

Code: RR100305

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B. Tech I Year (RR) Supplementary Examinations, May 2012

ENGINEERING MECHANICS

(Mechanical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 The resultant of the two forces when they act at an angle of 60° is 14 N. If the same forces are acting at right angles their resultant is $\sqrt{136}$ N. Find the magnitude of the two forces.
- 2 (a) Differentiate between coefficient of friction and angle of friction.
(b) Find the least force required to pull a body of weight W placed on a rough horizontal plane, when the force is applied at an angle θ with the horizontal.
- 3 (a) Explain theorem of Pappus.
(b) Show that the polar moment of inertia for an area with respect to an axis perpendicular to the plane is equal to the sum of the moments of inertia about two mutually perpendicular axes in the plane of the area.
- 4 A car is moving with a velocity of 15 m/s. The car is brought to rest by applying brakes in 5 seconds. Find the retardation and distance travelled by the car after applying brakes.
- 5 A train of weight 1960kN starts from rest and attains a speed of 120 km/hr in 5 minutes. If the frictional resistance of the track is 10 N per kN of the train's weight find the average pull required.
- 6 A body weighing 300 N is pushed up a 30° plane by a 400 N force acting parallel to the plane. If the initial velocity of the body is 1.5 m/s and coefficient of kinetic friction is $\mu = 0.2$. What velocity will the body have after moving 6 m?
- 7 A body moving with simple harmonic has amplitude of 1 metre and a period of oscillation of 2 seconds. What will be its velocity and acceleration at 0.4 second and after passing an extreme position?
- 8 What is meant by free vibration? And what are the different types of free vibrations. Explain.
