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

B.Tech II Year I Semester Supplementary Examinations November 2020

INTRODUCTION TO SOILD MECHANICS

(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 Write the relationship between elastic constants (E, C and K). | 2M |
| | b Write brief about point of contra flexure. | 2M |
| | c Write the torsion formula explaining each letter. | 2M |
| | d The maximum deflection value when a cantilever subjected to point load (W) at free end. | 2M |
| | e Define slenderness ratio. | 2M |

PART-B

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

UNIT-I

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| 2 | A steel bar 60 mm wide, 10 mm thick and 400 mm long is subjected to an axial pull of 90 KN. Find the changes in length, width, thickness and the volume of the bar. The poisons ratio value is 0.25. | 10M |
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OR

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| 3 | The normal stress in two mutually perpendicular directions is 550 N/mm ² and 450 N/mm ² both are tensile. The complimentary shear stress in these directions is of 250 N/mm ² . Find the normal, tangential stresses on the two planes which are equally inclined to the planes carrying the normal stresses mentioned above. | 10M |
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UNIT-II

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| 4 | A beam is simply supported and carries a uniformly distributed load of 70 KN/mm run over the whole span. The section of the beam is rectangular having depth as 550 mm. If the maximum stress in the material of the beam is 130 N/mm ² and moment of inertia of the section is 7 X 10 ⁸ mm ⁴ , find the span of the beam. | 10M |
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| 5 | Derive the bending equation $M/I = f/y = E/R$. | 10M |
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UNIT-III

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| 6 | A solid circular shaft transmits 90 KW power at 190 rpm. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1° in 5 m length of shaft, and shear stress is limited to 50 N/mm ² . Take modulus of rigidity is 1 X 10 ⁵ N/mm ² . | 10M |
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| 7 | A rectangular beam 160 mm wide and 320 mm deep is subjected to a maximum shear force of 60 KN. Determine (i) average shear stress (ii) maximum shear stress. | 10M |
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UNIT-IV

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| 8 | A beam 5 m long, simply supported at its end, is carrying a point load of 55KN at its center. The M.I of the beam is 75 X 10 ⁶ mm ⁴ , E is 2.0 X 10 ⁵ N/mm ² . Calculate deflection of the beam at center and slope at supports. | 10M |
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OR

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| 9 | A simply supported beam carries a UDL of 40 KN/m over its entire span of 5.5m. Determine the slope at the ends and deflection at its center. | 10M |
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UNIT-V

10 Determine the Euler critical load for the column section having T-shape, flange 160 mm X 20 mm and web 150 mm X 20 mm. The length of the column is 5 m, the ends of column are both hinged in one case and another case is fixed. Take E is 2.0×10^5 N/mm². **10M**

OR

11 (i) What are the assumptions made in Euler theory. **10M**
(ii) Define the term column and what are the types of columns?
(iii) Write the effective length formula's for columns based on end conditions.

*****END*****