

--	--	--	--	--	--	--	--	--	--

**GIET UNIVERSITY, GUNUPUR – 765022**

B. Tech (Fourth Semester – Regular) Examinations, June – 2021

BESAG4050 – STRENGTH OF MATERIALS

(Agricultural Engineering)

Time: 2 hrs

Maximum: 50 Marks

Answer ALL Questions-1**The figures in the right hand margin indicate marks.****PART – A: (Multiple Choice Questions)****(1 x 10 = 10 Marks)****Q.1. Answer ALL questions**

- a. In cantilever beam, slope and deflection at free end is _____.
 - (i) zero. (ii) maximum.
 - (iii) minimum. (iv) none of the above
- b. Which of the following statements is/are true for a simply supported beam?
 - (i) Deflection is maximum at a point where slope is zero. (ii) Deflection at supports in a simply supported beam is maximum.
 - (iii) Slope is minimum at supports in a simply supported beam. (iv) All of the above.
- c. The vertical distance between the axis of the beam before and after loading at a point is called as _____.
 - (i) deformation. (ii) slope.
 - (iii) deflection. (iv) none of the above.
- d. The load at which a vertical compression member just buckles is known as
 - (i) Critical load. (ii) Crippling load.
 - (iii) Buckling load. (iv) Any one of these.
- e. A column that fails due to direct stress is called
 - (i) Short column. (ii) Long column.
 - (iii) Medium column. (iv) Slender column.
- f. Riveted joint is joints
 - (i) Temporary (ii) Permanent
 - (iii) Both (i) and (ii) (iv) None of these
- g. A masonry dam may fail due to
 - (i) tension in the masonry of the dam and its base. (ii) overturning of the dam.
 - (iii) crushing of masonry at the base of the dam. (iv) any one of the above
- h. Portion of dam in contact with ground at downstream side is _____.
 - (i) Crest. (ii) Heel.
 - (iii) Foot. (iv) Toe.
- i. In cantilever beams, the extra support is known as _____.
 - (i) Prop. (ii) Hinch.
 - (iii) Cripple. (iv) Indeterminate end.
- j. Fixed beam is also known as _____.
 - (i) In built beam. (ii) Constressed beam.
 - (iii) Encaster beam. (iv) Constricted beam.

PART – B: (Short Answer Questions)**(2 x 5 = 10 Marks)**Q.2. Answer **ALL** questions

- What are the methods for finding out the slope and deflection at a section?
- Why moment area method is more useful, when compared with double integration?
- List types of welded joints.
- What is masonry dam?
- What do you understand by the term 'prop'?

PART – C: (Long Answer Questions)**(6 x 5 = 30 Marks)**Answer **ANY FIVE** questions

Marks

- Derive the relation between slope, deflection and radius of curvature of a simply supported beam. (6)
- A timber beam of rectangular section has a span of 4.8 m and is simply supported at its ends. It is required to carry a total load of 4500 kg uniformly distributed load over the whole span. Find the maximum value for (a) the breadth and depth of the beam, if the maximum bending stress is not exceed 70 kg/cm^2 and the maximum deflection is limited to 9.5 mm. Take E for timber as $105 \times 10^3 \text{ kg/cm}^2$ (6)
- An I section joist 40 cm x 20 cm x 2 cm and 6 m long is used as a strut with both end fixed. What is Euler's crippling load for the column take Young's modulus for the joist as $2.0 \times 10^6 \text{ kg/cm}^2$ (6)
- A single riveted lap joint is made is 15 mm thick plates with 20 mm diameter rivets. Determine the strength of the joint, if the pitch of the rivet is 6 cm. Take $f_s = 900 \text{ kg/cm}^2$, $f_b = 1600 \text{ kg/cm}^2$, and $f_t = 1200 \text{ kg/cm}^2$ (6)
- A tank is filled with a liquid of sp.gr. 1 up to a depth of 0.5 m over another liquid of sp.gr. 2. Find total pressure per metres length and its line of action, on the 1 m deep size of the tank (6)
- A masonry trapezoidal dam 4 m high 1 m wide at its top and 3 m wide its bottom retains water on its vertical face. Determine the maximum and minimum stresses, at the base, (i) when the reservoir is full and (ii) when the reservoir is empty. Take weight of the masonry as 2000 kg/m^3 (6)
- A propped cantilever 10 m long has 15 cm wide and 40 cm deep cross section. If the allowable bending stress and the deflection at the centre is 100 kg/cm^2 and 1.5 cm respectively, determine the safe uniformly distributed load, which cantilever can carry, take $E = 1.2 \times 10^6 \text{ kg/cm}^2$. (6)
- A fixed beam AB of 5 m span carries a point load of 20 kN at a distance of 2 m from A. Determine the values of fixing moments and deflection under the load, if flexural rigidity of the beam is $10 \times 10^3 \text{ kN-m}^2$ (6)

--- End of Paper ---