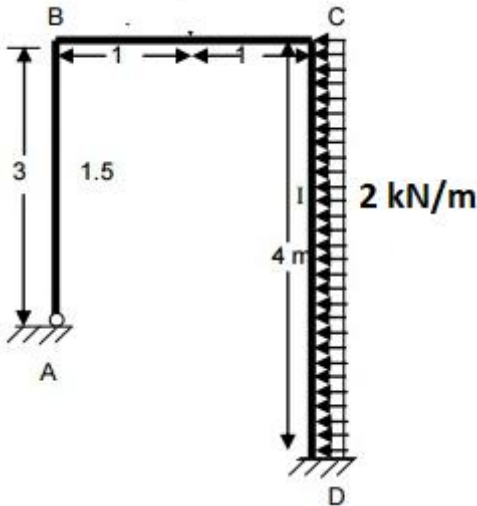


Fig.1 14M

OR

4. Analyse the frame shown in Fig. 2 by moment distribution method. Draw the bending moment diagram.

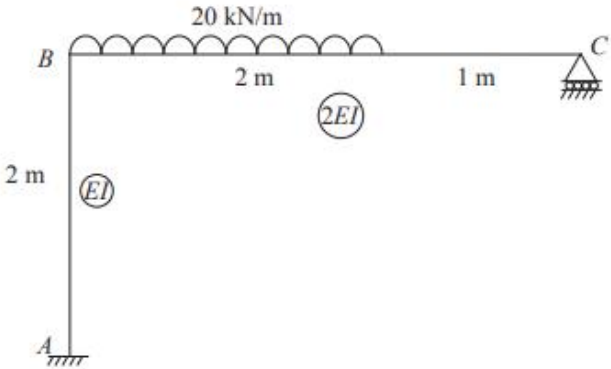
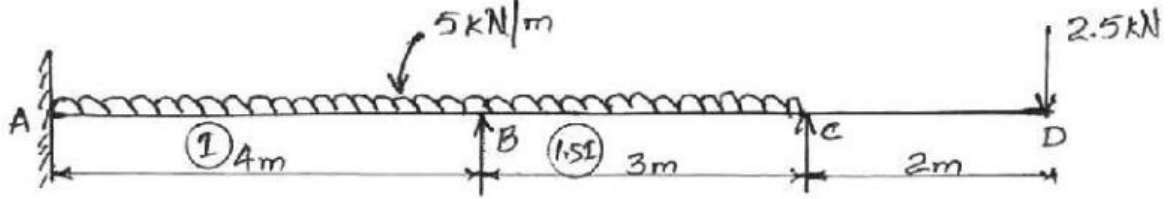


Fig.2 14M

UNIT-III

5. In a continuous beam shown in Fig.2 The support 'B' sinks by 10mm. Determine the moments by Kani's method and draw BMD.



ig.2

OR

6. Determine the end moments of the continuous beam as shown in Fig. 3 below by Kani's method. E is constant.

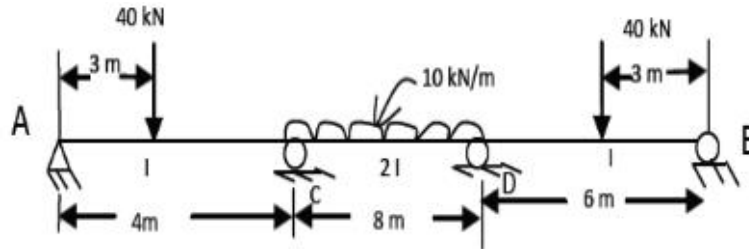


Fig.3

F
14M

14M

UNIT-IV

7. Analyse the continuous beam shown in Fig.4 by flexibility method, support B sinks by 10 mm.

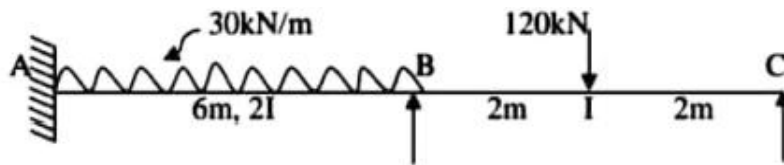


Fig.4

OR

8. Analyse the continuous beam shown in Fig.5. by stiffness method.

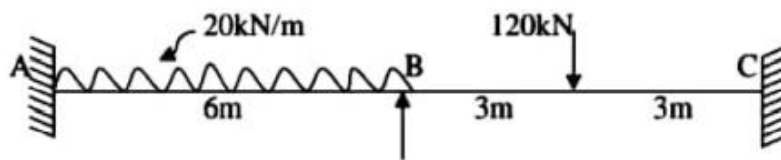


Fig.5

14M

14M

UNIT-V

9. A beam of span 6 m is to be designed for an ultimate UDL of 25 kN/m for entire span. The beam is simply supported at the ends. Design a suitable I section using plastic theory, assuming $\sigma_y = 250$ MPa.

OR

10. The section shown in Fig.6 is ISMB 400. Calculate plastic moment M_p , and shape factor. Take $\sigma_y = 250$ MPa.

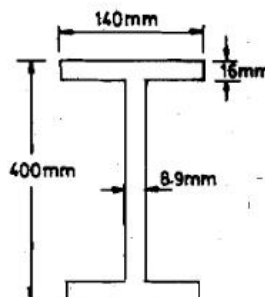


Fig.6

14M

14M

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III B.Tech. I Semester Supplementary Examinations August 2021

Water Resource Engineering-I

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

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

	Marks	CO	Blooms Level
UNIT-I			
1. a) Discuss the various practical applications of hydrology.	7M	CO1	L01
b) The network of 10 stations in and around a river basin has the Thiessen weights of 0.10, 0.06, 0.11, 0.07, 0.08, 0.09, 0.11, 0.12, 0.16 and 0.10 respectively. Stations 2, 4 and 5 lie outside the basin while the remaining are inside. If the rainfalls recorded at these gauges during a storm are 150, 168, 158, 135, 156, 207, 138, 162, 114 and 132 mm respectively, determine the average depth of rainfall over the basin by arithmetic and Thiessen mean methods.	7M	CO1	L01
OR			
2. a) Describe with a neat sketch the principle of working of Symon's non-recording rain gauge.	7M	CO2	L02
b) Explain the various types and forms of precipitation.	7M	CO2	L02
UNIT-II			
3. a) What is evaporation? Discuss the factors affecting evaporation.	7M	CO2	L02
b) Explain the Φ -index and W-index and bring out the difference between them.	7M	CO2	L02
OR			
4. a) Describe the various components of runoff.	7M	CO2	L02
b) Discuss the various physiographic factors which affect runoff.	7M	CO2	L02
UNIT-III			
5. a) Define unit hydrograph. What are the assumptions underlying the unit hydrograph theory? How do they limit the applicability of unit hydrograph?	7M	CO3	L03
b) The peak of flood hydrograph due to a 3-h duration isolated storm in a catchment is 270 m ³ /s. The total depth of rainfall is 5.9cm. Assuming an average infiltration loss of 0.3 cm/h and a constant base flow of 20m ³ /s, estimate the peak of the 3-h unit hydrograph of this catchment. If the area of the catchment is 567 km ² , determine the base width of the 3-h unit hydrograph by assuming it to be triangular in shape.	7M	CO3	L03
OR			
6. a) Explain a procedure of deriving a synthetic unit hydrograph for a catchment by using Snyder's method.	7M	CO4	L04
b) Explain the following: (i) Rational formula and (ii) SCS method.	7M	CO4	L04
UNIT-IV			
7. a) Derive an expression for the steady state discharge of a well in an unconfined aquifer.	7M	CO5	L05
b) In an artesian aquifer of 8m thickness, a 10cm diameter well is pumped at a constant rate of 100 lit/minute. The steady state drawdown observed in two wells located at 10m and 50m distances from the centre of the well are 3m and 0.05 m respectively. Compute the transmissivity and hydraulic conductivity of the aquifer.	7M	CO5	L05

OR

8. a) Explain the classification of canals. 7M CO5 L05
 b) Design an irrigation channel in alluvial soil according to Lacey's silt theory for the following data.
 Full supply discharge = 10 m³/s
 Lacey's silt factor = 0.9
 Side slopes of channel = 1/2(H): 1(V). 7M CO5 L05

UNIT-V

9. a) Define irrigation. Enumerate and explain the factors which necessitate irrigation. 7M CO5 L05
 b) Explain the various methods of improving soil fertility. 7M CO5 L05

OR

10. a) What is 'duty'? Explain the factors affecting duty. 7M CO5 L05
 b) A water course commands an irrigated area 1000 hectares. The intensity of irrigation of rice in this area is 70%. The transplantation of rice crop takes 15 days and during the transplantation period the total depth of water required by the crop on the field is 500mm. During the transplantation period, the useful rain falling on the field is 120mm. Find the duty of irrigation water for the crop on the field during transplantation, at the head of the field and also at the head of the water course assuming losses of water to be 20% in the water course. Also calculate the discharge required in the water course. 7M CO5 L05
