

Enrollment No.....



Faculty of Engineering  
End Sem (Even) Examination May-2022  
EN3ES01 Basic Civil Engineering

Programme: B.Tech.

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.

- Q.1 i. Mixing ratio for M-20 Grade concrete is- 1  
 (a) 1:1:2 (b) 1:3:6 (c) 1:1.5:3 (d) 1:4:8
- ii. Innermost part of timber log surrounding the pitch is called- 1  
 (a) Sapwood (b) Cambium layer  
 (c) Heart wood (d) Pith
- iii. Closed Contours of decreasing values towards their centre, 1  
 represents-  
 (a) A Hill (b) A depression  
 (c) A saddle or pass (d) Plane
- iv. Reduced level of a point having staff reading of 1.335 m with 1  
 BS = 2.330 m and RL of BM = 202.45 m.  
 (a) 203.545 m (b) 203.555 m (c) 203.445 m (d) 203.645 m
- v. Which of the following is not a load carrying component of a 1  
 building?  
 (a) Column (b) Beam (c) Wall (d) Slab
- vi. Foundation used in case of Low bearing capacity of soil. 1  
 (a) Raft foundation (b) Strap foundation  
 (c) Strip foundation (d) None of these
- vii. Forces passing through a common point are known as- 1  
 (a) Concurrent forces (b) Balanced Forces  
 (c) Collinear forces (d) Coplanar forces
- viii. The ratio of lateral strain to longitudinal strain is- 1  
 (a) Poisson's ratio (b) Bulk modulus  
 (c) Young's modulus (d) Shear modulus

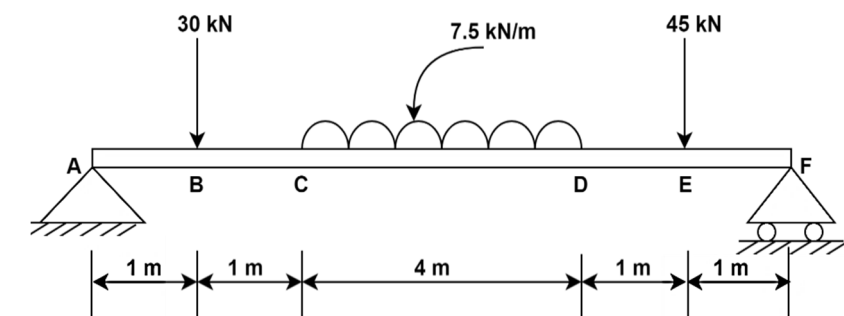
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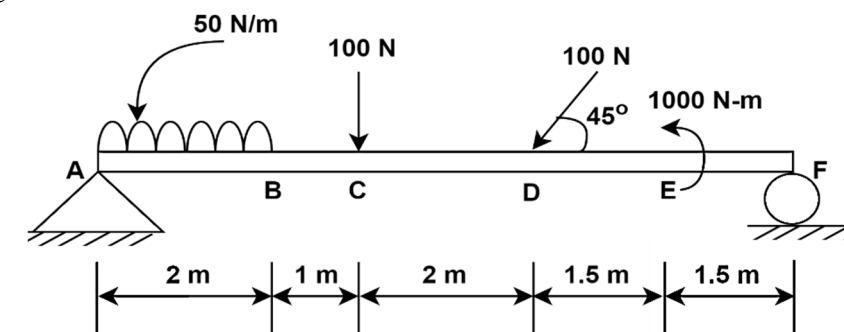
- ix. Shear force at any section includes- **1**  
 (a) Vertical forces (b) Horizontal forces  
 (c) Rotational forces (d) All of these
- x. The point at which the Bending moment diagram changes its nature and the value of bending moment is zero is known as **1**  
 (a) Point of inflexion (b) Point of contraflexure  
 (c) Sagging (d) Hogging
- Q.2 i. Write four characteristics of good brick. **2**  
 ii. Describe any four field test of cement. **3**  
 iii. Explain slump cone test procedure with diagram. **5**
- OR iv. Explain the following terms: **5**  
 (a) Workability (b) Rapid hardening cement  
 (c) Segregation of concrete (d) Efflorescence test  
 (e) Contour gradients
- Q.3 i. Define chain survey. **2**  
 ii. Following readings were taken during a compass survey for the traverse ABCDA. Analyse whether the traverse is affected by local attraction or not? If yes, correct all bearings by included angle method. **8**
- | LINE | AB       | BC       | CD       | DA       |
|------|----------|----------|----------|----------|
| FB   | 120° 30' | 77° 30'  | 306° 30' | 207° 30' |
| BB   | 300° 30' | 256° 00' | 125° 15' | 27° 45'  |
- OR iii. Calculate the reduced level of points and apply check by any of one method If following readings were taken on slopping ground 2.330, 1.550, 1.005, 2.200, 2.905, 1.110, 0.880, 1.550, 1.050, 2.555 and instrument was moved after 3<sup>rd</sup>, 6<sup>th</sup> and 8<sup>th</sup> reading take reduced level of Benchmark 55 m. **8**
- Q.4 i. Explain substructure and superstructure of a building in brief enlist the names of major components of a building that fall under substructure and super structure. **3**  
 ii. Explain the importance of foundation in any structure. Also enlist its broad classifications. **7**

[3]

- OR iii. Define floors and write it's components in details Explain any five types of flooring. **7**
- Q.5 i. Explain the following terms: **4**  
 (a) Stress (b) Strain  
 (c) Modulus of elasticity (d) Modulus of rigidity
- ii. State and prove Lami's Theorem. **6**
- OR iii. Resultant of two forces inclined at 90° is  $\sqrt{15}$  N and if inclined at 60° resultant is  $\sqrt{18}$  N. Calculate the magnitude of forces. **6**
- Q.6 i. Define beam. Enlist its major types. **2**  
 ii. Draw shear force diagram and bending moment diagram for the beam given below: **8**



- OR iii. Draw shear force diagram and bending moment diagram for the beam given below: **8**



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**Marking Scheme**  
**EN3ES01 Basic Civil Engineering**

Q.1	i.	Mixing ratio for M-20 Grade concrete is- (c) 1:1.5:3	<b>1</b>
	ii.	Innermost part of timber log surrounding the pitch is called- (c) Heart wood	<b>1</b>
	iii.	Closed Contours of decreasing values towards their centre, represents- (b) A depression	<b>1</b>
	iv.	Reduced level of a point having staff reading of 1.335 m with BS = 2.330 m and RL of BM = 202.45 m. (c) 203.445 m	<b>1</b>
	v.	Which of the following is not a load carrying component of a building? (c) Wall	<b>1</b>
	vi.	Foundation used in case of Low bearing capacity of soil. (a) Raft foundation	<b>1</b>
	vii.	Forces passing through a common point are known as- (a) Concurrent forces	<b>1</b>
	viii.	The ratio of lateral strain to longitudinal strain is- (a) Poison's ratio	<b>1</b>
	ix.	Shear force at any section includes- (a) Vertical forces	<b>1</b>
	x.	The point at which the Bending moment diagram changes its nature and the value of bending moment is zero is known as (b) Point of contraflexure	<b>1</b>
Q.2	i.	Four characteristics of good brick. 0.5 mark for each point (0.5 mark * 4)	<b>2</b>
	ii.	Any four field test of cement. 0.75 mark for each point (0.75 mark * 4)	<b>3</b>
	iii.	Slump cone test procedure Diagram 1 mark	<b>5</b>
OR	iv.	(a) Workability 1 mark	<b>5</b>
		(b) Rapid hardening cement 1 mark	
		(c) Segregation of concrete 1 mark	
		(d) Efflorescence test 1 mark	
		(e) Contour gradients 1 mark	

Q.3	i.	Definition of chain survey.	<b>2</b>
	ii.	Following readings were taken during a ..... 1 mark for each step	<b>8</b>
OR	iii.	Calculate the reduced level of points and apply check by any of one method 1 mark for each step	<b>8</b>
Q.4	i.	Substructure with major components 1.5 marks	<b>3</b>
		Superstructure with major components 1.5 marks	
	ii.	Importance of foundation 2 marks	<b>7</b>
		Its broad classifications 5 mrks	
OR	iii.	Define floors 3 marks	<b>7</b>
		It's components any five types of flooring 4 marks	
Q.5	i.	(a) Stress 1 mark	<b>4</b>
		(b) Strain 1 mark	
		(c) Modulus of elasticity 1 mark	
		(d) Modulus of rigidity 1 mark	
	ii.	State and prove Lami's Theorem. 1 mark for each step	<b>6</b>
	OR iii.	Calculate the magnitude of forces 1 mark for each step	<b>6</b>
Q.6	i.	Definition of beam and its major types.	<b>2</b>
	ii.	Draw shear force diagram and bending moment diagram for the beam 1 mark for each step	<b>8</b>
OR	iii.	Draw shear force diagram and bending moment diagram for the beam 1 mark for each step	<b>8</b>

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Q3(iii)

	2
	8
	8

BS	IS	FS	HI	R.L	Remark
2.330			57.330	55	B.M

1.55

55.78

2.200

1.005 58.525 56.325

2.905

~~55.62~~ 55.62

0.880

1.110 58.295 57.415

1.050

1.550 57.795 56.745

2.555

55.24

6.48

6.22

$\Sigma BS - \Sigma FS$

$=$  ~~first~~

last R.L  
- first R.L

$0.24 = 0.24$

30 + 120 +

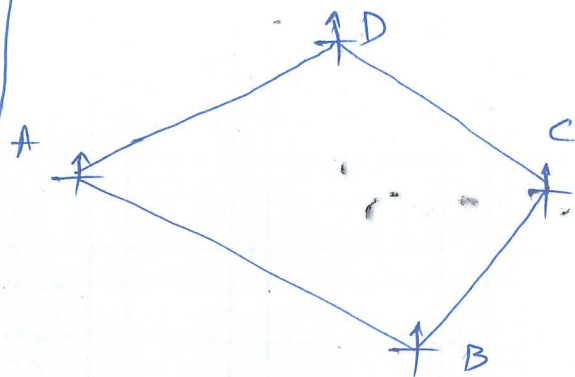
~~444~~  
315

5  
8  
5  
11  
58.125



Ques. 3 (ii)

Q. Line	BFB	BB	Diff.
AB	120°30'	300°30'	180°
BC	77°30'	256°00'	178°30'
CD	306°30'	125°15'	181°15'
DA	207°30'	27°45'	179°45'



— (1) marks.

Included angles.

$$\angle A = \text{BB of DA} - \text{FB of AB} \\ = -92^\circ 45' \text{ (anticlockwise)}$$

$$\angle B = \text{BB of AB} - \text{FB of BC} \\ = 223^\circ - 360^\circ = -137^\circ \text{ (anticlockwise)}$$

$$\angle C = \text{BB of BC} - \text{FB of CD} = -50^\circ 30' \text{ (anticlockwise)}$$

$$\angle D = \text{BB of CD} - \text{FB of DA} = -82^\circ 15' \text{ (anticlockwise)}$$

— (2) marks.

check for included angles.

$$\angle A + \angle B + \angle C + \angle D = 362^\circ 30'$$

$$\text{Theoretical sum} \rightarrow (2n-4)90^\circ = n=4 \\ = 360^\circ$$

$$\text{error} = 362^\circ 30' - 360^\circ = 2^\circ 30' \left[ \frac{2^\circ 30'}{4} = 0^\circ 37' 30'' \right]$$

Hence correction is required in all included angles.

corrected included angles

$$\angle A = 92^\circ 45' - 0^\circ 37' 30'' = 92^\circ 7' 30''$$

$$\angle B = 136^\circ 22' 30''$$

$$\angle C = 49^\circ 52' 30''$$

$$\angle D = 81^\circ 37' 30''$$

— (2) marks



Line AB is free from local attraction

$$\begin{aligned}\text{Corrected FB of AB} &= 120^\circ 30' \\ \text{corrected BB of AB} &= 300^\circ 30'\end{aligned}$$

Now

$$\begin{aligned}\text{corrected FB of BC} &= \text{BB of AB} - \angle B \\ &= 300^\circ 30' + 136^\circ 22' 30'' - 360^\circ \\ &= \cancel{164^\circ 52' 30''} \\ &= 76^\circ 52' 30''\end{aligned}$$

$$\begin{aligned}\text{corrected BB of BC} &= 76^\circ 52' 30'' + 180^\circ \\ &= 256^\circ 52' 30''\end{aligned}$$

$$\begin{aligned}\text{corrected FB of CD} &= \text{BB of BC} - \angle C \\ &= 256^\circ 52' 30'' + \cancel{50^\circ 30'} 49^\circ 52' 30'' \\ &= \cancel{307^\circ 22' 30''} 306^\circ 45' 00''\end{aligned}$$

$$\begin{aligned}\text{corrected BB of CD} &= 306^\circ 45' 00'' - 180^\circ \\ &= \cancel{126^\circ 45' 00''} 126^\circ 45' 00''\end{aligned}$$

$$\begin{aligned}\text{corrected FB of DA} &= \text{BB of CD} - \angle D \\ &= \cancel{126^\circ 45' 00''} - (-81^\circ 37' 30'') \\ &= 208^\circ 22' 30''\end{aligned}$$

$$\begin{aligned}\text{corrected BB of DA} &= 208^\circ 22' 30'' - 180^\circ \\ &= 28^\circ 22' 30''\end{aligned}$$

(2) marks

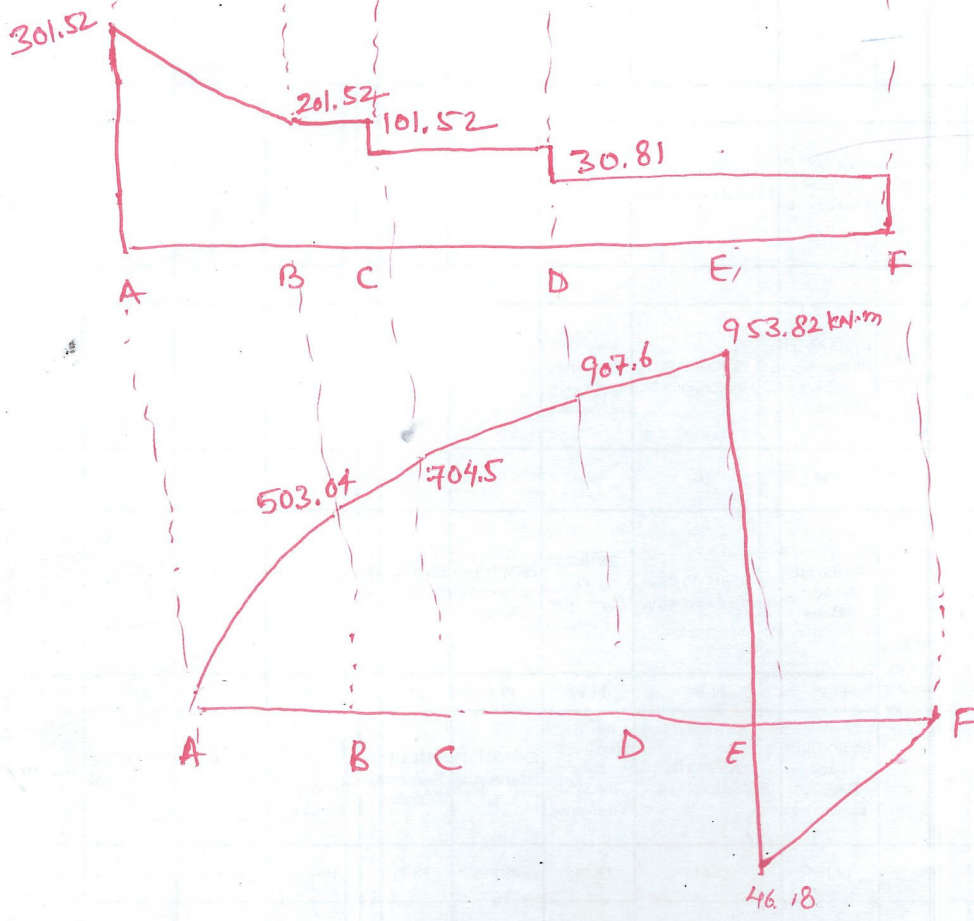
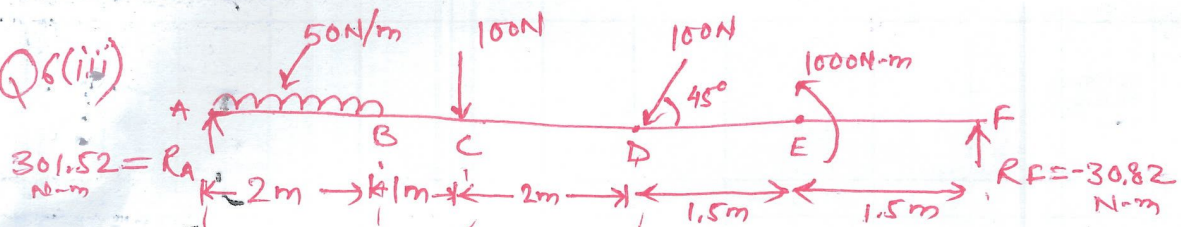
Corrected Bearings

Line	FB	BB
AB	120°30'	300°30'
BC	76°52'30"	256°52'30"
CD	306°45'00"	126°45'00
DA	208°22'30"	28°22'30"

(1) marks



Q6(iii)



Q6(ii)

