B.Tech. Fourth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Concrete Technology

P. Pages : 2 **MSP/KS/23/2559**

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. Illustrate your answers whenever necessary with the help of neat sketches.
10. Use of non programmable calculator is permitted.

1. a) List the various types of cements? Explain any two types of cement in brief. **7**

b) What are the Bogue's compounds of cement? Discuss their role in hydration of cement. **7**

OR

2. a) Explain bulking of sand in detail. **7**

b) Explain in brief plasticizers and superplasticizers. **7**

3. a) Explain the factors affecting the workability of concrete? **7**

b) Define segregation and bleeding in concrete? Explain the causes of segregation and bleeding. **7**

OR

4. a) What are the factors affecting the compressive strength of concrete? Explain. **7**

b) Write working principle of "Rebound Hammer" Test on concrete with its limitations? **7**

5. a) Enlist the factors governing the design of concrete mix? **7**

b) What are the significance of fly-ash and pozzolan in view of quality of concrete. **7**

OR

6. a) Explain concrete mix design procedure as per IS 10262 : 2009. **7**

b) Briefly describe design of concrete mixes with fly ash. **7**

7. a) Explain in brief "self compacting concrete". **7**

b) Write a note on cold and hot weather concreting. **7**

OR

8. a) Explain "Ready Mixed concrete". **7**

b) Write a note on "Fibre Reinforced concrete and pumped concrete". **7**

9. a) Explain crack repair by grouting and sealing. **7**

b) Write briefly the purpose and procedure for the damage assessment in concrete element. **7**

OR

10. a) Explain common cause of cracking or damage concrete. **7**

b) Explain briefly the strengthening of deficient structures. **7**

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B.Tech. Fourth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Structural Analysis

P. Pages : 3 | **MSP/KS/23/2560**

Time : Three Hours | Max. Marks : 70

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8. Assume suitable data whenever necessary.
9. Use of non programmable calculator is permitted.

1. Analyse the continuous beam as shown in fig. 1 by using three moment equation and draw BMD assume uniform EI. **14**

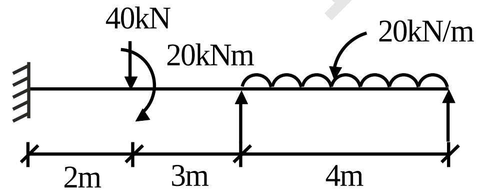

Fig. 1

OR

2. A continuous beam is shown in fig. 2 If support B sink by 10 mm, find the moments and reaction at support & Draw BMD using three moment theorem. **14**

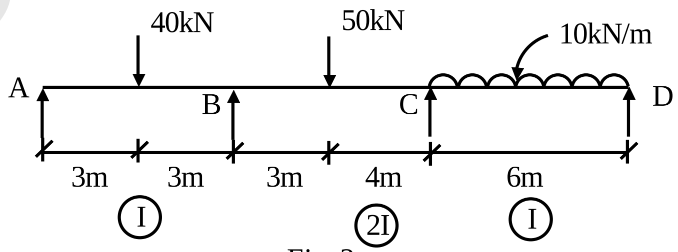

Fig. 2

3. Analyse the portal frame by Slope deflection method. Draw BMD. Fig. 3 **14**

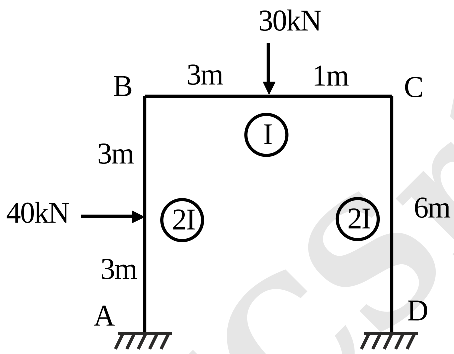

Fig. 3

OR

4. Analyse the continuous beam shown in fig. 4 by using moment distribution method. Draw BMD. **14**

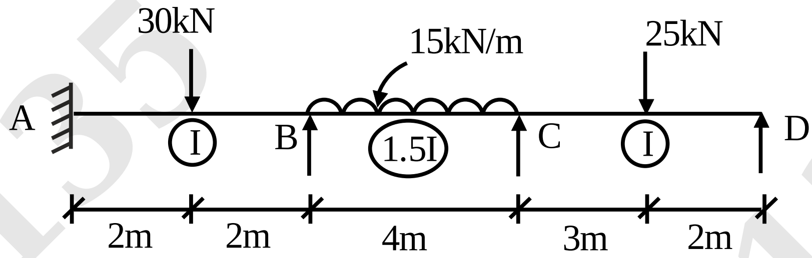

Fig. 4

5. Five rolling loads as shown in fig. 5 are crossing a simply supported beam of moving from left to right 15m span calculate. **14**

i) Maximum '+' ve and '−' ve SF at 5m from left support.

ii) Max BM at 5m from left support.

iii) Absolute max^{m} BM anywhere in the span.

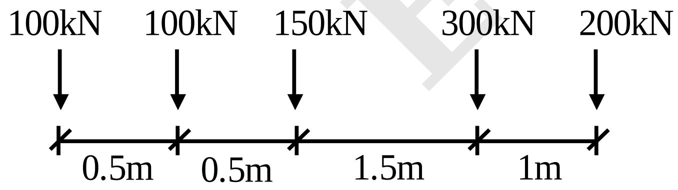

Fig. 5

OR

6. Draw the influence lines for the forces in members U_2 U_3, L_2, L_3 & U_2 L_3 of truss as shown in fig. 6. If live load of 6.5kN/m longer than the span. Transverses the girder find maximum values of forces in the members mentioned above **14**

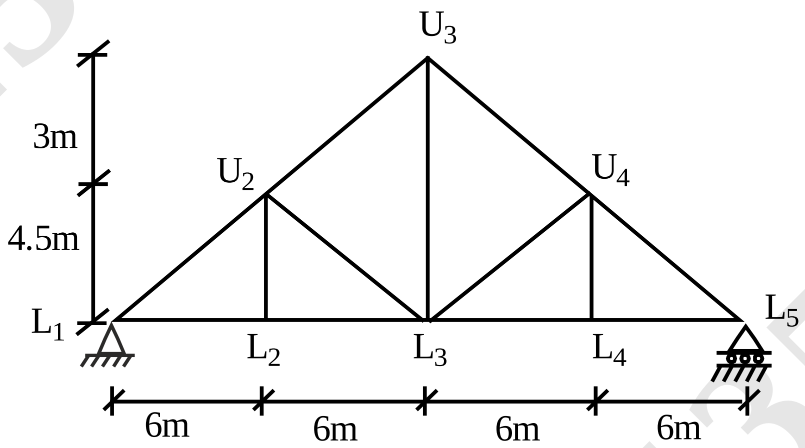

Fig. 6

7. a) Derive member stiffness matrix for a prismatic plane beam element. **7**

b) Derive rotation transformation matrix for plane beam element. **7**

OR

8. Assemble global displacement matrix for plane beam loaded is shown in fig. 7 using stiffness method. **14**

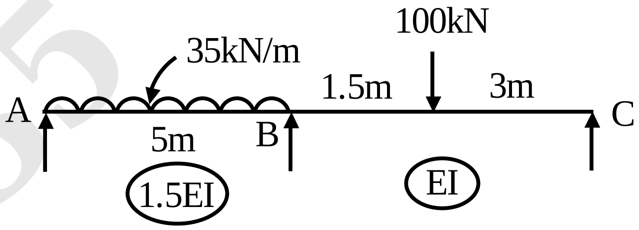

Fig. 7

9. Determine the final member forces for the truss shown in fig. 8 by stiffness method take $A = 200\text{mm}^2$ $E = 8000\text{kN}/\text{mm}^2$. **14**

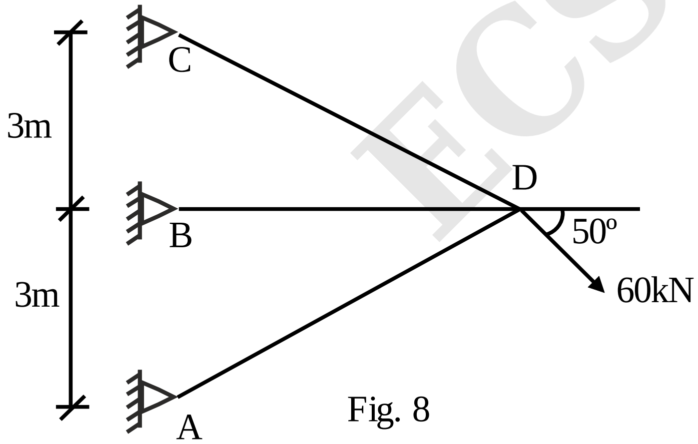

Fig. 8

OR

10. Calculate the forces in the member of truss as shown in fig. 9 by stiffness matrix method take cross section area of member is 1000mm^2 and $E = 200\,\text{kN}/\text{mm}^2$. **14**

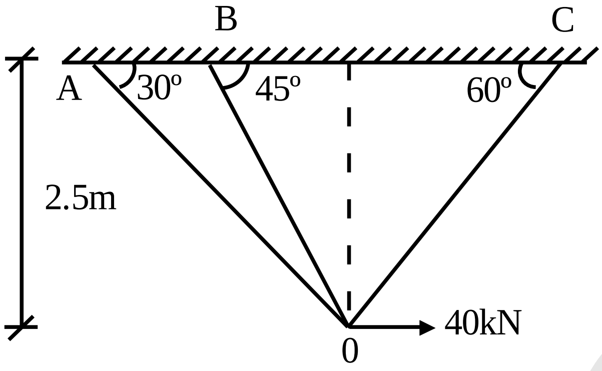

Fig. 9

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B.Tech. Fourth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Environmental Engineering

P. Pages : 2

Time : Three Hours

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MSP/KS/23/2561

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. 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) Enlist the various types of water demand. Explain the various factors affecting the water demand. **7**

b) Determine the population of a city in 2051 by arithmetic increase method & geometric increase method. **7**
The data from census record for the city is as follows.

Year	1991	2001	2011	2021
Population	11000	14500	18000	21000

OR

2. a) Discuss the major objectives of water treatment, what are the components of water supply scheme? **7**

b) Design a plain sedimentation tank for a population of 2 lakh with water supply rate 200 lpcd. Assuming detention period = 60 minutes. Velocity = 50 cm/min. and depth = 3.5 m. **7**

3. a) Write a short notes on various types of coagulant? **4**

b) Difference between Slow sand filter and Rapid sand filter. **5**

c) What is disinfection? Explain any two. **5**

OR

4. a) Explain the layouts of various water distribution system. **5**

b) With neat sketch explain the working of a Rapid sand filter. **5**

c) Draw a flow sheet of conventional plant water treatment. **4**

5.	a)	Define sewer, sewage & sewerage system.	**5**
	b)	Describe conservancy system & water carriage system.	**5**
	c)	With neat sketch explain inverted syphons.	**4**

OR

6.	a)	Write down the merits and demerits of separate and combined system.	**5**
	b)	Enlist the sewer appurtenances with sketches.	**4**
	c)	Explain physical and chemical characteristics of water.	**5**
7.	a)	Draw a flow sheet of sewage treatment plant.	**5**
	b)	A grit chamber is to be designed for a flow of 10 MLD. The chamber is designed to remove particles of 0.35 mm diameter and specific gravity 2.65.	**5**
	c)	Explain which factor are consider for site selection for sewage treatment plant.	**4**

OR

8.	a)	Explain activated sludge process.	**5**
	b)	Explain the importance of self cleansing velocity.	**5**
	c)	What are the different types of privies? Explain in short.	**4**
9.	a)	What is Air Pollution? Classify sources of Air pollution.	**5**
	b)	Explain various land disposal methods of sewage.	**5**
	c)	Write short note on climate change.	**4**

OR

10.	a)	Discuss the effect of air pollution on human health.	**5**
	b)	Write short notes on industrial waste water treatment.	**5**
	c)	What is environmental management system.	**4**

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B.Tech. Fourth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Transportation Engineering

P. Pages : 2 **MSP/KS/23/2562**

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. Illustrate your answers whenever necessary with the help of neat sketches.
10. Use of non programmable calculator is permitted.
11. Use IRC 37/58.

1. a) What are the ideal requirement of an alignment? Explain discuss the obligatory points in details. **7**

b) What are the planning surveys? Enlist various planning survey. Explain engineering survey in details. **7**

OR

2. a) Explain in details first 20 years Road development plan and it's silent features. **7**

b) Discuss how to judge suitability of subgrade soil with the help of Group index method. **7**

3. a) Design a super elevation for a design speed of 100 kmph and ruling minimum radius. **7**

b) State the primary & secondary objectives of providing transition curve. **7**

OR

4. a) In vertical alignment of two gradients a vertical summit curve is formed at their intersection. The gradients are 4% & –6%. The design speed on same section of road is fixed as 100kmph design the length of summit curve to provide stopping sight distance. **7**

b) Explain camber? What are the objectives of camber? Discuss the factors on which amount of camber to be provided. **7**

5. a) Describe in detail traffic volume study. State significance 30th highest hourly volume traffic. **7**

b) Explain how the static & dynamic characteristics of vehicle affects the safe driving. **7**

OR

6.	a)	Discuss the parking study in details.	**7**
	b)	Discuss road user characteristics in details.	**7**
7.	a)	What do you understand by permanent way? Discuss the requirements of ideal permanent way.	**7**
	b)	Define 'Gauge' of railway track what are the factors which affect the selection of gauge.	**7**

OR

8.	a)	What are the objectives of providing ballast in the permanent way. Also discuss the various types of ballast.	**7**
	b)	On BG 3 degree curve the equilibrium cant is provided for speed of 70 kmph. a) Calculate the value of equilibrium cant. b) What would be the maximum permissible speed on track.	**7**
9.	a)	What do you understand by terminal area? What facilities are provided in this area?	**7**
	b)	Enumerate the various factors which are to be considered while selecting a suitable site for an airport. Explain in brief.	**7**

OR

10.	a)	Calculate actual runway length required if new airport is to be developed at site. i) Elevation = 1400m ii) ART = 37ºC iii) Basic runway length = 2500m iv) Effective gradient = 0.38%	**7**
	b)	What are the different parking system for an aircraft? Discuss any one in detail.	**7**

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

Surveying & Geomatics

P. Pages : 2

Time : Three Hours

MSP/KS/23/2563

Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
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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) What is the principle of Surveying? Explain in detail. **6**

b) The following bearings were observed in running a close traverse. **8**

Line	F.B.	B.B.
AB	75º 50’	254º 20’
BC	115º 20’	296º 35’
CD	165º 35’	344º 50’
DE	224º 50’	44º 50’
EA	304º 50’	125º 50’

At what stations do you suspect the local attraction? Determine the correct magnetic bearings. If declination was 5º 10’E, what are the true bearings.

OR

2. a) The area of an old map plotted to a scale of 20 m to 1 cm measures now as $1050\,cm^2$ as measured by planimeter. The plan is found to have shrunk so that a line originally 10 cm long now measures 9.20 cm only further 20 m chain used was 5 cm to short. Find the true area of the land. **7**

b) State the Principle of plane table surveying. Explain Radiation method to measure area of given field. **7**

3. a) What are the various methods of measurement of horizontal angle? Explain any one method in detail. **7**

b) Two points A and B are on opposite sides of P. The tacheometer was set up at P on and the following readings were taken. **7**

Inst. Station	Height of Inst.	Staff Station	Vertical angle	Hair Reading
P	1.500	A	+4º 30’	1.120, 2.150, 3.550
P	1.500	B	+8º 30’	0.855, 1.605, 2.450

The tacheometer is fitted with an analytic lens, the multiplying constant being 100 and additive constant C=0. The staff was held vertical. R.L. of point P is 150.50m.

Find : a) The distance AB b) The gradients of line AB.

OR

4. a) What are the various types of Curve? Explain any one curve with neat sketch. **7**

b) The following records are obtained in traverse survey, where the length and bearing of a last line were not recorded: **7**

LINE	LENGTH	BEARING
AB	95.50	30º20'
BC	150.50	110º30'
CD	70.25	210º30'
DA	?	?

Compute the length and bearing of line DA.

5. a) The following consecutive readings were taken with a level and 4m leveling staff on continuously sloping ground at common interval of 30m. 0.380, 0.755, 2.350, 2.925, 3.480, 0.560, 1.265, 1.895, 2.530, 2.875, 3.730, 0.625, 2.105, 3.110, 3.855. The R.L. of first point is 150.00m. Calculate R.L of other points in a level page and also determine the gradient of line. **8**

b) What are the temporary adjustments in auto level? Explain in detail. **6**

OR

6. a) An observer standing on the deck of a ship just sees a light house. The top of the light house is 42m above the sea level and height of the observer's eye is 3m above the sea level. Find the distance of the observer from the light house. **6**

b) What are the characteristics of contours? Explain with neat sketches. **8**

7. a) What are the uses of Total Station? Explain how to measure the area of field using total station. **7**

b) What are the various types of total station? Explain working principle. **7**

OR

8. Explain the following.
   i) GPS **4**
   ii) DGPS **5**
   iii) Real Time Kinematic (RTK) Survey. **5**

9. a) Explain Remote Sensing and its application. **7**

b) Explain GIS and its application. **7**

OR

10. Explain the following.
    i) UAV Drone and its applications. **7**
    ii) LiDAR survey and its applications. **7**

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