S. B. Roll. No.....

APPLIED PHYSICS-I
1st Exam/Common/5752/Dec'22
(For 2018 Batch Onwards)

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

SECTION-A

Q1. a) Fill in the blanks. **15x1=15**

i. Dimensional formula of Moment of Inertia is_____
ii. Rolling is a combination of _____and translational motion.
iii. If a liquid does not wet the walls of the containing vessel. Then its meniscus will be_____
iv. If a coolie is carrying a mass of 30kg over his head and he covers a distance of 100 meters in the horizontal direction, then the work done by him is _____
v. Water is absorbed by the plants due to_____

b) State true or false:

vi. SI unit of pressure is Newton m^{-2}.
vii. One nanosecond is 10^{-6} sec.
viii. No work is done when a body moves on a horizontal rough surface.
ix. Air is heated by radiation.
x. A Photovoltaic cell converts solar energy into electrical energy.

c) Multiple Choice questions.

xi. A particle moves in a circle of radius R with a constant speed under a centripetal force F, the work done in completing a full circle in joules is: a) Zero b) π RF c) 2 π RF d) πR^2F
xii. Impulse is the product of force and: a) area b) displacement c) time d) velocity
xiii. The temperature of a body is 0^oC. Its temperature on Kelvin scale is:
a) 273.13 b) 273.15 c) 273.17 d) 273.19
xiv. A Rocket works on the principle of conservation of:
a) Mass b) energy c) linear momentum d) angular momentum
xv. Force developed in a body on expansion or contraction is
a) Tension b) Vander Waals forces c) Thermal stress d) Surface tension

SECTION-B

Q2. Attempt any six questions. **6x5=30**

a. What is SI system of units? Write down its advantages.
b. Differentiate between scalar and vector quantities with examples.
c. If A = i + 4 j + 3 k and B = 4 i + 2 j – 4 k. Then calculate their cross product.
d. Define Centripetal force and centrifugal force with examples.
e. An electric motor lifts a load of 180 kg to a height of 30 m in 2 minutes. Find the power of the motor?
f. State and prove theorem of perpendicular axis with diagram.
g. A metal cube, having each side 10 cm is subjected to a tangential force of 10^4 N. The upper face of the cube is displaced by 0.2 mm with respect to the bottom face. Find the value of the modulus of rigidity (in Nm^{-2}).
h. Define viscosity and coefficient of viscosity with their units.
i. What are the three modes of heat transfer? Write examples of each.

SECTION-C

Q3. Attempt any three questions. **3x10=30**

i. Define Scalar Product of two vectors. Write down its properties and examples.
ii. Show that for a freely falling body, total mechanical energy remains constant.
iii. State and prove law of conservation of angular momentum. Write down its applications.
iv. a) Explain Hooke's law by drawing stress – strain diagram.
b) Convert 1 Joule of work done into ergs by the method of dimensions.
v. Explain Co-efficient of linear, surface and cubical expansions. Also find relation between them?