

Faculty of Engineering / Science

End Semester Examination May 2025

EN3ES30 / BC3ES12 Basic Civil Engineering & Mechanics

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|------------------|---|------------------|------------------------------|---|-----|
| Programme | : | B.Tech. / B. Sc. | Branch/Specialisation | : | All |
| Duration | : | 3 hours | Maximum Marks | : | 60 |

Note: All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary.
 Notations and symbols have their usual meaning.

| Section 1 (Answer all question(s)) | | | | Marks CO BL |
|---|--|---|--|--------------------|
| Q1. Which bouges compound is responsible for resisting chemical attacks specially sulphate attack in cement? | | | | 1 1 1 |
| <input type="radio"/> Di Calcium Silicate <input type="radio"/> Tri Calcium Silicate | | <input checked="" type="radio"/> Tetra Calcium Alumino Ferrite <input type="radio"/> Tri Calcium Aluminate | | |
| Q2. Which one of these is field test of brick? | | | | 1 1 1 |
| <input type="radio"/> When drop from 1 metre height it will not break <input type="radio"/> When 2 brick struck with each other metallic ringing sound came. | | <input type="radio"/> When scratching with finger on surface it will not create impression <input checked="" type="radio"/> All of the above | | |
| Q3. Which of these is fundamental principle of survey? | | | | 1 1 1 |
| <input checked="" type="radio"/> Working from whole to part <input type="radio"/> Traversing | | <input type="radio"/> Triangulation <input type="radio"/> All of the above | | |
| Q4. On which System of survey prismatic compass work on? | | | | 1 2 1 |
| <input type="radio"/> Quadrantal bearing system <input type="radio"/> Back bearing system | | <input type="radio"/> Fore bearing system <input checked="" type="radio"/> Whole circle bearing system | | |
| Q5. Which one of these is application of remote sensing? | | | | 1 1 1 |
| <input type="radio"/> Resource exploration <input type="radio"/> Site investigation | | <input type="radio"/> Environmental study <input checked="" type="radio"/> All of the above | | |
| Q6. Closely spaced contours indicates. | | | | 1 2 1 |
| <input type="radio"/> Uniform ground <input type="radio"/> Uneven ground | | <input checked="" type="radio"/> Steep ground <input type="radio"/> None of the above | | |
| Q7. Two or more forces whose line of action intersect at same point are called as- | | | | 1 1 1 |
| <input type="radio"/> Collinear forces <input type="radio"/> Parallel forces | | <input checked="" type="radio"/> Concurrent forces <input type="radio"/> Coplanar forces | | |
| Q8. The theorem used for equilibrium of particles applied with 3 concurrent coplanar force are- | | | | 1 2 1 |
| <input type="radio"/> Polygon law <input checked="" type="radio"/> Lamis theorem | | <input type="radio"/> Parallelogram law <input type="radio"/> Triangle law | | |
| Q9. When bending moment changes its sign and value of BM is zero then it is known as- | | | | 1 1 1 |
| <input checked="" type="radio"/> Point of contraflexure <input type="radio"/> Point of turning | | <input type="radio"/> Zero shear force point <input type="radio"/> None of the above | | |

Q10. Which type of lines is drawn for shear force diagram in case of uniformly varying load?

1 2 1

- 2 degree parabola
- 3 degree parabola
- Inclined lines
- Straight lines

Section 2 (Answer all question(s))

Q11. Write the constituents of cement with their percentage composition.

Marks CO BL
2 1 1

| Rubric | Marks |
|--|-------|
| Name of Constituents-1, Percentage share of constituents-1 | 2 |

Q12. Describe bogues compounds in brief.

3 2 1

| Rubric | Marks |
|---|-------|
| Name of the Bogues Compound-1, Description of Compounds-2 | 3 |

Q13. (a) Describe foundation and its four types in detail with diagrams.

5 2 1

| Rubric | Marks |
|--|-------|
| Define Foundation-1, Define Foundation types-2, Diagrams of foundation types-2 | 5 |

(OR)

(b) Define timber and explain all its constituents with a diagram of its cross section of timber.

| Rubric | Marks |
|--|-------|
| Timber definition-1, Explanation of constituents-2, Diagram of cross section-2 | 5 |

Section 3 (Answer all question(s))

Marks CO BL
3 2 1

Q14. Explain the two fundamental principles of survey.

| Rubric | Marks |
|---|-------|
| First Principle of Survey-1.5, Second Principle of Survey-1.5 | 3 |

Q15. (a) Following bearings are observed while traversing with compass. Find local attraction, included angle and corrected fore bearing and back bearing.

7 4 1

| Line | Fore Bearing | Back Bearing |
|------|--------------|--------------|
| AB | 126° 45' | 308°00' |
| BC | 49°15' | 227°30' |
| CD | 340°30' | 161°45' |
| DE | 258°30' | 78°30' |
| EA | 212°30' | 31°45' |

| Rubric | Marks |
|--|-------|
| Find Local Attraction-2, Find Corrected Fore bearing and Back bearing-2.5, Find Included Angle and corrections-2.5 | 7 |

(OR)

- (b)** The following staff readings were observed with a level and instrument was shifted by third, sixth and eighth staff readings.
 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684 m. Calculate R.L. of all the points if the first reading was taken at a B.M of 432.383 m.

| Rubric | Marks |
|---|-------|
| Entering of reading in table-2, Finding the Reduced Levels-2.5, Apply the Check on Reduced Levels-2.5 | 7 |

Section 4 (Answer any 2 question(s))

Marks CO BL

Q16. Define contours, and explain it's characteristics in detail.

5 3 1

| Rubric | Marks |
|--|-------|
| Define Contour-1, Explanation of characteristics-2, Diagrams-2 | 5 |

Q17. Define remote sensing, GIS and write its applications in detail.

5 4 1

| Rubric | Marks |
|---|-------|
| Definition of remote sensing and GIS-2, Applications minimum three with explanation-3 | 5 |

Q18. The perpendicular offsets taken at 10m intervals from survey line to a irregular boundary are 2.18 m , 3.2 m , 4.26 m, 6.2 m, 4.8 m, 7.2 m, 8.8 m, 8.2 m, and 5.2 m. Determine the area enclosed by trapezoidal and simpsons Rule.

5 4 1

| Rubric | Marks |
|---|-------|
| Area by trapezoidal rule-2.5, Area by simpsons rule-2.5 | 5 |

Section 5 (Answer all question(s))

Marks CO BL

Q19. State triangle law and polygon law with diagram.

4 3 1

| Rubric | Marks |
|---|-------|
| State Triangle Law with diagram-2, State Polygon Law with diagram-2 | 4 |

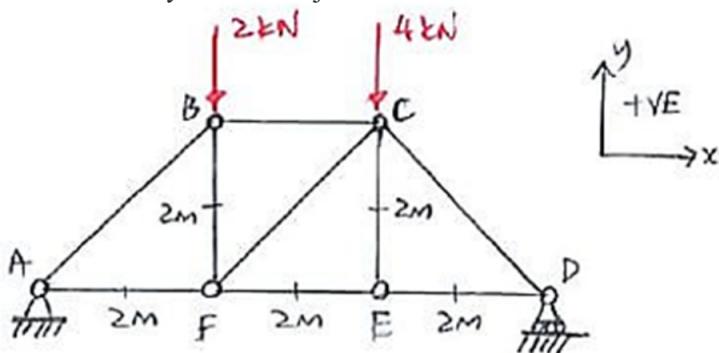
Q20. (a) State parallelogram law and derive its formula.

6 4 1

| Rubric | Marks |
|--|-------|
| Parallelogram Law Statement-2, Derivation of Parallelogram Law-3, Final relation-1 | 6 |

(OR)

- (b) Solve the truss by method of joint and determine forces in all the members.



| Rubric | Marks |
|---|-------|
| Find the reactions-2, Find the forces in every member-4 | 6 |

Section 6 (Answer all question(s))

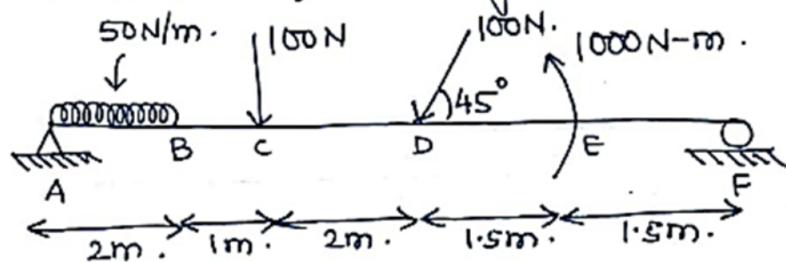
Marks CO BL

3 2 1

- Q21.** Define types of supports and load with diagram with reference to beam.

| Rubric | Marks |
|--|-------|
| Types of Supports-1.5, Types of Load-1.5 | 3 |

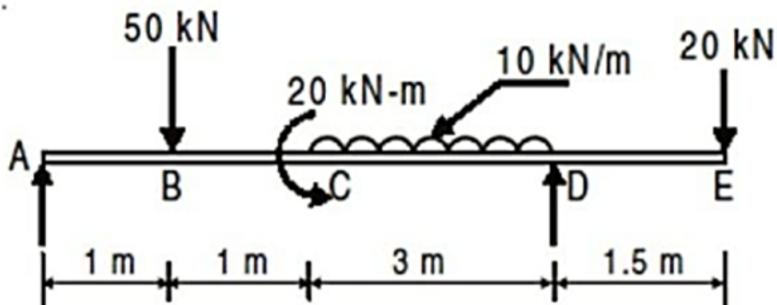
Q22. (a) Draw shear force and bending moment diagram by solving this beam.



| Rubric | Marks |
|--|-------|
| Reactions-1, Shear Force values and diagram-3, Bending Moment values and diagram-3 | 7 |

(OR)

(b) Draw shear force and bending moment diagram by solving this beam.



| Rubric | Marks |
|--|-------|
| Reactions at Supports-1, Shear Force values and diagram-3, Bending Moment values and diagram-3 | 7 |
