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**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING  
MID TERM EXAMINATION - OCT 2023**

**Semester :** Semester III - 2022

**Course Code :** MEC2011

**Course Name :** Sem III - MEC2011 - Mechanics of Solids

**Program :** B. TECH

**Date :** 31-OCT-2023

**Time :** 11:30AM - 1:00PM

**Max Marks :** 50

**Weightage :** 25%

**Instructions:**

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

**PART A**

**ANSWER ALL THE QUESTIONS**

**(5 X 2 = 10M)**

1. Mention any two examples of a statically determinate beam. (CO1) [Knowledge]
2. In MOS equations, materials are assumed to obey hooks law. State True or False. (CO1) [Knowledge]
3. Draw a fixed support and show the possible reactions that can develop on it. (CO1) [Knowledge]
4. Define point of contraflexure? (CO1) [Knowledge]
5. Differentiate between cantilever and simply supported beams. (CO2) [Knowledge]

**PART B**

**ANSWER ALL THE QUESTIONS**

**(4 X 5 = 20)**

6. Three equally spaced rods in the same vertical plane support a rigid bar AB. Two outer rods are of brass, each 600 mm long and of 25 mm in diameter. The central rod is of steel which is 800 mm long and 30 mm in diameter. Determine the forces in the rods due to an applied load of 120 kN through the midpoint of the bar. The bar remains horizontal after application of load. Take  $E_s/E_b = 2$  (CO1) [Comprehension]
7. How temperature stresses are different from normal stress? Explain (CO1) [Comprehension]

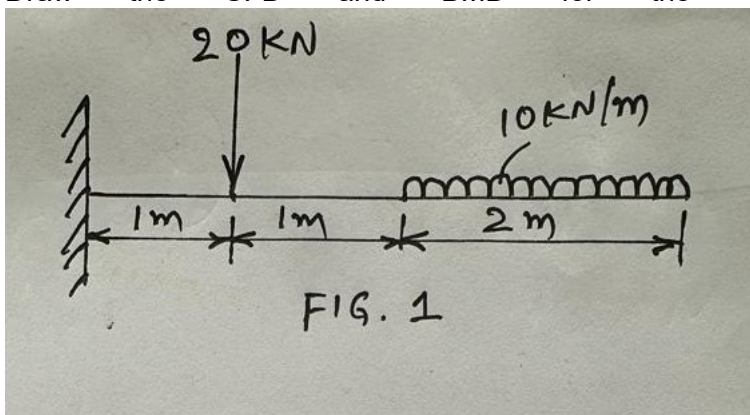
8. Give a note on temperature stresses and provide expression for temperature stress and strain.  
(CO1) [Comprehension]
9. Draw a simply supported beam of span 6 m such that it has two point loads. Each load is at equal distances from the two ends. Draw the SFD if both the loads are of 80 kN in magnitude.  
(CO2) [Comprehension]

### PART C

ANSWER ALL THE QUESTIONS

(1 X 20 = 20M)

10. 1. The following data refers to mild steel specimen tested in a laboratory. Diameter of specimen = 25 mm, gauge length of specimen = 300 mm, length of specimen after failure = 360 mm, extension observed under a load of 20 kN = 0.060 mm, load at yield point = 150 kN, load at failure = 252 kN and neck diameter at failure point = 18.25 mm. Determine (a) Young's Modulus, (b) Yield stress, (c) Ultimate stress, (d) percentage elongation, (e) percentage reduction of cross sectional area and (f) safe stress for a factor of safety of 2
2. Draw the SFD and BMD for the cantilever beam shown below



(CO2,CO1) [Application]