**C**   **Reg. No. :**

Answer All Questions

PART A - (5x 1 = 5 Marks)

1. The velocity ratio in case of an inclined plane inclined at angle 'θ ' to the   CO1- U
    horizontal and weight being pulled up the inclined plane by vertical effort is
    (a) sinθ   (b) cosθ   (c) tanθ   (d) cosecθ

2. The _____ forces do not cause the rotation.   CO2- U

    (a) Non-concurrent   (b)Concurrent   (c)Parallel   (d) Non-Parallel

3. What is the Centroidal distance of an equilateral triangle of side 2 m?   CO3- App

    (a) 0.866m   (b)0.769m   (c)1.000m   (d) 0.577m

4. A cubical block rests on an inclined plane of μ = 1/√3, determine the angle   CO1- U
    of inclination when the block just slides down the inclined plane?
    (a) 40°   (b) 50°   (c) 30°   (d) 20°

5. If we place some coins over the paper strip and pull it with a jerk, then coins   CO5- U
    don't fall off because of

    (a) friction   (b) inertia   (c) resistance   (d) force

PART – B (5 x 3= 15Marks)

6. Draw free body diagram for given fig.   CO1- U
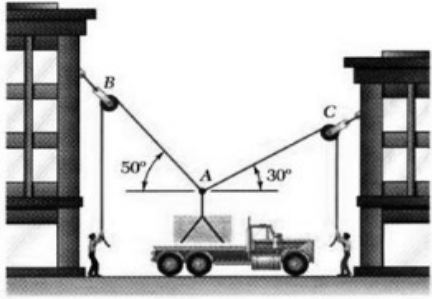
7. Sketch the different types of supports with support reactions   CO1- U

8. Differentiate Centroid and Center of Gravity.   CO1- U

9. Define dynamic friction and static friction   CO2- App

10. Define Rolling resistance   CO1- U

PART – C (5 x 16= 80Marks)

11. (a) The resultant of the forces system shown in figure is 520N along the   CO2-App   (16)
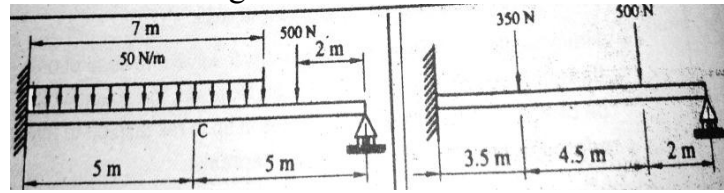   negative direction of Y axis. Determine P and θ.
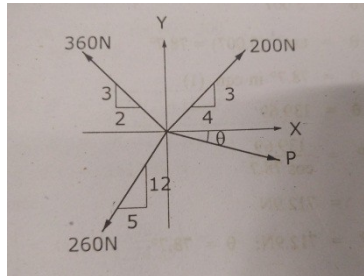
Or

(b) A girl is sitting on an automobile tire which is suspended as shown   CO2-App   (16)
    in fig.
    If the girl and the tire together have a mass of 60 kg.
    Determine (i) The tension in the rope AC (ii) The tension in the
   rope BC

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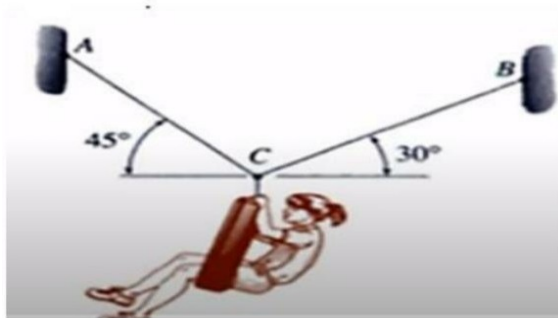
12. (a) Find the simplest equivalent force for the system of forces acting on the beam shown in fig. CO4-Ana (16)

Or

(b) Blocks A and B of weight 200N and 100N respectively, rest on a 30^0 CO4-Ana (16) inclined plane and are attached to the post which is held perpendicular to the plane by force P, parallel to the plane, as shown in fig.Assume that all surfaces are smooth and that the cords are parallel to the plane . Determine the value of P. Also find the normal reactions of blocks A and B
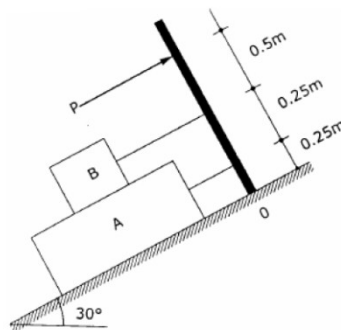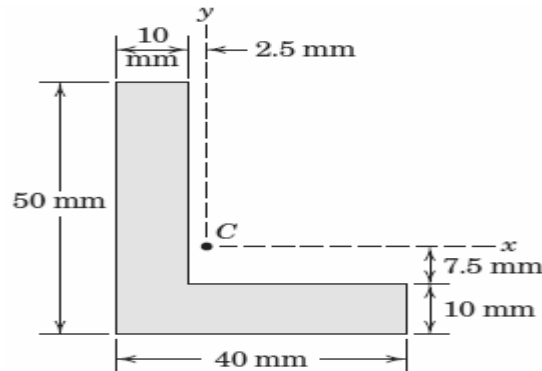

13. (a) Locate the centroid of the given T Section as shown in fig. CO3-App (16)
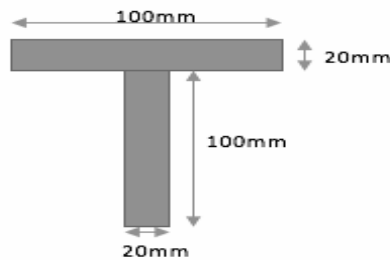
Or

(b) Find the moment of inertia of a channel section as shown in fig, CO3-App (16)

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14. (a) A 7m long ladder rests against a vertical wall, with which it makes   CO4-Ana   (16)
an angle of 45^0 and on a floor. If a man whose weight is one half
that of the ladder climbs it, at what distance along the ladder will he
be, when the ladder is about to slip? Take coeff. of friction between
the ladder and the wall is 1/3 and that between the ladder and the
floor is ½.

Or

(b) A body of weight 100N is placed on a rough horizontal plane and   CO4-Ana   (16)
pushed by a force of 45N as shown in fig.to just cause sliding over
the horizontal plane. Determine the coefficient of friction in all the
three cases.
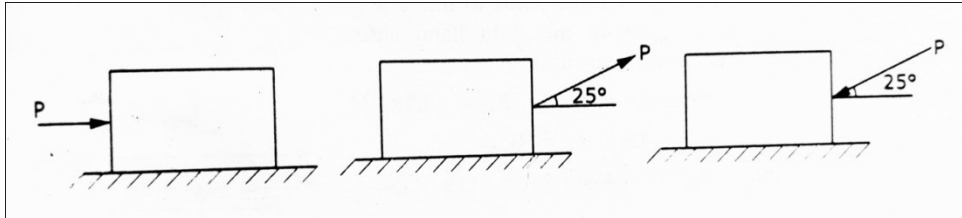
15. (a) A body of mass 15kg is initially at rest on a 10° inclined plane.   CO2-App   (16)
Then it slides down. Calculate the distance moved by the body, on
the inclined plane, when the velocity reaches to 6m/s.The
coefficienr of fricirtion between the body and the plane is 0.1

Or

(b) An elevator of weight (including the weight of man)4.5KN starts   CO2-App   (16)
moving upwards with a constant acceleration and acquires a
velocity of 1.8 m/s, after travelling a distance of 2m.Find the pull in
the cable during accelerated motion.