Sanjay Ghodawat University, Kolhapur

2019-20
EXM/P/09/00

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

Year and Program M.TECH. Structures 2019-20	**School of Technology**	**Department Civil Engineering**
Course Code CSE 501 (RJ)	**Course Title** ADVANCED STRUCTURAL ANALYSIS	**Semester – I**
Day and Date: Monday 16/12/16.	**Examination: ESE**	**Time** 4 hr **Max Marks: 100** 10.30 am to 2.30 pm

Instructions: 1) All questions Compulsory.
2) Figure to the right indicate full mark.
3) Draw sketches wherever necessary.
4) Assume suitable data if require

Que		Marks	Blooms level	CO
1	Construct ILD for reaction at support A and Shear force at D for a two span continuous beam as shown in fig.1 obtain ordinates of ILD at every 2m Interval.	10	L3	1

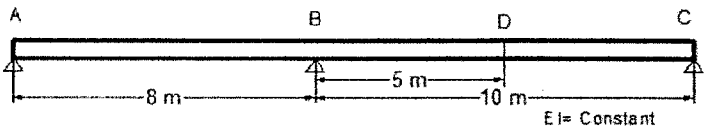


fig. 1

OR

	Derive expression for horizontal trust and maximum thrust for two hinged parabolic arch having span L and central rise h. Also draw ILD for horizontal thrust.	10	L3	1
2	A quarter circular beam of radius R curved in plan is fixed at end A and free at end B, carries a vertical load P at the free end. Determine the deflection at the free end and sketch the shear force, bending moment and torsional moment diagram. Assume EI= GJ.	10	L2	2
3	Find the equation for deflection, Foundation pressure,slope, Bending moment and shear force diagram for long beam (semi-infinite) on elastic foundation subjected to moment Mo at the end which is hinged.	10	L3	2

OR

	A rail supported on sleepers and ballast is subjected to three concentrated wheel loads each of magnitude 120 kN spaced at interval 1676mm. If k= 16 N/mm^2 , E= 210 kN/mm^2 and I= 368 x 10^5 mm^4 compute the maximum deflection of rail and bending moments developed under each load.	10	L3	2

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4	A reinforced concrete column of an Industrial building is Simply supported at the ends with a cross section 300x300mm reinforced with 4 bars of 16 mm .the height of column is 4m. The column is subjected to a service load of 100 kN, acting at center of height of column. If Ec= 28 kN/mm^2 , Estimate the maximum deflection, bending moment and slope developed in beam –column.	10	L4	4
5	**Solve any two of the following.**			
a)	Analyse the continuous beam shown in Fig.2 by flexibility matrix method. Draw BMD, Take EI constant for entire beam.	15	L4	5

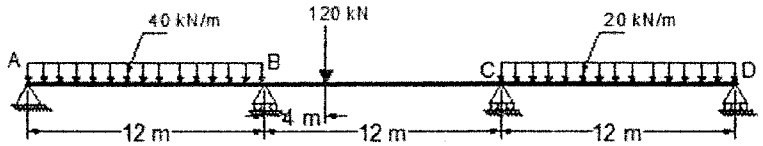


fig. 2

b)	Analyse portal frame ABCD from Fig. 3 by force method. Draw BMD.	15	L4	5

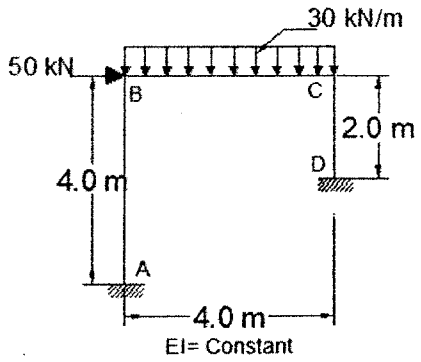


fig. 3

c)	Analyze the pin jointed truss shown in fig. The numbers in parentheses are cross sectional areas in cm^2.Take E= 20000 kN/cm^2.	15	L4	5

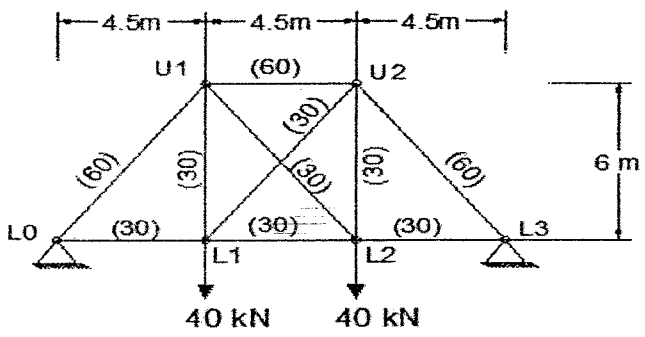


fig. 4

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6 Solve any two of following.

a) Analyze a continuous beam as shown in fig. 5 by stiffness method. 15 L4 6

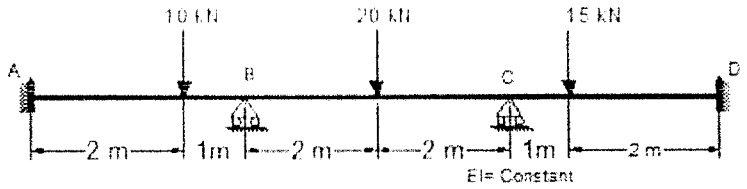


fig 5

b) Analyse portal frame ABCD from Fig. 6 by stiffness method. 15 L4 6

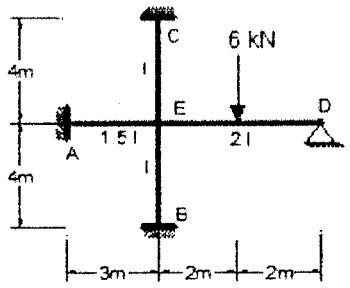


fig. 6

c) Fig. 7 shows a Jib crane carrying vertical load 100 kN at A. Determine the displacement of joint A. Hence calculate the forces in members AB and AC. The numbers. in parentheses are cross sectional areas in cm^2. Take E= 20000 kN/cm^2. 15 L4 6

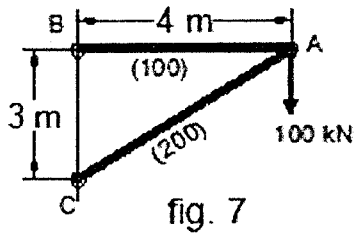


fig. 7

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