

Roll No.

Z-8-A

Total No. of Questions : 4]

[Total No. of Printed Pages : 8

11th ARF(SZ)JKUT2024-25

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PHYSICS

Time : 3 Hours]

[Maximum Marks : 70

Section-A

(Objective Type Questions)

1 each

1. (i) Which of the following is not the unit of surface tension ?

(A) N/m

(B) J/m²

(C) kg/s²

(D) N/m²

(ii) The numbers 2.745 and 2.735 on rounding off to 3 significant figures

will give :

(A) 2.75 and 2.74

(B) 2.74 and 2.73

(C) 2.75 and 2.73

(D) 2.74 and 2.74

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Turn Over

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(iii) When the distance travelled by a body is proportional to the time taken, what happens to its speed ?

- (A) Becomes zero
- (B) Increases
- (C) Remains the same
- (D) Decreases

(iv) If a projectile is thrown with velocity u at an angle θ with the horizontal, then velocity at maximum height during projectile motion will be :

- (A) $u \sin \theta$
- (B) $2u \sin \theta$
- (C) $2u \cos \theta$
- (D) $u \cos \theta$

(v) The forward movement in swimming takes place because of :

- (A) First law of motion
- (B) Second law of motion
- (C) Third law of motion
- (D) Fourth law of motion

- (vi) The maximum value of static friction when the body is at the verge of starting motion is known as :
- (A) Impending motion
 - (B) Angle of repose
 - (C) Static friction
 - (D) Limiting friction
- (vii) Linear velocities of all the particles of the rigid body in rotational motion is :
- (A) One
 - (B) Zero
 - (C) Same
 - (D) Different
- (viii) At what depth below the surface of earth the value of ' g ' is same as that of height of 5 km ?
- (A) 10 km
 - (B) 7.5 km
 - (C) 5 km
 - (D) 2.5 km

(4)

(ix) The heat transfer in the light bulb takes place due to :

- (A) Conduction
- (B) Convection
- (C) Radiation
- (D) Both convection and radiation

(x) What is the value of Avogadro's constant ?

- (A) $6.022 \times 10^{23} \text{ mol}^{-1}$
- (B) $6.022 \times 10^{26} \text{ mol}^{-1}$
- (C) $6.022 \times 10^{25} \text{ mol}^{-1}$
- (D) $6.022 \times 10^{22} \text{ mol}^{-1}$

Section-B

(Very Short Answer Type Questions)

2 each

2. (a) From the velocity-time graph of uniform accelerated motion, deduce the equation of motion in velocity and time.
- (b) State the conditions for the equilibrium of a particle under concurrent forces.

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- (c) A force of 50 N acts on a body and moves it to a distance of 4 m on a horizontal surface. Calculate work done if the direction of force is at an angle of 60° to the horizontal surface.
- (d) Give two points of difference between conservative and non-conservative forces.
- (e) What is Collision ? Define two types of collision.
- (f) A torque of 20 N-m is applied on a wheel initially at rest. Calculate angular momentum of the wheel after 3 seconds.
- (g) State universal law of gravitation. Derive relation between ' g ' and ' G '.
- (h) State law of equipartition of energy. Also give the concept of mean free path.
- (i) Why longitudinal waves are called pressure waves ?

Section-C

(Short Answer Type Questions)

3 each

3. (a) If string wires of same material of length l and $2l$ vibrate with frequencies 100 Hz and 150 Hz, find the ratio of their tensions.
- (b) Find the dimensions of Planck's constant. If its value in CGS system is 6.62×10^{-27} erg-sec. What will be its value on MKS system ?
- (c) Why are the curved roads banked ? Find the angle of banking of curved road. <https://www.jkboseonline.com>
- (d) State and explain the principle of conservation of angular momentum.
- (e) Define orbital velocity. Derive an expression for it.
- (f) State and explain Hooke's law.
- (g) Define Thermal Equilibrium. How does it occur ? What is the relationship between thermal equilibrium and zeroth law ?

- (h) State second law of thermodynamics by Kelvin and Clausius. Give two applications of second law of Thermodynamics.
- (i) Show that average kinetic energy of translation per molecule of gas is directly proportional to the absolute temperature of gas.

Section-D

(Long Answer Type Questions)

5 each

4. (a) Show that the path followed by projectile is parabolic when it is projected at an angle θ with horizontal.

Or

Explain cross product of vectors. Give its example and properties.

- (b) State and prove Bernoulli's theorem. Give its applications.

Or

Define Capillarity. Derive ascent formula for the rise of a liquid in a capillary tube and discuss the result obtained.

(8)

- (c) What are Standing Waves ? Explain their formation in open organ pipe.

Or

Show that the total energy of particles performing linear simple harmonic motion is constant. What is the time period of total energy in SHM ?