

Roll No.

Total No. of Pages : 02

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B.Tech. (Agriculture Engg.) (Sem.-6)

STRENGTH OF MATERIALS

Subject Code : BTAG-605-19

M.Code : 91603

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Define deflection of a beam.
- b) What are types of beams?
- c) Define buckling load.
- d) What do you mean by equivalent length of a column?
- e) Define pitch of a riveted joint.
- f) What are different types of welded joints?
- g) Which failure occurs when the net horizontal force above any plane in the dam or at the base of the dam exceeds the frictional resistance developed at that level?
- h) What is uplift pressure in dams?
- i) Write the relationship between moment, slope and deflection.
- j) Define Flexural rigidity of beams.

SECTION-B

2. Explain conjugate beam method to find slope and deflection.
3. Calculate the safe compressive load on a hollow cast iron column one end rigidly fixed and other pin jointed, 150 mm outer and 100 mm inner diameter, 10 metres long. Use Euler's formula with a factor of safety of 5 and take, $E = 90 \text{ GN/m}^2$.
4. A horizontal girder of steel having uniform section is 14 m long and is simply supported at its ends. It carries concentrated loads of 120 kN and 80 kN at two points 3 m and 4.5 m from the two ends, respectively. For the section of the girder, $I = 16 \times 10^4 \text{ cm}^4$, and E for steel is 210 GPa. Calculate the deflection of the girder at points under the two loads.
5. Explain three moment equation for continuous beams.
6. A cantilever AB of span 6 m is fixed at the end A and propped at the end B. It carries a point load of 50 kN at the mid span. Level of the prop is the same as that of the fixed end. Find the reaction at the prop.

SECTION-C

7. Find the suitable pitch for a single riveted lap joint for plates 1 cm thick each, if safe working stress in tension in the plates and crushing and shearing of the rivet material are respectively 150 MN/m^2 , 212.5 MN/m^2 and 94.5 MN/m^2 in the following types of joints: (a) single riveted, (b) double riveted. Find out the efficiency of the joint in the above two cases.
8. A fixed beam AB of 7 m span carries a uniformly distribute load of 20 kN/m run on the entire beam. The level of right support sinks by 10 mm below that of left hand end. If $E=2.08 \times 10^8 \text{ kN/m}^2$ and $I = 4.52 \times 10^{-5} \text{ m}^4$ find: (a) Moments at the supports, (b) Reactions at the supports, (c) Deflection at the centre.
9. Write a note on the stability of masonry dams.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.