

CLASS: BTECH
BRANCH: CS/IT/ECE/EEE

SEMESTER: I
SESSION: NOV/2018

SUBJECT: ME1001 BASICS OF MECHANICAL ENGINEERING

TIME: 2 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

- Q1 Determine the reactions and the forces in members BF and FE of a truss as shown in Fig.1. [5]

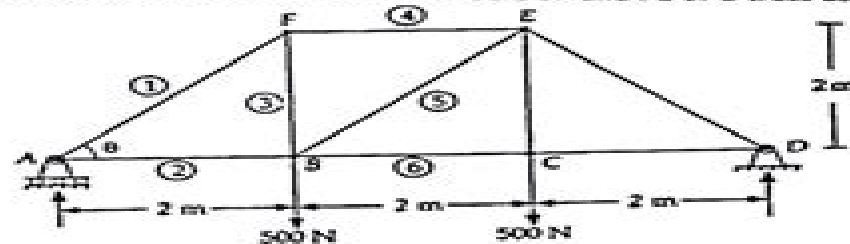


Fig. 1

- Q2 (a) Define Poisson's Ratio. [2]
Q2 (b) A circular rod of 100 mm diameter and 500 mm long is subjected to a tensile force of 1000 kN. Determine modulus of rigidity, bulk modulus and change in volume if Poisson's ratio = 0.3 and $E = 2 \times 10^5 \text{ N/mm}^2$. [3]
- Q3 (a) A roller moves within two conveyor belts, of which top belt moves at the speed of 8 m/s and bottom belt moves at 6 m/s. Determine the linear and angular velocity of the roller if the diameter of the roller is 55 cm. [2]
- Q3 (b) A 100N body is initially stationary on a 45 degree incline. The coefficient of dynamic friction between the block and incline is 0.5. What distance along the incline must the weight slide before it reaches a speed of 40 m/s? [3]
- Q4 (a) A bar AB 5 m long slides in the xy - plane. Point A touches the vertical plane and point B end touches the horizontal plane and makes an angle $\theta = 60^\circ$ with the vertical. The velocity and acceleration of point A at any instant are 10 m/s and 5 m/s^2 respectively in the downward direction. Determine velocity and acceleration of point B. [2]
- Q4 (b) A flywheel of 550 mm diameter is brought uniformly from rest up to a speed of 350 rpm in 20 seconds. Find the velocity and the acceleration of a point on its rim 3 seconds after starting from rest. [3]
- Q5 (a) Define angle of repose. [2]
Q5 (b) A body of weight 100 N rests on a rough horizontal surface $\mu = 0.3$ and is acted upon by a force applied at an angle of 30 degree to the horizontal. What force is required to just cause the body to slide over the surface? [3]

Mechanical Engineering Material Sample Question Paper

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