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R-15

Code: 5G655

III B.Tech. I Semester Supplementary Examinations November 2019

Design and Drawing of Reinforced Concrete Structures

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

PART-A

Answer any One questions (1 x 28 = 28 Marks)

1. Design a roof slab with restrained edges which is continuous on three edges and discontinuous on one short edge for a room of 4.8 m X 3.6 m clear in size. The width of the beams on all edges is 230mm. Take the roof finishes as 2.0 kN/m² and that of the live load for roof as 1.5 kN/m². Use M-20 grade concrete and Fe 500 steel. Detail the following to scale.
 - (a) Draw the reinforcement of the slab in plan view.
 - (b) Draw cross sections of the slab in both directions showing reinforcement.

OR

2. Design an isolated square footings to carry a column load of 1090 kN for a 300mm square tied column containing 20 mm bars as the longitudinal bars. Assume soil safe bearing capacity as 150 kN/m². Use M-25 grade concrete and Fe-500 grade steel. Assume unit weight of soil as 17 kN/m³.

Draw to scale, showing reinforcement details

 - (a) Plan view of the footing.
 - (b) Sectional elevation of the footing.

PART-B

Answer any Three questions (3 x 14 = 42 Marks)

3. A simply supported 'T' beam has an effective span of 8m. The flange of the 'T' beam is 1000mmX100mm and the web below is 250mmX400mm. It is reinforced with 5-25 mm Fe415 grade steel bars in tension at an effective cover of 50mm. Determine the magnitude of two equal point loads which can be supported at its one-third points. Assume $f_{ck}=20\text{N/mm}^2$.
4. Design a rectangular beam section of 230 mm width subjected to an ultimate bending moment of 90 kNm and an ultimate shear force of 50 kN. Assume M 20 grade concrete and Fe 500 grade steel.
5. Design an axially loaded tied column 300mm X 450mm pinned at one end and fixed at other end with an unsupported length of 3.5m for carrying a factored load of 2200kN. Use M25 grade concrete and Fe 500 grade steel.
6. Design a short column under biaxial bending with the following data. Size of the column 450mmX450mm. Factored 'Pu'=1000kN, Mux=75kNm, Muy=60kNm. Reinforcement is assumed to be distributed equally on four sides. Use M20 grade concrete and Fe 500 grade steel.
7. A rectangular cantilever beam of span 4m is 350mmX650mm in cross section. Bending moment at the support due to uniformly distributed service loads is 150 kNm out of which 50% moment is due to permanent loads. Check the beam for deflection. It carries 3-25mm bars in tension at an effective cover of 50mm. M20 grade concrete and Fe415 steel are used.

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III B.Tech. I Semester Supplementary Examinations November 2019

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 objectives of water supply system 5M
- b) What are the various sources of water? Explain the suitability of sources of water with reference to quantity and quality. 9M

OR

- 2. a) What is Per capita demand? Explain the factors affecting Per capita demand of water. 7M
- b) Estimate the population of a city for the years 2041 using Geometrical and incremental increase methods, based on the census data given below.

Year	1961	1971	1981	1991	2001	2011
Population	160000	198000	250000	345000	410000	580000

7M

UNIT-II

- 3. a) Explain the reservoir intake structure with neat sketch. 7M
- b) Explain the systems of water distribution 7M

OR

- 4. a) Explain the following chemical characteristics of water 9M
 - i) pH ii) Hardness and iii) chloride
- b) Explain the various water borne diseases 5M

UNIT-III

- 5. a) Explain the layout of conventional water treatment units and their functions 7M
- b) Design a sedimentation tank to treat 5 MLD of water. Assume required data. 7M

OR

- 6. a) With neat sketch, explain the working principle of rapid sand filter. 7M
- b) Explain the importance of break point chlorination in determining dosage of disinfectant. 7M

UNIT-IV

- 7. a) Explain the various methods of sewerage systems 7M
- b) Explain the factors affecting the quantity of sewage 7M

OR

- 8. a) Explain the various shapes of sewers and their suitability. 7M
- b) What are the various sewer appurtenances? Explain in detail about manhole with neat sketch. 7M

UNIT-V

- 9. a) Explain the physical characteristics of sewage 7M
- b) Determine the 5 day BOD of a sample at 20°C, if its 3 day BOD at 20°C is 250 mg/lit, K_D at 20° C is 0.1/day 7M

OR

- 10. a) Write a note on i) Grit chamber ii) Oxidation pond 7M
- b) Design a septic tank for a apartment of 100 persons with daily sewage flow of 120 lpcd. 7M

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Code: 5G652

III B.Tech. I Semester Supplementary Examinations November 2019

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 briefly geology Importance for civil engineering Application? 14M

OR

2. Define weathering and Give brief note on types of weathering, Effects of weathering of rocks? 14M

UNIT-II

3. Define Mineral and Describe briefly Importance of study of Mineral? 14M

OR

4. Give brief note on Physical properties of Feldspar, Quartz, Olivine, Augite and explain its importance? 14M

UNIT-III

5. a) Define Rock and Describe briefly types of Rocks and its formations? 7M

b) Explain briefly Dykes and sills? 7M

OR

6. Explain briefly different types of Folds with neat sketches? 14M

UNIT-IV

7. Give brief note on causes of Landslides and explain briefly their impacts, control techniques? 14M

OR

8. Describe briefly Groundwater exploration techniques? 14M

UNIT-V

9. Discuss Types of dams and explain briefly importance of Geological considerations in the selection of a dam site? 14M

OR

10. Give brief note on Effects of tunneling on the ground? 14M

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R-15

Code: 5GA51

III B.Tech. I Semester Supplementary Examinations November 2019

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 do you mean by Managerial Economics? Describe the Nature and Scope of Managerial Economics?

OR

2. Discuss about the time perspective in business decision? Under what kind of business decisions time perspectives become an important consideration?

UNIT-II

3. What is meant by Elasticity of Demand? How is the Elasticity of Demand measured?

OR

4. Discuss about the cost – output relationship in the short run and the long run?

UNIT-III

5. “Monopolistic competition is the middle ground between perfect completion and monopoly” explain the statement in detail.

OR

6. Briefly explain the features, merits and demerits of public and private sector business organizations?

UNIT-IV

7. A company has **two** investment proposals each costing Rs.1,00,000 and the expected cash inflows are given below;

Year	1	2	3	4	5
Project – A	20,000	30,000	50,000	50,000	20,000
Project – B	35,000	35,000	35,000	35,000	35,000

The cost of capital is 10%. Calculate NPV and Profitability Index. Suggest the management.

OR

8. Define Accounting. Explain Double Entry Book Keeping System. Explain the classification of Accounts with detail examples?

UNIT-V

9. Elucidate the Solvency and Profitability Ratios?

OR

10. The following figures are extracted from the Balance Sheet of X Ltd., as on 31st December.

Particulars	2017 (Rs.)	2018 (Rs.)	Particulars	2017 (Rs.)	2018 (Rs.)
Stock	25,000	40,000	Bills Payable	2,000	3,000
Debtors	10,000	16,000	Provision for taxes	5,000	7,000
Cash at Bank	5,000	4,000	Bank Overdraft	5,000	15,000
Creditors	8,000	15,000			

Calculate the Current Ratio and Acid Test Ratio for the two years and comment on the Liquidity position of the company.

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III B.Tech. I Semester Supplementary Examinations November 2019

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

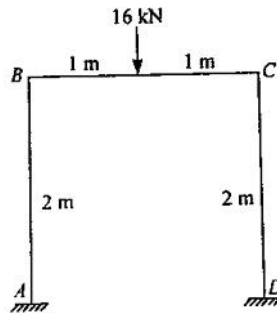
1. A parabolic arch hinged at the springings and crown has a span of 20m. The central rise of the arch is 4m. It is loaded with an u.d.l of intensity 2KN/m on the left 3m length. Calculate
- a) The direction and magnitude of reactions at the hinges
 - b) The bending moment, normal thrust and shear at 4m and 15m from the left end
 - c) Maximum positive and negative bending moments? 14M

OR

2. a) Explain the effect of rib shortening in two- hinged arches. 6M
- b) A two –hinged parabolic arch of span 20m and rise 4m carries an u.d.l of 50KN/m on the left half of the span. Find the reactions at the supports and the position and amount of maximum bending moment? 8M

UNIT-II

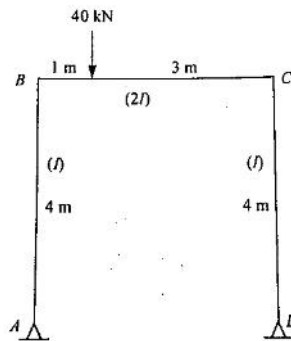
3. a) Under what circumstances, the portal frames may undergo side sway? 4M
- b) Analyse the portal frame shown in figure below by slope- deflection method. Also draw the S.F and B.M diagrams.



10M

OR

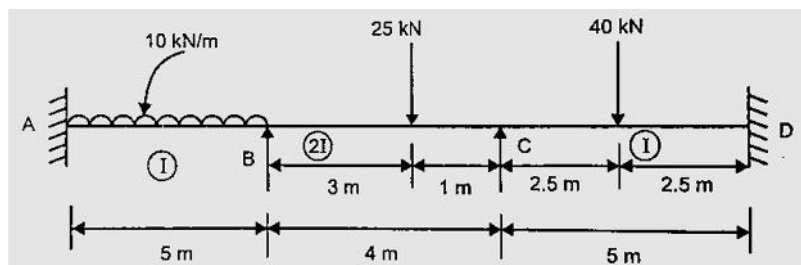
4. Analyse the portal frame shown in figure below by moment distribution method. Also draw the shear force and bending moment diagrams.



14M

UNIT-III

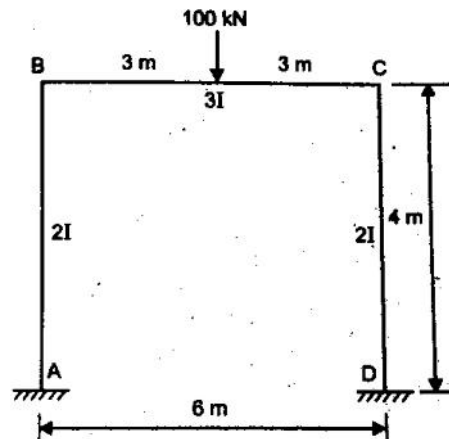
5. Analyse the continuous beam loaded as shown in figure below by Kani's method. Sketch the B.M.D.



14M

OR

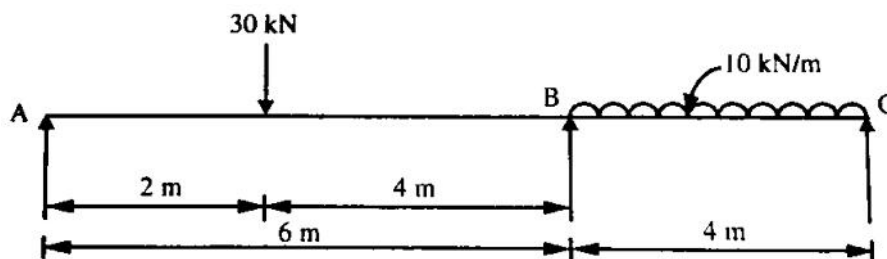
6. Analyse the frame loaded as shown in figure below by Kani's method and sketch the B.M.D.



14M

UNIT-IV

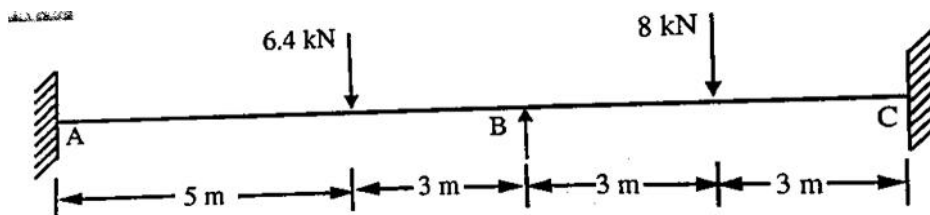
7. Analyse the continuous beam shown in figure below by flexibility method and draw the B.M.D.



14M

OR

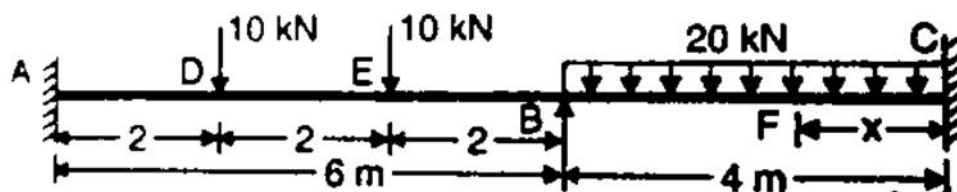
8. Analyse the continuous beam shown in figure below by stiffness method and draw the B.M.D.



14M

UNIT-V

9. a) What are the assumptions made for evaluation of the fully plastic moment? 5M
 b) A two span continuous beam of uniform section loaded with ultimate loads as shown in figure below. Determine the required plastic moment of resistance?



9M

OR

10. What are the basic theorems of plastic analysis? Explain them in detail. 14M

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R-15

Code: 5G653

III B.Tech. I Semester Supplementary Examinations November 2019

Water Resource 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) Illustrate the hydrologic cycle. Discuss how the cycle process is affected with the human activities. 7M
- b) Thiessen polygons constructed for a network of 10 rain gauges in a river basin yielded Thiessen weights of 0.10, 0.16, 0.12, 0.11, 0.09, 0.08, 0.07, 0.11, 0.06 and 0.10. If the rainfalls recorded at these gauges during a cyclonic storm are 132, 114, 162, 138, 207, 156, 135, 158, 168 and 150 mm respectively, determine the average depth of rainfall by Thiessen mean method. 7M

OR

2. a) Describe the natural siphon recording type rain gauge with a neat sketch. 6M
- b) Explain the following in brief. (i) Estimation of average rainfall over an area (ii) rainfall mass curve (iii) hyetograph (iv) IDF curves. 8M

UNIT-II

3. a) What is evapotranspiration? Explain the factors affecting evapotranspiration. 7M
- b) The following mass curve was obtained for a 14-hour effective rainfall period that occurred over a catchment area of 25 km². Calculate the volume of runoff, when the ϕ -index is 0.35cm/h.

Time (h):	0	2	4	6	8	10	12	14	
Accumulated rainfall:	0	1.0	3.0	5.5	7.7	8.0	9.0	10	7M

OR

4. a) Explain the physiographic factors of the basin which affect the runoff 7M
- b) Discuss in detail about the infiltration indices 7M

UNIT-III

5. a) Define unit hydrograph. List the assumptions and limitations of unit hydrograph theory. 6M
- b) The following are the total runoff ordinates in m³/s, and the corresponding base flow of a catchment having a drainage area of 104 km². Derive the 2-h unit hydrograph ordinates

Time (h):	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Total flow:	0	11	170	260	266	226	188	157	130	108	91	76	64	54	46	32
Baseflow:	0	8	9	10	12	14	17	19	22	25	26	29	29	30	32	32

8M

OR

6. a) Describe the S-curve method of developing a 6-h UH by using 12-h UH of the catchment. 6M
- b) The ordinates of 4-h UH of a basin of area 300 km² measured at 1-h intervals are 6, 36, 66, 91, 106, 93, 79, 68, 58, 49, 41, 34, 27, 23, 17, 13, 9, 6, 3 and 1.5 m³/s respectively. Obtain the ordinates of a 3-h UH for the basin using the S-curve technique. 8M

UNIT-IV

7. a) Derive an expression for the steady state discharge of well, fully penetrating into a confined aquifer. 6M
- b) In an unconfined aquifer of thickness 28m, a 15 cm diameter well is pumped at a constant rate of 240 lpm at a steady state, the drawdown in observation wells located 10 m and 100m respectively, was observed to be 3.8 m and 0.06 m. Determine the aquifer parameters. Also determine the radius of influence and drawdown at the well. 8M

OR

8. a) Give the comparison between Kennedy's theory and Lacey's theory and draw typical cross section of the Lacey's regime channel. 7M
- b) A tube well penetrates fully into an unconfined aquifer. Calculate the discharge from the tube well under the following conditions:
- i. Diameter of the well = 300 mm
 - ii. Drawdown = 2.5 m
 - iii. Effective length of the strainer under the above drawdown = 12 m
 - iv. Coefficient of permeability of aquifer = 0.5 mm/s
 - v. Radius of zero drawdown = 500 m
- 7M

UNIT-V

9. a) Give complete classification of methods of irrigation and illustrate Furrow and uncontrolled flooding methods. 6M
- b) After how many days will you supply water to soil (clay loam) in order to ensure efficient irrigation of the given crop, if
- i. Field capacity of soil = 27%
 - ii. Permanent wilting point = 14%
 - iii. Dry density of soil = 15 kN/m³
 - iv. Effective depth of root zone = 75 cm
 - v. Daily consumptive use of water for the given crop = 11 mm.
- 8M

OR

10. a) Define duty, delta and base period, and deduce the relation among them 6M
- b) A water course commands an irrigated area of 800 hectares. The intensity of irrigation of rice in this area is 50%. The transplantation of rice crop takes 15 days and the total depth of water required by the crop is 60cm on the field during the transplantation period, given that the rain falling on the field during this period is 15cm. Find the duty of irrigation water for the crop on the field during transplantation, at the head of the distributory, assuming losses of water to be 20% in the water course. Also calculate the discharge required in the water course. 8M
