B.E. Power Engg., 1st Yr. 2nd Semester (Old) Examination, 2019

Subject: ENGG. MECHANICS - II

Full Marks: 100   Time: 3 Hours

Answer any **five (5)** questions from the followings. Each question carries 20 Marks.

1. A particle under a constant deceleration is moving in a straight line and covers a distance of 20 m in first two seconds and 40 m in the next 5 seconds. Calculate the distance it covers in the subsequent 3 seconds and the total distance covered, before it comes to rest.

2. A ball is dropped from the top of a tower 30 m high. At the same instant a second ball is thrown upward from the ground with an initial velocity of 15 m/sec. When and where do they cross and with what relative velocity?

3. Two ships move from a port at the same time. Ship A has velocity of 30 kmph and is moving in N30°W while ship B is moving in south-west direction with a velocity of 40 kmph. Determine the relative velocity of A with respect to B and the distance between them after half an hour. (Solve with figure)

4. A block weighing 2500 N rests on a level horizontal plane for which coefficient of friction is 0.20. This block is pulled by a force of 1000 N acting at an angle of 30° to the horizontal. Find the velocity of the block after it moves 30 m starting from rest. If the force of 1000N is then removed, how much further will it move? (Use Work-Energy Equation.)

5. A body weighing 300N 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/sec and coefficient of kinetic friction is μ=0.2, what velocity will the body have after moving 6m?

6. Draw the SFD and BMD for a cantilever beam subjected to a concentrated load at free end (Fig.1)
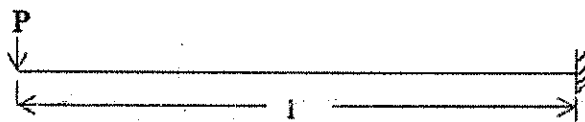

Fig. 1

7. Derive the equation of trajectory for inclined projectile motion on level ground with assumptions and also find the time of flight of the projectile.

8. Write short note on the followings
   (a) Central force motion (b) Castigliaonos's theorem