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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

SY-civil

Mid Semester Examination – September 2019

Course : B. Tech in CIVIL ENGINEERING **Semster : III**

Subject Name: Mechanics of Solid (SOM) **Subject Code: BTCVC302**

Max Marks: 20 **Date:** 5th October 2019 **Time: 11 am to 12 pm** **Duration: 1 Hour**

Instructions to the Students:

1. Assume suitable data wherever necessary and State it clearly.
2. Figures to Right Indicate full Marks.

QUESTIONS

Q. 1 **Attempt following Questions (6 Marks)** 6

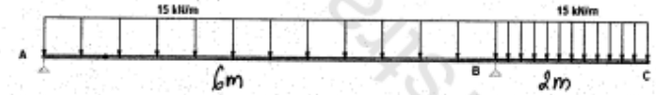
1. Define Normal Stress
2. Define Volumetric Strain
3. State the Relation between E, G and K
4. Define Shear Stress
5. State the Assumptions made in the Theory of Pure Torsion
6. Define Bulk Modulus

Q.2 **Solve ANY TWO of the following.** 6

(A) State the Assumptions made in the Theory of Pure Bending.

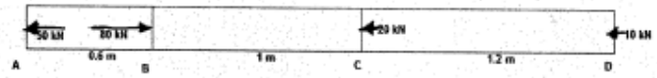
(B) A steel tie rod 40 mm in diameter and 2 meter long is subjected to a pull of 80 kN. To what length the bar should be bored centrally so that the total extension will increase by 20%

(C) Draw the Shear Force Diagram and Bending Moment for the Beam ABC. Support A and Support B are Roller Supports.



Q. 3 **Solve ANY ONE of the following.** 8

(A) A Brass bar having a cross sectional area of 1000 mm^2 is subjected to axial forces forces as shown in figure. Find the Total Change in Length of the Bar. Take E = 1.05 x 10^5 N/mm^2. At Point D, 10 kN load is acting towards Left



(B) A 3 meter high pole stands as a vertical cantilever fixed at its base. It has to support a horizontal load of 10 kN at its top. Find the minimum diameter required if the post is of wood, if the permissible bending stress is 15 N/mm^2. Alternatively, if a hollow aluminum tube whose thickness is one eighth of the external diameter, is provided, what would be the external and internal diameters of the tube? Permissible bending stress for aluminum is 50 N/mm^2.