Combined First and Second Semester B.Tech. Degree
Examination, May 2014
(2008 Scheme)
08-105: ENGINEERING MECHANICS

Time: 3 Hours                                      Max. Marks: 100

Instruction: Answer all questions from Part A. Each question carries 5 marks.
Part B answer 2 questions from each Module, each question carries 10 marks.

PART – A

1. State and explain principle of transmissibility of forces.

2. Briefly explain limiting friction and cone of friction.

3. Distinguish between moment of inertia and radius of gyration.

4. Explain instantaneous centre. How it can be located?

5. Explain D Alemberts principle of rotary motion.

6. Distinguish between centrifugal and centripetal force.

7. Distinguish between simple harmonic motion and periodic motion.

8. Define the term coefficient of restitution. A ball dropped from a height of 12 m on a horizontal floor it rebounds to a height of 8 m. Find the coefficient of restitution between floor and wall.

P.T.O.
PART - B

Module - I

9. A string of length 24 cm is attached to a point on a smooth vertical wall and to a point on the surface of a sphere of radius 12 cm. The sphere whose weight 100 kN hangs in equilibrium against the wall as shown. Find tension in the spring and reaction of the wall.

10. A weight of 60 kN is on the point of motion down a rough inclined plane, when supported by a force of 24 kN acting parallel to the inclined plane and is on the point of motion up the same inclined plane under the action of a force 36 kN applied parallel to the plane. Find the coefficient of friction.

11. Determine the reactions at support of a beam shown in figure.

Module - II

12. Calculate M.I. of shaded area as shown with respect to centroidal axes.
13. 2 ships A and B leave a port at the same time. The ship A travelling North West at 32 km per hour and ship B 40° South of West at 24 km per hour. Determine the speed of ship B relative to ship A. At what time they will be 150 km apart?

14. A lift has an upward acceleration of 1.2m/s². What force will a man weighing 750 N exert on the floor of the lift? What force would be exerted if the lift had an acceleration of 1.2m/s² downwards? What upward acceleration would cause his weight to exert a force of 900 N on the floor?

Module - III

15. A body moving with simple harmonic motion has velocities 10 m/s and 4 m/s at 2 and 4 m distance from mean position. Find amplitude and time period of the body.

16. A car of weight 25 kN moving at a speed of 0.5 m/s to the right collides with a car of weight 35 kN which is at rest. If after collision the second car observed to move to the right at a speed of 0.3 m/s. Determine the coefficient of restitution between two cars. Also find the loss of kinetic energy due to impact.

17. An automobile weighing 25 kN is moving at a speed of 60 km per hour. When the brakes are fully applied causing all four wheels to skid. Determine time required to stop the automobile. Coefficient of friction between road and tyre is 0.5.