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APPLIED MECHANICS

3rd Exam/Common/0519/0851/0569/0556/0931/Nov'16

Duration: 3 hrs **M. Marks :75**

SECTION - A

Q.1 Fill in the blanks **10×1 = 10**

a) Acceleration is a _____ quantity.
b) _____ forces cannot produce a rotation
c) In the study of levers, we use the principle of _____
d) The efficiency of screw jack may be increased by _____ the pitch.
e) The efficiency of an ideal machine is _____
f) Angle of repose is _____ to angel of friction.
g) The algebraic sum of moments in equilibrium is equal to _____
h) The turning effect of a force is called _____
i) Lami's theorem is applicable only for _____
j) The point through which whole area of a plane figure acts is called _____

State True or False **5×1 = 5**

a) Dynamic friction is also called Limiting friction.
b) Friction cannot produce motion by acting alone.
c) Composition of forces is the process of determining the resultant of a system of forces.
d) The V.R of third system of pulley is 2^n.
e) Area of quadrant is given by $\pi R^2/4$.

SECTION - B

Q.2 Short Answer Type. Attempt any six questions **6×5 = 30**

1. Explain triangle law of forces.
2. Explain the concept of free body diagrams.
3. State the characteristics of a couple?
4. Explain the angle of repose.
5. Where does the C.G of following regular solids lies?
   a) Hemisphere(Solid) b) Cone(Solid) c) Cone(Hollow)
   d) Cylinder(Hollow) e) Cylinder(Solid)
6. Discuss "Friction is a necessity as well as an evil".
7. Explain the reversible and self locking machines.
8. Write a note on simple wheel and axle.
9. What are laws of static friction?

SECTION - C

Long answer type. Attempt any three **3×10 = 30**

Q.3 A man and a boy carry a weight of 300N between them by means of a uniform rod 2m long and weighing 100N, where must the weight be placed so that the man may bear twice as much of the weight as that of the boy.

Q.4 The frustum of a solid cone has base diameter 12cm, top diameter 6cm and height 8cm. Find the position of C.G from the base.

Q.5 Two forces act an angle of 120^o. The bigger force is equal to 80N and the resultant is at right angles to the smaller force. Find the smaller force and the resultant force.

Q.6 A wooden block weighing 500N is just pulled up the plane having an inclination of 30^o with the horizontal by a pull parallel to the plane. If the coefficient of friction is 0.25, Find the pull.

Q.7 In a machine an effort of 60N is required to lift a load of 250N and on effort of 70N is required to lift a load 375N if the velocity ratio is 20 the determine :
   a) Law of the machine. b) Efficiencies corresponding to 250N.

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