

Code: 4G655

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Design and Drawing of Reinforced Concrete Structures

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

PART-A**Answer any one question (1 x 28 = 28 Marks)**

1. Design a simply supported rectangular beam to carry 38kN/m superimposed load over a span of 5.5 m on 300mm wide supports. Use M20 grade concrete and Fe 415 grade steel. Check the design for all necessary conditions. Draw to a suitable scale
 - (a) Longitudinal section showing the reinforcement details.
 - (b) The cross section of the beam at salient points, showing reinforcement details.

OR

2. Proportion and design a reinforced concrete isolated footing for a column of size 450x450mm transmitting an axial load of 1200kN and uniaxial bending moment of 450kNm at service state. The soil investigations at the site have indicated that the unit weight, safe bearing capacity and angle of repose of soil are 19kN/m³, 150 kN/m² and 30°, respectively. The construction materials to be used are M20 concrete and HYSD steel of grade Fe415.
 - Draw reinforcement details in plan
 - Draw reinforcement details in section

PART-B**Answer any Three questions (3 x 14 = 42 Marks)**

3. A rectangular beam 230mm wide and 450 mm deep upto the centre of reinforcement, has to resist a factored moment of 50kN-m. Design the section. Use M20 grade concrete and Fe 415 steel.
4. Design the torsional reinforcement in a rectangular beam section, 300mm wide and 600mm deep and it is subject to an ultimate twisting moment of 150kNm, combined with an ultimate (hogging) bending moment of 250kNm and an ultimate shear force of 150kN. Assume M20 grade concrete and Fe 415 steel and mild exposure conditions.
5. An R.C. Column 400mm x 450mm is subjected to an axial ultimate load of 2200kN and bent in single curvature about the minor axis M_y (top)= 80kNm and M_y (bottom)=100kNm as ultimate moments. If $L_o=6m$ and $L_e=4.50m$ on both axes, calculate the design moments for the column.
6. A circular column of 400mm diameter transfers an axial dead load of 500kN and an axial live load of 400kN. The column is having 8-20mm diameter bars. The safe bearing capacity of the soil is 250 kN/m², Use M20 grade of concrete and HYSD steel bars of Fe415 grade. Design a circular footing to support the circular column.
7. A rectangular simply supported beam of clear span 4.5m is 300mm x 600mm in cross section. It is reinforced with 4 bars of 20mm diameter. Use M20 grade concrete and Fe415 steel. The effective cover is 40mm. Taking super imposed live load as 26 kN/m and dead load as 18kN/m, calculate the short term and long term deflections of the beam.

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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)

UNIT-I

1. a) Explain the need for protected water supply system. 6M
b) Discuss about various sources of water and their suitability in terms of quantity and quality. 8M

OR

2. a) Explain the factors affecting water demand 6M
b) Estimate the population of a city for the year 2031, based on the following data using geometrical increase method and incremental increase method.
- | | | | | | | | | |
|----------------------|---|------|------|------|------|------|------|----|
| Census Year | : | 1961 | 1971 | 1981 | 1991 | 2001 | 2011 | |
| Population(in lakhs) | : | 1.65 | 2.20 | 2.80 | 3.60 | 4.20 | 5.50 | 8M |

UNIT-II

3. a) What is an intake? Explain the reservoir intake with neat sketch 7M
b) Explain about the water distribution networks. 7M

OR

4. a) Explain briefly about physical characteristics of water 7M
b) Explain the various water borne disease and their controls. 7M

UNIT-III

5. a) Discuss briefly Conventional water treatment processes units and their functions 7M
b) Design a rectangular sedimentation tank to treat 10MLD of water. Assume suitable data. 7M

OR

6. a) Explain the working principle of slow sand filter with neat sketch. 7M
b) What are the different methods of disinfections and explain each briefly. 7M

UNIT-IV

7. a) Explain the systems of conveyance of sewage 7M
b) What are the various shapes of sewers? Explain the design of egg shaped sewer. 7M

OR

8. a) The drainage area of one sector of a town is 50 hectares and the classification of surface area is as follows.

Percentage of total surface area	Type of surface area	Run-off coefficient
25%	Hard Pavement	0.85
25%	Roof surface	0.80
30%	Unpaved street	0.50
20%	Gardens and lawns	0.15

If the time of concentration for the area is 30 minutes, find the maximum storm water runoff. 7M

- b) What is meant by sewer appurtenances? Explain in detail about manhole with neat sketch. 7M

UNIT-V

9. a) Explain the cycles of aerobic and anaerobic decomposition. 7M
b) Determine the 5 day BOD of a sample at 25°C, if its one day BOD at 30°C is 200 mg/lit, K at 20°C is 0.1/day 7M

OR

10. a) Explain the working principle of standard rate trickling filter with neat sketch 7M
b) Design a septic tank for a small colony of 200 persons with daily sewage flow of 120 lpcd. 7M

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III B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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. a) What is weathering of rocks? List down various types of weathering? 2M
 b) Give a brief about significance of geology in civil engineering highlighting any case history of failure of major civil engineering projects in India? 12M

OR

2. a) Give a brief about significance of geology in planning, designing and execution of major civil engineering projects and development of water resources? 12M
 b) Highlight on significance of weathering? 2M

UNIT-II

3. a) Highlight on physical properties of feldspar? 4M
 b) Elaborate on identification of minerals by physical properties? 10M

OR

4. Distinguish between cleavage and fracture? Elaborate on study of hardness of minerals? Distinguish between physical properties of quartz and feldspar? 14M

UNIT-III

5. a) What is dip of rocks? What is the importance of faults in civil engineering? 6M
 b) List down various types of rocks? How are these rock types formed? How do you distinguish these rock types in the field? 8M

OR

6. a) What are the major rock types and how are they formed? 6M
 b) Give a brief about structures of igneous rocks? 8M

UNIT-IV

7. a) Give a brief about hydrological properties of rocks? 10M
 b) What do you understand about seismic zones in India? 4M

OR

8. a) Give a brief about groundwater exploration? 10M
 b) Highlight on measures for controlling landslides? 4M

UNIT-V

9. a) What are the types of dams? Comment on suitable foundation for these dams? 10M
 b) High light on any dam failures and factors responsible for the same? 4M

OR

10. a) Give a brief about geological considerations in tunneling? 12M
 b) What are the problems you encounter in tunneling of steeply inclines thin rocks and steeply inclined thick rocks? 2M

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Engineering Hydrology-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)

UNIT-I

1. a) Explain in brief 'water-budget equation' with the aid of examples. 4M
- b) The following are the rain gauges observations during a storm. Construct the (i) mass curve of precipitation (ii) hyetograph, also find the total precipitation and max intensity of rainfall.

Time since commencement of storm (min)	Accumulated rainfall (cm)
5	0.1
10	0.2
15	0.8
20	1.5
25	1.8
30	2.0
35	2.5
40	2.7
45	2.9
50	3.1

10M

OR

2. a) Define DAD curve and its utility. 4M
- b) A storm of 24 hrs duration occurring in a catchment produces the following isohyets.

Isohyets (cm)	15	14	13	12	11	10	9	8
Enclosed area (Km ²)	22	78	98	115	150	195	250	300

10M

It is found that intensity of rainfall is highest in the central area of 22 Km² and gradually decreases away from the centre. Draw the DAD curve of this 24 hr storm and calculate average depth of rainfall over an area of 230 km²

UNIT-II

3. a) Define the Infiltration capacity. Explain the different factors affect the Infiltration capacity. 5M
- b) Horton infiltration equation describes how the infiltration capacity (mm/hr) for the soil change with time as soil becomes wetter. In a specific soil the parameter are known $f_0 = 35$ mm/hr, $f_c = 6$ mm/hr, $K = 2$ hr⁻¹
- (i) What is the infiltration capacity after 15, 30 and 60 min
- (ii) How much water has infiltrated after 15, 30 and 60 min 9M

OR

4. a) What factors should be considered in selecting a site for the stream gauging station? 4M
- b) During a flood, all the gauge sites of the river Harbhangi in Orissa were submerged. From the flood marks, the following data were collected. Compute the discharge.
- River stage at two sites, 1.73 km apart are 380.38 m and 400.2 m respectively, Mean cross-section of the channel = 335 m². Mean wetted perimeter of the area = 98 m (measured from the earlier river cross section). Mannings 'n' = 0.035. 10M

UNIT-III

5. The ordinate of a 6-hour unit hydrograph of a catchment is given below.

Time (hr)	0	3	6	9	12	15	18	24	30	36	42	48	54	60	69
Ordinate of 6-h UH	0	25	50	85	125	160	185	160	110	60	36	25	16	8	0

Derive the flood hydrograph in the catchment due to the storm given below.

Time from the start of storm (h)	0	6	12	18
accumulated rainfall (cm)	0	3.5	11.0	16.5

The index for the catchment is estimated as 0.25 cm/h. The base flow can be assumed to be 15m³/s at the beginning and increasing by 2.0 m³/s for every 12 hr till the end of the direct runoff hydrograph.

14M

OR

6. a) Explain different factors affecting the flood hydrograph. 7M
 b) Explain the procedure of deriving a D-h unit hydrograph from the IUH of the catchment. 7M

UNIT-IV

7. a) State the assumptions of the Thiem's method and derive the equation for the discharge of well through a confined aquifer. 7M
 b) The following observations were made on a 300 mm. diameter well penetrating an unconfined aquifer
- Rate of pumping=1800 litre/min
 - Drawdown in a test well 30 m away=1.8 m
 - Drawdown in a test well 60 m. away=0.6 m
 - Depth of water in the main well before pumping=50 m

Determine (i) Radius of influence (ii) Coefficient of transmissibility of the aquifer

7M

OR

8. a) For a trapezoidal channel section to be most economical prove that three sides of the section are tangential to the semicircle. 6M
 b) Design a regime channel for a discharge of 50 cumecs and silt factor 1.1, using Lacey's theory 8M

UNIT-V

- 9 a) How water logging leads to salinity? Why leaching is done? 5M
 b) What do you understand by field capacity? Derive the relation for the max depth of water stored in the root zone in filling the soil upto field capacity. 9M

OR

10. The cultivable commanded area for a distributary is 15,000 hectares. The intensity of irrigation for the Rabi crop (wheat) is 40% and for the Kharif (Rice) crop is 15%. If the total water requirement of the two crop are 37.5 cm and 120 cm and their periods of growth are 160 days and 140 days respectively; (i) determine the outlet discharge from the average demand consideration; (ii) also determine the peak demand discharge assuming that the kor water depth for two crops are 13.5 cm and 19 cm and their kor periods are 4 weeks and 2 weeks respectively. 14M

Code: 4GA51

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Managerial Economics and Financial Analysis

(Common to CE, ME & ECE)

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. What are the different methods of measuring Price Elasticity of demand? Given the following information, calculate the price elasticity using percentage and arc methods and comment on the nature of the good:

$P = 12; Q = 10$ and $P_1 = 15; Q_1 = 8$.

OR

2. Briefly discuss the various methods of Demand forecasting.

UNIT-II

3. Define Isoquant and Isocost line. Graphically show the optimal or cost minimizing choice of inputs. Also graphically show the long-run and short-run expansion path of a firm.

OR

4. Define Production Function and write the Cobb-Douglas production function. Suppose in the Cobb-Douglas production function, $\alpha + \beta > 1$, what does it imply about the returns to scale? If $\alpha + \beta = 1$ and $\alpha + \beta < 1$, what do they imply?

UNIT-III

5. Discuss in brief the short-run and long-run equilibrium conditions under Monopolistic market. Why do firms under Monopolistic market operate with Excess Capacity?

OR

6. Briefly discuss the various forms of business organizations. Write a short comment on PPP model.

UNIT-IV

7. Define Capital. What are the different types of capital? Elaborate.

OR

8. What are the different methods of capital budgeting? Find out the Net Present Value of a project with an initial investment of Rs. 10,000/-; even cash inflow of Rs. 500/- for a period of 2 years with 5% interest rate and zero scrap value.

UNIT-V

9. What is Balance Sheet? What are the different sections of a balance sheet? Chart out assets and liabilities of a firm with suitable examples.

OR

10. What are turnover and solvency ratios? Calculate current ratio from the following information:

Particulars	Rs.
Inventories	50,000
Trade receivables	50,000
Advance tax	4,000
Cash and cash equivalents	30,000
Trade payables	1,00,000
Short-term borrowings	4,000

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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

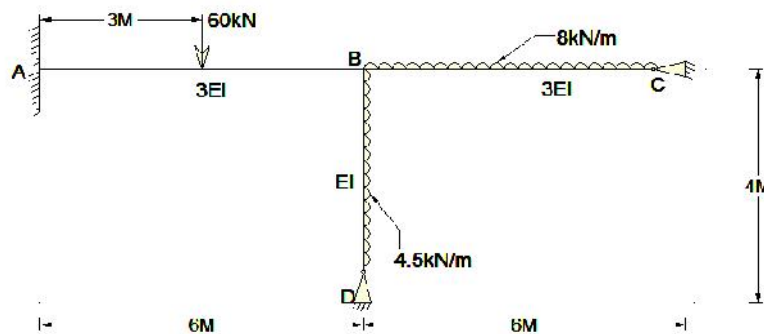
1. A three hinged parabolic arch span of 30m and central rise of 6m it is loaded with a point load of 6kN at a length of 8m from left end support calculate normal thrust, and radial shear at a section under the load. Also calculate maximum positive and negative bending moment

OR

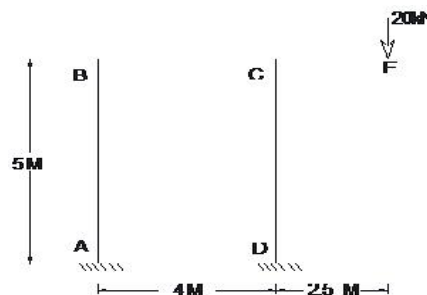
2. A parabolic arch hinged at the ends has a span of 60m and a rise of 12m. A concentrated load of 8 KN acts at 15m from the left hinge. Calculate the horizontal thrust and bending moment at the quarter span of the right half of the span.

UNIT-II

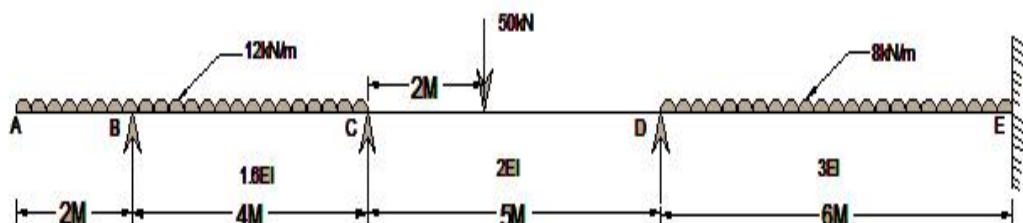
3. Analyze the frame shown in fig. below by slope deflection method .

**OR**

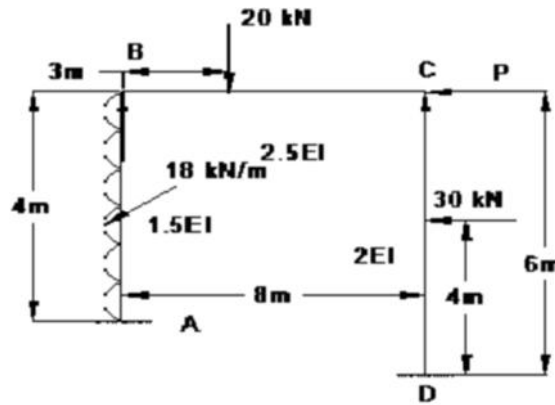
4. Analyze the frame shown in fig. below by moment distribution method where EI is constant.

**UNIT-III**

5. Analyze the continuous beam shown in fig. below by Kani's method. The support B sinks by 8mm. take $EI = 10 \times 10^6 \text{ Nm}^2$

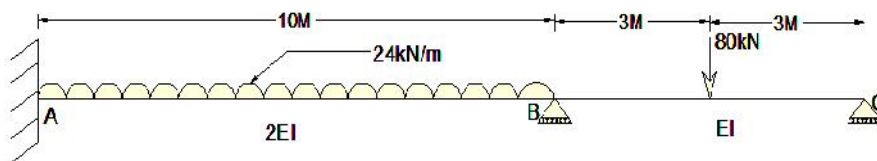
**OR**

6. Find the value **P** to prevent sway in the given frame shown in fig. below by Kani's method.



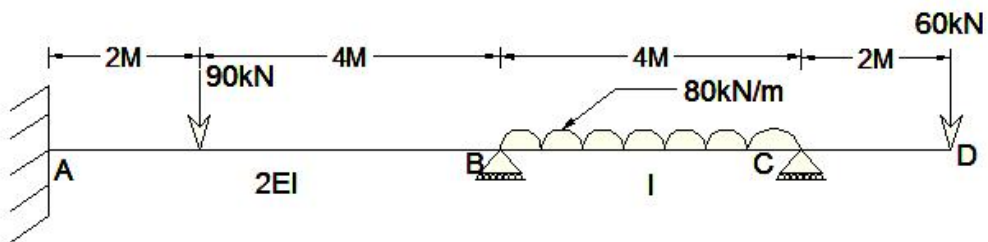
UNIT-IV

7. Analyze the continuous beam shown in fig. below by flexibility matrix method and draw SFD. What will be the change in the forces, if supports B and C settle down by $200/EI$ and $100/EI$.



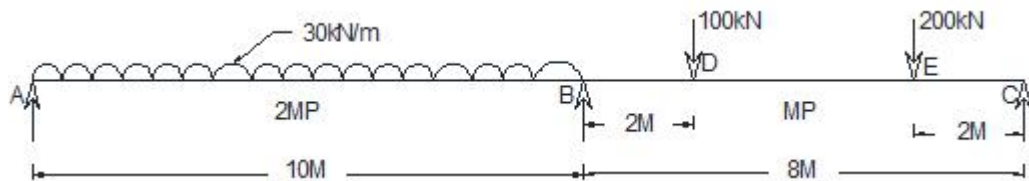
OR

8. Analyze the beam shown in fig. below by stiffness matrix method.



UNIT-V

9. Analyze the continuous beam shown in fig. below by plastic Analysis. All the loads are service loads, use partial safety factor of 1.5



OR

10. Determine the collapse load of a fixed beam shown in fig. below subjected to load W at $1/3^{rd}$ span.

