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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2021

MECHANICS OF SOLIDS

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

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|---|---|---------------------------------------------------|----|
| 1 | a | Define lames theorem and formula. | 2M |
| | b | Define parallel axis theorem with equation. | 2M |
| | c | Define determinate and indeterminate structures. | 2M |
| | d | Write general equation for three moment equation. | 2M |
| | e | What is degree of indeterminacy? | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- | | | |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 2 | Derive an expression for hoop and radial stresses across thickness of the thick cylinder. | 10M |
| OR | | |
| 3 | A thick spherical shell of 200 mm internal diameter is subjected to an internal fluid pressure of 7 N/mm ² . If the permissible tensile stress in the shell material is 8 N/mm ² , Find thickness of the shell. | 10M |

UNIT-II

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|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 4 | A masonry dam of rectangular section, 20 m high and 10 m wide, has water upto a height of 16 m on its one side find: | 10M |
| | i) Pressure force due to water on one-meter length of the dam. | |
| | ii) Position of centre of pressure. | |
| | iii) The position at which the resultant cuts the base and Maximum and minimum intensities at the base of the dam. Take weight density of masonry is 19.62 kN/m ³ and of water 9.81 kN/m ³ | |

OR

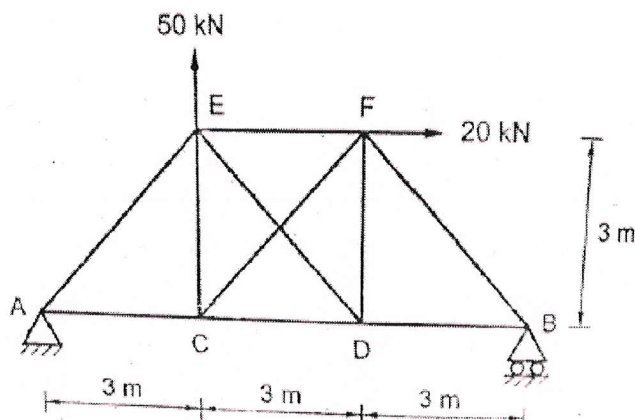
- | | | |
|---|----------------------------------------------------------------------------------------------|-----|
| 5 | Determine the centroidal moment of inertia of the equal section 30 x 30 x 10 mm ³ | 10M |
|---|----------------------------------------------------------------------------------------------|-----|

UNIT-III

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|---|------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 6 | Calculate the central deflection and slope at ends of a simply supported beam carrying a U.D.L. 'w' per unit length over the whole span. | 10M |
|---|------------------------------------------------------------------------------------------------------------------------------------------|-----|

OR

- | | | |
|---|--------------------------------------------------------------------------------------------------------|-----|
| 7 | Analyze the truss shown in Figure below. Assume that the cross sectional area of all members are same. | 10M |
|---|--------------------------------------------------------------------------------------------------------|-----|



UNIT-IV

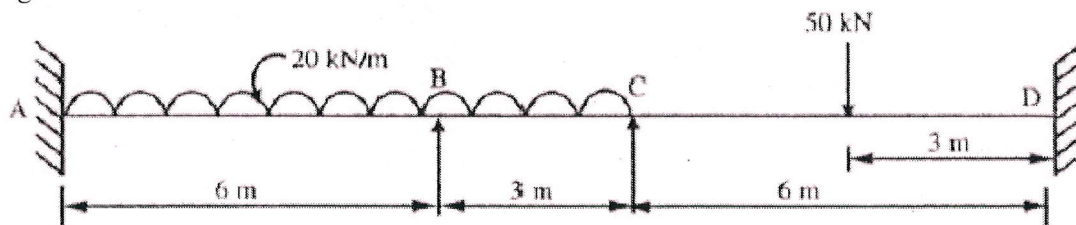
- 8 A Fixed beam of span **8 m** is subjected a **UDL** of **3 kN/m** on the left half of the span and a **10M**
point load of **8 kN** at the middle of the right half of the span. Draw the **SFD** and **BMD**.

OR

- 9 A continuous beam **ABC** of uniform section with span **AB** and **BC** as **5 m** each, is **10M**
fixed at **A** and simply supported at **B** and **C**. The beam is carrying a uniformly
distributed load of **8 kN/m** run throughout its length. Find the support moments and the
reactions using theorem of three moments. Also draw **SFD** and **BMD**.

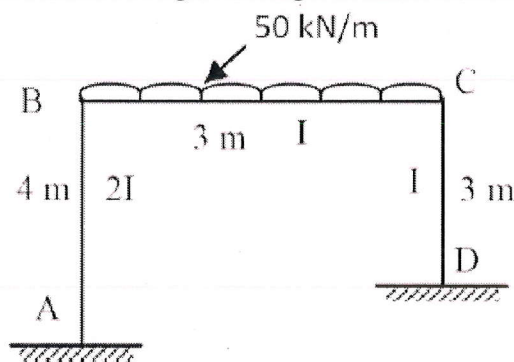
UNIT-V

- 10 Analyze the continuous beam as shown in figure below by slope deflection method. Support **B** **10M**
sinks by **10 mm**. Take **E = 200 GPa** and **I = 16 x 10⁷ mm⁴**. Draw the bending moment
diagram.



OR

- 11 Analyze the portal frame shown in figure using moment distribution method. **10M**



END

