Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering / Science
End Sem Examination Dec 2024
EN3ES30 / BC3ES12
Basic Civil Engineering & Mechanics

Programme: B.Tech. / B.Sc. Branch/Specialisation: All

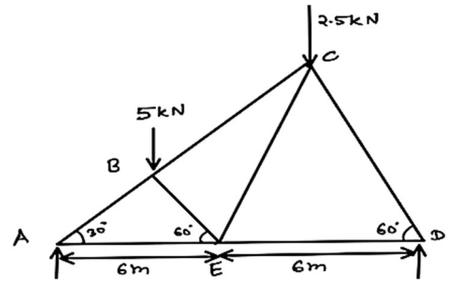
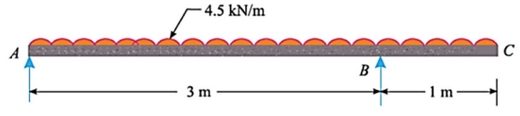
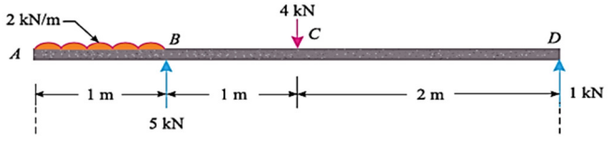
Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	PO	CO	PSO
Q.1	i.	What is the most dominant constituent of cement? (a) Silica (b) Lime (c) Magnesia (d) Alumina	**1**	02	01	01	
	ii.	The vertical portion between each tread on the stair is called: (a) Going (b) Nosing (c) Winder (d) Riser	**1**	01	01	01	
	iii.	The last reading taken from the instrument is called: (a) End sight (b) Free sight (c) Fore sight (d) Back sight	**1**	01	01	02	
	iv.	_____ instrument is used to sight to an object. (a) Compass (b) U-frame (c) Plumbing fork (d) Alidade	**1**	01	01	02	
	v.	Contours can be found in a _____ map. (a) Political (b) Topographical (c) Physical (d) None of these	**1**	01	01	02	
	vi.	Volume calculations can be done with the help of which method/s- (a) Trapezoidal (b) Prismoidal (c) Both (a) and (b) (d) None of these	**1**	01	01	02	
	vii.	The line of action of all the forces lie in the same plane is called- (a) Coplanar system of forces (b) Non coplanar forces (c) Collinear forces (d) Concurrent forces	**1**	01	01	03	

P.T.O.

	viii.	Which theorem is based on concurrency, equilibrium and collinearity principle? (a) Lami's theorem (b) Verignon's theorem (c) Themes theorem (d) All of these	**1**	01	01	03
	ix.	What will be the value of bending moment at supports of simply supported beam? (a) Zero (b) Maximum (c) Minimum (d) Cannot be calculated	**1**	01	01	04
	x.	A point where bending is zero and at the point of change between positive and negative- (a) Zero point (b) Point of inflection (c) Point of contraflexure (d) Neutral point	**1**	01	01	04
Q.2	i.	What do we understand by sub-structure and super structure?	**2**	02	01	01
	ii.	Explain any two types of cement. Write detailed procedure to find workability of cement concrete by slump cone test with different types of slump with neat diagrams.	**8**	02	01 02	02
OR	iii.	Write any three properties of steel. Draw and explain any five types of foundation in detail.	**8**	02	01 02	02
Q.3	i.	Write principles of surveying.	**2**	02	01	02
	ii.	Following consecutive staffs reading were taken with a level along a sloping ground line XY at a regular interval of 20m by using 4m levelling staff 0.352, 0.787, 1.832, 2.956, 3.758, 0.953, 1.766, 2.738, 3.872, 0.812, 2.325 and 3.137. The instrument was shifted after 5th & 9th readings. RL of point X is 120.280. Calculate RL of all points by rise and fall method.	**8**	03	01 02	02
OR	iii.	Explain two types of traverse with diagram. Also Differentiate between prismatic & surveyors compass (any 6).	**8**	02	01 02	02

Q.4	i.	The following offsets were taken to a curved boundary from a survey line: 0, 2.46, 3.78, 3.26, 4.40, 3.28, 4.24 and 5.20 m. Compute the area between curved boundary, survey line and offsets, if the offsets were taken at a regular interval of 10 m using trapezoidal rule.	**3**	03	01 02	04
	ii.	What do we understand by contour? Write any five properties with diagram.	**7**	02	01 02	02
OR	iii.	What do we understand by remote sensing and GIS? Write any three applications in detail.	**7**	02	01 02	01
Q.5	i.	Write the statement of Lami's theorem and formula with diagram.	**3**	02	01	04
	ii.	Write statement of Parallelogram law of forces. Derive the formula for magnitude and direction of resultant by analytical method with diagrams.	**7**	02	01 02	03
OR	iii.	Solve the truss as shown in figure and find force in member AB, AE, BE and BC: 	**7**	03	01 02	03
Q.6	i.	Define shear force and bending moment.	**2**	02	01	04
	ii.	An overhanging beam ABC is loaded as shown in figure. Draw SFD and BMD. 	**8**	03	01 02	04
	iii.	A beam ABCD, 4m long is overhanging by 1 m and carries load as shown in figure. Draw SFD and BMD. 	**8**	03	01 02	04

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Marking Scheme

EN3ES30 Basic Civil Engineering and Mechanics

Q.1 i) b) Lime **1**

ii) d) Riser **1**

iii) c) Fore sight **1**

iv) d) Alidade **1**

v) b) Topographical **1**

vi) c) Both **1**

vii) a) coplanar system of forces **1**

viii a) Lami's Theorem **1**

ix) a) Zero **1**

x) c) Point of Contraflexure **1**

Q.2 i. Sub-structure ----------1 mark **2**
super structure ----------1 mark

ii. 2 types of cement---------- -2 marks **8**
workability procedure with diagram------3 marks
types of slump diagrams ----------3 marks

OR iii. 3 properties of steel----------3 mark **8**
5 types of foundation with diagram -------5 mark

Q.3 i. 2 principles of surveying- ----------1 mark each **2**

ii. Correct table value input ----------2 marks **8**
Correct RL calculations ----------3 marks
Correct check calculations ----------3 marks

1. Σ B.S. –Σ F.S. = 2.117 – 10.767 = -8.650
2. Σ Rise – Σ fall = 0.00 – 8.650 = -8.650
3. Last R.L. – First R.L. = 111.630 – 120.280 = -8.650

B.S.	I.S.	F.S.	Rise	Fall	R.L.	Remark
0.352					120.280	Point X
	0.787			(0.352-0.787) 0.435	(120.280-0.435) 119.845	
	1.832			(0.787-1.832) 1.045	(119.845-1.045) 118.800	
	2.956			(1.832-2.956) 1.124	(118.800-1.124) 117.676	
0.953		3.758		(2.956-3.758) 0.802	(117.676-0.802) 116.874	C.P.1
	1.766			(0.953-1.766) 0.813	(116.874-0.813) 116.061	
	2.738			(1.766-2.738) 0.972	(116.061-0.972) 115.089	
0.812		3.872		(2.738-3.872) 1.134	(115.089-1.134) 113.955	C.P.2
	2.325			(0.812-2.325) 1.513	(113.955-1.513) 112.442	
		3.137		(2.325-3.137) 0.812	(112.442-0.812) 111.630	Point Y
2.117		10.767		8.650		

OR iii. Types of traverse with diagram---------- 2 marks **8**
6 Difference ----------6 marks

Q.4 i. **Answer 240.5 m^2** ----------3 marks **3**

P.T.O.

$$\left[\frac{0.0 + 5.20}{2} + 2.46 + 3.78 + 3.26 + 4.40 + 3.28 + 4.27\right]10$$

240.5 m²

ii. Definition ----------2 marks **7**
5 properties with diagram ----------5 marks

OR iii. Remote sensing ----------2 marks **7**
GIS ----------2 marks
3 Applications ---------- 3 marks

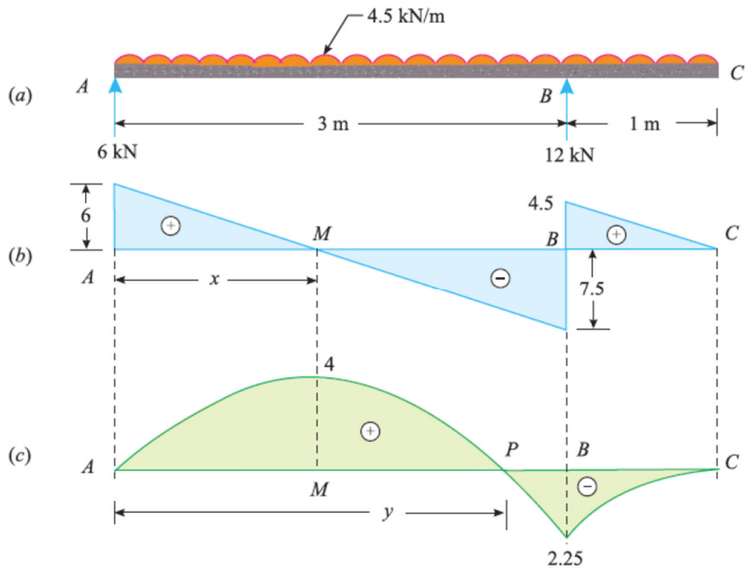
Q.5 i. Statement of Lami's Theorem----------1 mark **3**
Formula ----------1 mark
Diagram ----------1 mark

ii. Statement ----------2 marks **7**
Derivation with diagram ----------5 marks

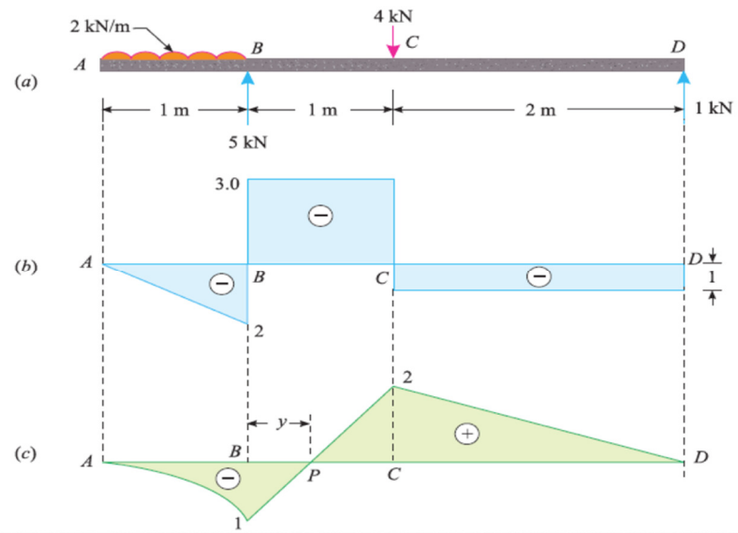
OR iii. Support reactions **R_A = 3.75 kN, R_D = 3.75 kN** ----------3 marks **7**
Forces in members ----------1 mark each (4)
F_{AB} = -7.5 kN, F_{AE} = 6.495 kN , F_{BC} = -5 kN, F_{BE} = -4.33 kN

Q.6 i. Definition of SF & BM ----------1 mark each **2**

ii. Support reactions **R_A = 6 kN, R_B = 12 kN** ----------2 marks **8**
SFD with correct values----------3 marks
BMD with correct values----------3 mark



iii. Support reactions **R_B = 5 kN, R_D = 1 kN** ----------2 marks **8**
SFD with correct values----------3 marks
BMD with correct values----------3 marks



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