Reg No.:

# 

Fifth Semester B.Tech Degree Examination December 2021 (2019 scheme

# Course Code: CET301 Course Name: STRUCTURAL ANALYSIS - I

Max. Marks: 100

**Duration: 3 Hours** 

(14)

# PART A

	(Answer all questions; each question carries 3 marks)	Marks
1	State and explain Eddy's theorem	(3)
2	Explain suspension bridge and its parts with a neat figure	(3)
3	Write the equation for support reactions and H, when cable is subjected to a	(3)
	UDL of w kN/m over the span	
4	What are the reason for sway in frames	(3)
5	Explain about the lack of fit of an indeterminate frame	(3)
6	What are the assumptions used for the analysis of frame	(3)
7	Write a note on (i) distribution factor and (ii) carry over moment	(3)
8	Write the significance of influence line diagram	(3)
9	State and explain Castigliano's first theorem for deflection	(3)
10	Write the steps for analysing beam by the consistent deformation method	(3)

PART B

(Answer one full question from each module, each question carries 14 marks)

# Module -1

11

Analyse the pin jointed truss as shown in figure 1 by the method of joints



Figure 1

## 1100CET301122101

12 a) Find the slope and deflection at B of the cantilever using moment area (8) method.

 $E=2x10^5$  N/mm<sup>2</sup>, I = 8500 cm<sup>4</sup>



b) State and explain Moment Area Theorem I and Theorem II (6)

Figure 2

#### Module -2

13

Analyse the beam shown using consistent deformation method and draw the (14) SFD and BMD



14 a) Define static and kinematic indeterminacies with one example(5)b) State Maxwell's law of reciprocal deflections(4)

b) Derive an expression for deflection by unit load method (5)

## Module -3

15





16

Analyse the beam and Draw SFD and BMD using moment distribution (14) method



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## Module -4

A cable of span 200 meter and dip 12m carries a load of 10kN per meter run (14) of horizontal span. Find

i) the maximum tension in the cable and the inclination of the cable at the support.

ii) the forces transmitted to the supporting pier if the cable is clamped toa saddle with smooth rollers resting on the top of the pier. Anchorcable is inclined at 30° to the horizontal.

iii) calculate the length of the cable.

A cable of span 50meter is supporting four concentrated loads 30kN, 40kN, (14) 10kN and 15kN respectively at points C, D, E, and F which are 10m, 20m 30m and 40m from left support. Both supports are in same level. Dip of point D is 7m. Calculate the support reactions and the tensions in the various parts of the cable. Also find the length of the cable.

(4)

### Module -5

19 a) Explain about the types of arches

17

18

b) A three hinged parabolic arch hinged at the supports and at the crown has a (10) span of 30m and a central rise of 4m. it carries a concentrated load of 60kN at 18m from left support and a uniformly distributed load of 30 kN/m over the left half portion. Determine the moment, normal thrust and radial shear at a section of 7.5m from the left support.

20 a) Draw ILD for SF and BM at any intermediate section of overhanging beams (4)

b) A simply supported beam has a span of 20m.UDL of 50 kN/m and 5m long (10) crosses the girder from left to right. Draw ILD for SF and BM at a section 7m from left end. Calculate the maximum positive shear force, maximum negative shear force, and maximum bending moment at this section.

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