B.Tech. (Civil Engineering) Fourth Semester (C.B.C.S.)

Structural Analysis

P. Pages : 4 **PSM/KW/23/2600**

Time : Three Hours Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data whenever necessary.
9. Use of non programmable calculator is permitted.

1. Analyse the continuous beam by three moment and draw BMD. Refer fig. 01. **14**

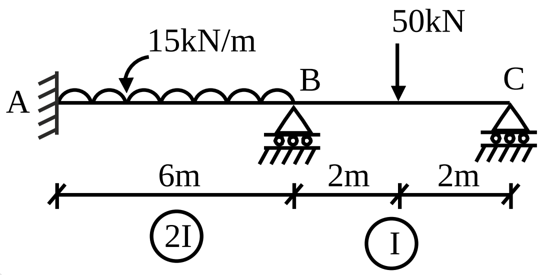


Fig. No. 1

OR

2. Analyse the continuous beam ABC as shown in fig. 02, if support B sinks by 10 mm. Given $E = 200\,kN/mm^2$ & $I = 1\times10^8 mm^4$. **14**

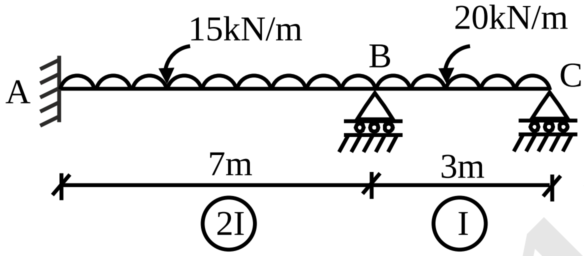


Fig. No. 2

3. Analyse the portal frame as shown in fig. 03, using slope and deflection method & Draw BMD. **14**

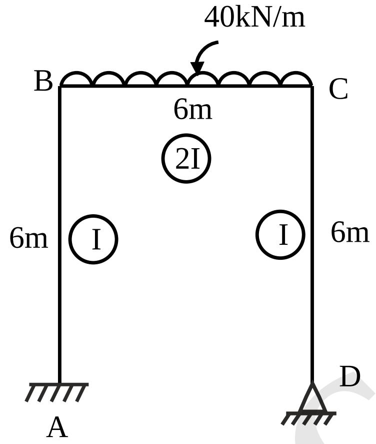


Fig. No. 3

OR

4. Analyse the continuous beam by moment distribution method taking EI as constant. Also draw BMD. Refer fig. 04. **14**

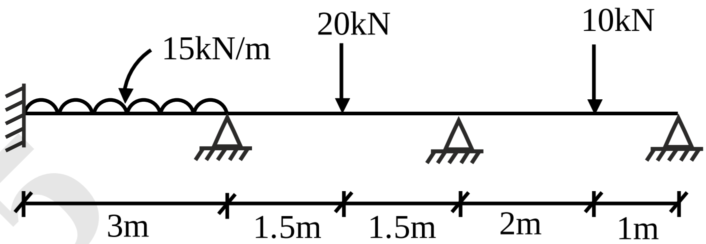


Fig. No. 04

5. Four loads as shown in fig. 05 are travelling over girder of 25 m span from right to left with 10 kN load. Calculate maximum BM & SF at 7 m from left support. Also calculate absolute maximum BM. **14**

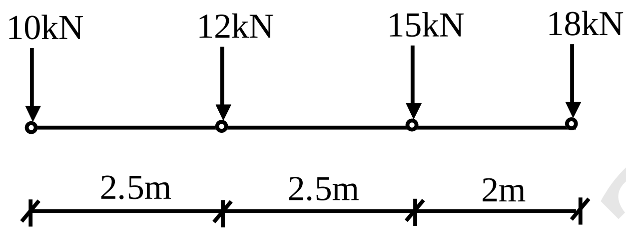


Fig. No. 05

OR

6. Draw the influence line diagram for forces in member U_3U_4, U_3L_4 and L_3L_4 of frame shown in fig. 06. Find the maximum forces developed, when UDL of intensity 40 kw/m over the span move from left to right on top chord. **14**

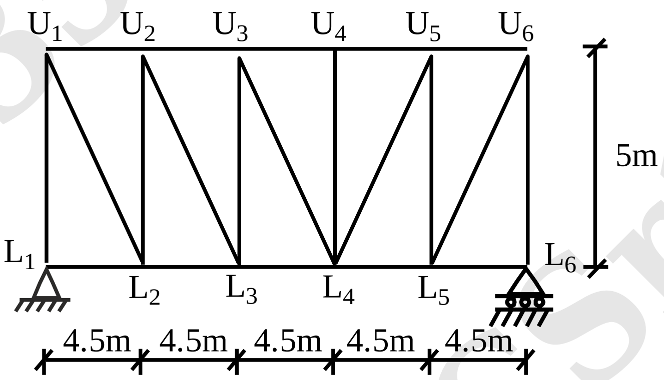


Fig. No. 06

7. a) Derive the stiffness matrix of beam element. **4**

b) Analyse the continuous beam as shown in fig. 7 & draw BMD & SFD. Assume constant EI. Use stiffness matrix method. **10**

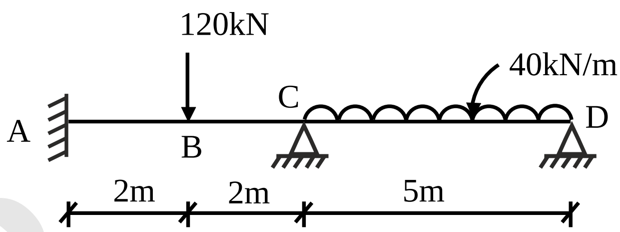


Fig. No. 07

OR

8. Analyse the plane frame as shown in fig. 08 and Draw BMD neglecting axial deformation. Use stiffness method. **14**

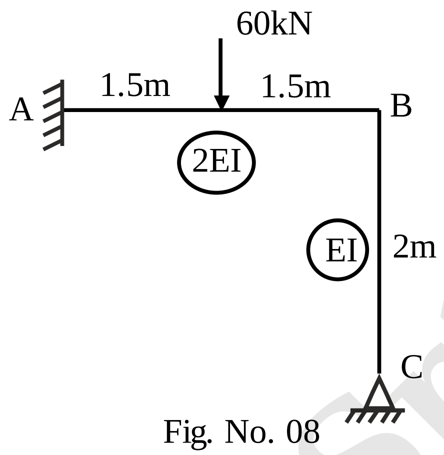
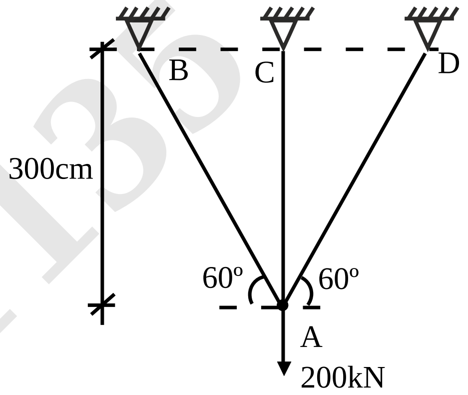


Fig. No. 08

9. a) Derive stiffness matrix of truss element. **4**

b) Determine forces in members of given truss as shown in fig. 09. **10**



$E_{AB} = E_{AD} = 8000\,kN/cm^2$

$E_{AC} = 300 kN/cm^2$

Area of each member = $8cm^2$

Fig. No. 09

OR

10. Determine the final forces for the truss as shown in fig. 10 by stiffness method. **14**

$A = 200\,mm^2$ $E = 8000\,kw/mm^2$

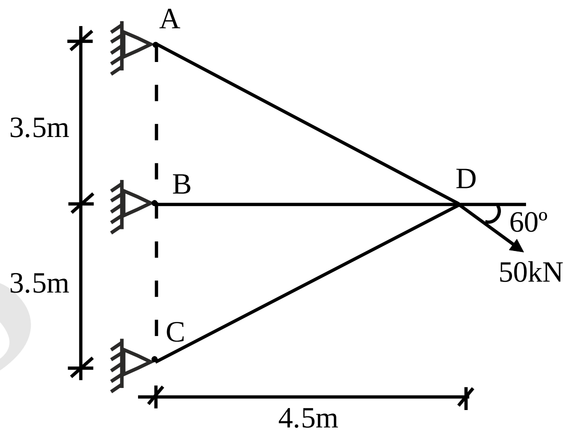


Fig. No. 10

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B.Tech. (Civil Engineering) Fourth Semester (C.B.C.S.)

Environmental Engineering

P. Pages : 2 **PSM/KW/23/2601**

Time : Three Hours Max. Marks : 70

* 1 5 4 9 *

Notes :
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5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data whenever necessary.
9. Diagrams and chemical equations should be given whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) What is per capita demand? List out daily water requirement for an avg. India city? **4**

b) What is mean by Intake structure? What point should be kept in a mind while selecting a Intake structure? **7**

c) List out various population forecasting methods? Explain which method is the best? **3**

OR

2. a) Draw a layout of conventional water treatment plant explain each unit in brief. **7**

b) Design a cascade aerator for design flow of 18 MLD. **7**

3. a) Explain coagulation process? List out various types of coagulant used in conventional water treatment plant explain any two in brief. **7**

b) Design a rapid sand filter for design flow of 15 MLD. **7**

OR

4. a) Write a short notes on “clariflocculator”. **7**

b) What is meant by disinfection process? Enlist various types of disinfectant. **7**

5. a) Differentiate between separate system & combine system of sewage collection methods. **7**

b) Enlist various pattern of sewage collection system. Explain them in brief. **7**

OR

6. a) Design a main sewer line for a colony of population 18,000. Per capita demand of water supply is 1351pcd. The sewer line is to be laid at a slope of $\frac{1}{500}$. Use Manning's coeff. N = 0.012 the design discharge is 1.5 times avg. discharge & the sewer is to be design for running full. **7**

b) Explain the various system of house plumbing in brief with neat sketch. **7**

7. a) Draw a layout of conventional waste water treatment plant and explain each unit in brief. **7**

b) What is mean by Activated sludge process? Explain with the help of neat sketch. **7**

OR

8. a) Explain working principal of PST in brief. **7**

b) Write a short note on **any three.** **7**

i) Self purification of Stream.

ii) Pit privy

iii) Septic tank

iv) Sludge dying bed

9. a) Define air pollution? and explain various sources of air pollutant. **7**

b) Write a note on impact of air pollution on human being. **7**

OR

10. a) What is meant by MSW? Explain in brief various sources of the same. **7**

b) Write a short note **any three.** **7**

i) Climate change

ii) Geo environment

iii) Environmental management system

iv) Sustainable resource management

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B.Tech. (Civil Engineering) Fourth Semester (C.B.C.S.)

Transportation Engineering

P. Pages : 2 **PSM/KW/23/2602**

Time : Three Hours Max. Marks : 70

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3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.
10. Use of non programmable calculator is permitted.

1. a) Explain components of transportation system in short. **7**

b) Explain the salient features of 'Rural road development plan : Vision 2025' **7**

OR

2. a) State the ideal requirement of highway alignment. Explain how obligatory points influences the alignment of a new road. **7**

b) Enumerate the surveys to be carried to finalize an alignment. **7**

3. a) Define Camber. Describe its types with suitable sketches. **7**

b) Design the length of summit curve for stopping sight distance for the following data **7**
i) gradients are + 3.0% & -4.5%
ii) design speed = 80 kmph

OR

4. a) Calculate extra widening required for a National Highway having carriage way width 10.5m. **7**
i) Radius of curve = 270 m
ii) Length of wheel base = 6.0 m
iii) Speed of vehicle = 90 kmph

b) Compare flexible and rigid pavements in detail. **7**

5. a) Explain vehicular characteristics in detail. **7**

b) Draw neat sketches of traffic signs in India. **7**

OR

6. a) Draw well labelled diagrams for 'At grade road intersections'. **7**

b) What are the main causes of road accidents in India? What precautionary measures should be taken to minimize accidents? **7**

7. a) What do you understand by "Permanent Way"? Discuss the requirements of ideal permanent way. **7**

b) What are the objectives of providing ballast in the permanent way? Also discuss the various types of ballast. **7**

OR

8. a) Define 'Gauge' of railway track. What are the factors which affect the selection of gauge? **7**

b) Write a note on sleepers and list out the functions of sleeper. **7**

9. a) Enumerate the various factors which are to be considered while selecting a suitable site for an airport. **7**

b) Discuss the characteristics of an aircraft that influences the planning and design of airport facilities. **7**

OR

10. a) The length of runway under standard conditions is 1600m. The airport site has an elevation of 270 m. Its reference temperature is 32.90ºC. If the runway is to be constructed with an effective gradient of 0.20 percent, determine the corrected runway length. **7**

b) What are the characteristics of ideal layout of Airport? **7**

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B.Tech. (Civil Engineering) Fourth Semester (C.B.C.S.)

Surveying & Geomatics

P. Pages : 2 **PSM/KW/23/2603**

Time : Three Hours Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
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5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data whenever necessary.
9. Use of non programmable calculator is permitted.

1. a) Explain briefly how plane surveying differs form geodetic surveying. **6**

b) A steel Tape was exactly 35m long at 20ºC when supported throughout its length under a pull of 10kg. A line was measured with this Tape under a pull of 15kg at a mean Temperature of 32ºC and found to be 800m long. The cross-sectional area of Tape= $0.032cm^2$, and its total weight = 0.693kg, α for steel 11×10^6 per ºC and E of steel $= 2.1\times10^6$ kg/cm. Compute the True length of line when the Tape was supported During measurement at every (i) 15m (ii) 30m. **8**

OR

2. a) The following are the observed bearings of the lines of a traverse. ABCDEA with a compass in a place where local attraction was suspected. **8**

Line	FB	BB
AB	191º45’	13º0’
BC	39º30’	222º30’
CD	22º15’	200º30’
DE	242º45’	62º45’
EA	330º15’	147º45’

Find the correct bearings of the lines.

b) Describe the construction of optical square and explain how to use it in field. **6**

3. a) What are the permanent adjustments of theodolite? Explain any one adjustment in detail. **6**

b) Following notes refer to theodolite surveying. **8**

Line	Length (m)	Bearing
AB	100.0	?
BC	80.50	140º30’
CD	60.25	220º30’
DA	?	310º15’

Calculate the distance DA and bearing of AB

OR

4. a) A tacheometer was set up at a station 'A' and the reading on the vertically held staff at 'B' were 2.255, 2.605 and 2.955 the line of staff being at an inclination of +8º24', another observation on the vertically held staff at C gave the reading 1.640, 1920 and 2.200 the inclination of line of sight being +1º06'. Calculate horizontal distance between A and B and elevation of 'B' if the RI, of 'C' is 418.685. The constant of instrument were 100 and 0.3. **6**

b) What are the different types of curves? Draw neat sketches of each. Explain all the types in brief. **6**

5. a) The following are the consecutive staff reading observed with a 4m levelling staff at a common interval of 30m 0.525m, on A, 0.936, 1.953, 2.846, 3.644, 0.962, 2.534, 3.844, 0.956, 1.579 and 3.016m on B. The elevation of point A is 120m. Make a level Book and apply usual-check. Determine the Gradient of Line AB. **7**

b) The following offsets are taken from a survey line to a curved boundary line: **7**

Dist. (m)	0	5	10	15	20	30	40	60	80
Offset (m)	2.5	3.80	4.60	5.20	6.10	4.70	5.80	3.90	2.20

Find the area between the survey line, the boundary line, and first and the last offsets by-

i) Trapezoidal rule ii) Simpson's rule

OR

6. a) The following notes refer to reciprocal levels. **8**

Instrument at	Staff reading at		Remark
	A	B	
A	1.055	1.655	Distance AB = 1500m
B	0.940	1.550	RL of A = 220.250m

Find:

i) True RL of point B

ii) Combined correction for curvature and refraction

iii) Error in line of collimation

b) Explain with neat sketches of characteristics of contour. **6**

7. a) What is GPS, suggest possible users of a GPS and how it might benefit them. **7**

b) Describe the salient features of a total station and explain how angles are measured using it. **7**

OR

8. a) Describe the process of contouring using total station. **8**

b) How do you find the errors in total station. **6**

9. a) Explain GIS and its components. **7**

b) What are the various applications of Remote Sensing. **7**

OR

10. a) What are the various Principles of LiDAR. **7**

b) What is UAV Drone and write its applications. **7**

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