#### BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI (MID SEMESTER EXAMINATION)

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

SEMESTER: I SESSION: MOV2018

### SUBJECT: ME1001 BASICS OF MECHANICAL ENGINEERING

TERMINE. 2 HOURS

**FULL MARKS: 25** 

INSTRUCTIONS:

- The total marks of the guestions 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.
- OI. Determine the reactions and the forces in members BF and FE of a truss as shown in Fig. 1.

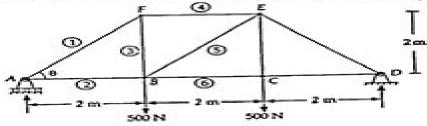


Fig. 1

- Q2 (a) Define Poisson's Ratio.
- [2] [3] 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 modulud and change in volume if poissons ratio = 0.3 and E = 2 x 105 N/mm2,
- Q3 (a) A roller moves within two conveyor belts, of which top belt moves at the speed of 8 m/s [2] 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.
- 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?
- Q4 (a) A bar AB 5 m long slides in the xy plane, Point A touches the vertical plane and point B 121 and 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/s2 respectively in the downward direction. Determine velocity and acceleration of point B.
- O4 (b) A flywheel of 550 mm diameter is brought uniformly from rest up to a speed of 350 rpm in [3] 20 seconds. Find the velocity and the acceleration of a point on its rim 3 seconds after starting from rest.
- (a) Define angle of repose.
- Q5 (b) A body of weight 100 N rests on a rough horizontal surface µ = 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?

:::::: 12/10/2018 M ::::::

# <u>Mechanical Engineering Material Sample Question</u> <u>Paper</u>

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