U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

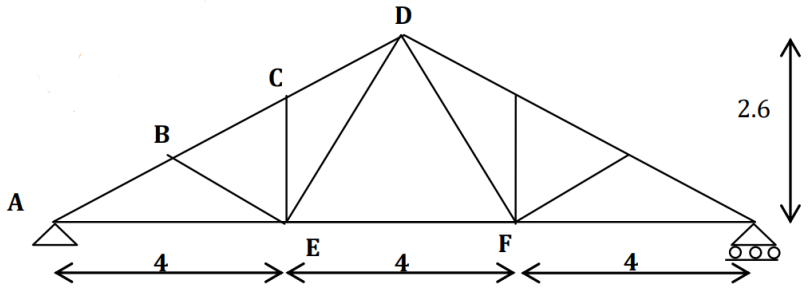
August 2024 Supplementary Examinations

Programme: B.E. **Semester: VII**
Branch: Civil Engineering **Duration: 4 hrs.**
Course Code: 21CV7PCDDG **Max Marks: 100**
Course: DESIGN AND DRAWING OF RCC AND STEEL STRUCTURES

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. Use of IS 456-2000, IS 800-2007, SP-16 handbook, SP-6 handbook/ Steel tables are allowed

			PART - A	CO	PO	Marks
	1	a)	A one-way slab of dimensions 3 meters wide and 7 meters long is supported on its longer sides by beam and column. The shorter span reinforcement is of 10 mm bar of 100 mm c/c with alternate bars cranked. Distribution steel consists of 8 mm bars at 120 mm c/c. The thickness of slab is 100mm. The beam is 230 mmx450 mm with 2 no.'s of 12mm bars at top and 2 no.'s of 16mm bars at bottom continuous and 2 no.'s of 16mm bars extra. Shear reinforcement consists of two legged 8 mm bar at 200 mm c/c Draw to a suitable scale: (i) Plan of slab with reinforcement details (ii) Longitudinal section of beam (iii) Cross section of beam at its center.	*CO1*	*PO1*	**10**
		b)	Design a rectangular combined footing with a central beam for supporting two columns 400 x 400 mm in size to carry a load of 1000kN each. Center to center distance between the columns is 3.5m. The projection of the footing on either side of the column with respect to center is 1m. Safe bearing capacity of the soil can be taken as 190kN/m^2. Use M20 concrete and Fe-415 steel. Draw to a suitable scale the following details: (i)Longitudinal section of the footing beam showing reinforcement details (ii)Plan of footing slab showing reinforcement details.	*CO1*	*PO3*	**40**
			OR			
	2	a)	Design a cantilever retaining wall (T type) to retain earth for a height of 4m. the backfill is horizontal. The density of soil is 18kN/m^3. Safe bearing capacity of soil is 200 kN/m^2. Take the co-	*CO1*	*PO3*	**40**

			efficient of friction between concrete and soil as 0.6. The angle of internal friction of soil as 30 degrees. Use M20 concrete and Fe415 steel. Draw to a suitable scale the following details: (i)Cross section of wall (ii) Sectional Elevation of the stem showing curtailment of reinforcements.			
		b)	A cantilever beam rests on R .C Column 300mm x 300mm with the overall length of the beam beyond face of column equal to 2.8m. Given the thickness at support and free end = 450mm and 200mm respectively for the beam. Reinforcement details are as follows • Tension steel- 2-16# for full length and 2-16# from face of the support up to mid span • Anchor bars- 2-12#. Stirrups- 2L-8#@ 250mmc/c Draw to a suitable scale i. Longitudinal elevation of beam showing reinforcement details ii .Cross-section of beam @ support	***CO1***	***PO1***	**10**
			UNIT - III			
	3	a)	A framed bolted connection is used to connect a column ISMB500 with a beam ISLB400. Angles ISA 100x100x8 mm are used for the connections. Connection of the angle with the beam is with 3 bolts of 20mm diameter. Connection of the angle with column is with 4 bolts of 20 mm diameter, 2 on each angle. Draw to a suitable scale: i) Side elevation ii) Longitudinal view	***CO2***	***PO1***	**10**
		b)	Design a welded plate girder for a span of 30m to carry an imposed load of 30 KN/m and two point loads of 100 kN each at one third span points. Design the central section and bearing stiffener only. Consider 2 flats of 60 x 8 mm, one on either side of the web to be used as Intermediate stiffeners. Assume suitable intermediate stiffener at a spacing of 2 m centre to centre on either sides of web plate. Assume continuous fillet weld of size 5 mm of length at all connections. Draw to a suitable scale the following: (i) Central section of the girder. (ii) Half longitudinal section showing details of stiffeners and connection	***CO2***	***PO3***	**40**
			OR			
	4	a)	The centerline of a roof truss is shown in figure below (truss dimensions are in meters).	***CO2***	***PO3***	**40**

			 The magnitude and nature of forces under service conditions are given below: Top Chord members = 50 kN Compression Bottom Chord members = 45 kN Tension use M16 turned bolts of grade 8.8 Design top chord and bottom chord members and connections at support A. Assume left support to be hinged and right support to be on roller. Draw to a suitable scale 1. Support A and its joint details 2. Elevation of truss for half span			
		b)	Draw the front elevation and side elevation of a beam to beam framed connection with following details. Main beams have radiating secondary beam on either sides connected to its web. The top level of all beams are same Main beam comprising of ISMB600 @ 122.6kg/m Secondary beams- 1 no. each on either side comprising of ISLB 300@ 37.7 kg/m Cleat angle 100x 100 x 10mm	***C02***	***P01***	**10**

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