2) A car weighing 4000 N is moving at a speed of 100 m/s as shown in figure 6. The resistance to the car is largely due to air drag which is equal to 0.004 v^2. What distance will it travel before its speed is reduced to 50 m/s?

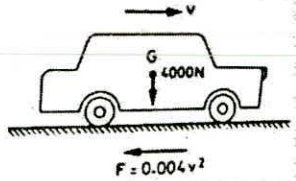

Figure 6

Q.5. Attempt the following. (06X2=12)

A) What is meant by impulse of a force and momentum? State and prove the principle of impulse and momentum.

B) Explain the components of motion: rectangular components of velocity and acceleration.

Q.6. Attempt the following. (06X2=12)

A) Ball A of mass 1 kg moving with a velocity of 2 m/s, impinges directly on a ball B of mass 2 kg at rest. Find the velocities of the two balls after impact. Assume the coefficient of restitution e = ½.

B) Explain and prove D'Alembert's principle. How will you explain the concept of dynamic equilibrium?

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Dr. Babasaheb Ambedkar Technological University, Lonere - Raigad

Summer Semester Examinations, May 2018

B. Tech Course, Semester: II

Subject: Engineering Mechanics (EM 202)

Date: 16 / 05 / 2018 Time: 3 Hours Max Marks: 60

Instructions to the Students:

1. Attempt ANY FIVE Questions from Question No 1 to Question No 6.
2. Illustrate your answers with neat sketches, diagrams etc. wherever necessary.
3. Necessary data is given in the respective questions. If such data is not given, it means that the knowledge of that part is a part of examination.

Q.1. Attempt the following. (06X2=12)

1) State and explain the Principle of Transmissibility. How it is useful as per engineering mechanics point of view? Explain with any example.

2) How will you find out resultant of a several concurrent coplanar forces by summing rectangular components? Explain this method with resolution and projections of the forces with any example.

Q.2. Attempt the following. (06X2=12)

1) Two equal loads of 2500 N are supported by a flexible string ABCD at points B and C as shown in figure 1. Find the tensions in the portions AB, BC and CD of the string.

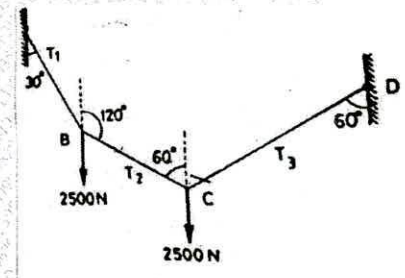

Figure 1

2) A truss is loaded and supported as shown in figure 2. Determine the axial forces in the member CE, CG and FG.

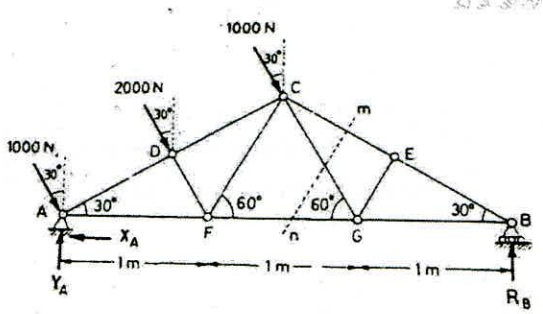

Figure 2

Q.3. Attempt the following. (06X2=12)

1) A block A weighing 1000 N is to be raised by means of a 15 ° wedge B weighing 500 N as shown in figure 3. Assuming the coefficient of friction between all contact surfaces to be 0.2, determine what minimum horizontal force P should be applied to raise the block.

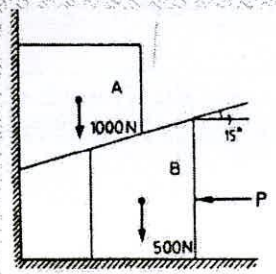

Figure 3

2) A square hole is punched out of a circular lamina as shown in figure 4. The diagonal of the square which is punched out is equal to the radius of circle. Find the centroid of the remaining lamina?

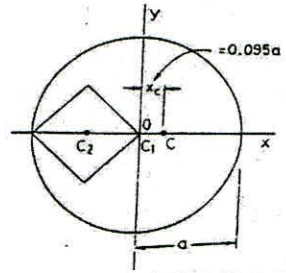

Figure 4

Q.4. Attempt the following. (06X2=12)

1) Two cylinders A and B rest in a horizontal channel as shown in figure 5. The cylinder A has a weight of 1000 N and radius of 9 cm. The cylinder B has weight of 400 N and a radius of 5 cm. the channel is 18 cm wide at the bottom with one side vertical. The other side is inclined at an angle 60 ° with the horizontal. Find the reactions at the points L, N and P.

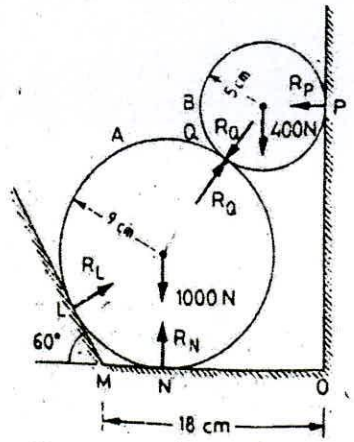

Figure 5