Roll No. of Candidate . _____

PHYSICS **Intermediate Part-I , Class 11th (1stA 324- IV)** **Paper: I** **Group – I**

Time: 20 Minutes **OBJECTIVE** **Code : 6477** GUJ-I-24 **Marks: 17**

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

1. 1 - A 2 Kg mass is placed on the floor of an elevator which is moving downward with 4.9 m/s^2 acceleration, the reaction of floor on the mass is
(A) 9.8 N (B) 0 N (C) 4.9 N (D) 14.7 N

2 - Which pair of angles gives same range of projectile thrown with velocity v_i
(A) $(20^\circ, 60^\circ)$ (B) $(20^\circ, 40^\circ)$ (C) $(30^\circ, 60^\circ)$ (D) $(30^\circ, 70^\circ)$

3 - For circular motion with constant speed v, ω and r are at
(A) 90° with each other (B) 120° with each other
(C) 60° with each other (D) 30° with each other

4 - Which of the following is correct
(A) in irreversible process entropy remains constant
(B) in reversible process entropy increases
(C) in reversible process entropy remains constant
(D) in irreversible process entropy decreases

5 - To observe one hundred fringes in Michelson's interferometer, the distance travelled by moveable mirror will be minimum in case of _____ light.
(A) Red (B) Green (C) Blue (D) Yellow

6 - A body in SHM with amplitude x_0 goes from mean position to $\frac{x_0}{2}$. Its phase is
(A) 30° (B) 45° (C) 60° (D) 90°

7 - $\hat{i}\cdot(\hat{j}\times\hat{k}) =$ _____
(A) 0 (B) 1 (C) $\hat{i}$ (D) $\hat{j}$

8 - Two masses 2 Kg and 3 Kg are moving towards each other with velocity 3 m/s and 2 m/s. The total momentum of the system is
(A) 12 Ns (B) 0 Ns (C) 13 Ns (D) –12 Ns

9 - Mass is a highly concentrated form of _____.
(A) Momentum (B) Inertia (C) Energy (D) Acceleration

10 - A spectrometer is not used to
(A) study spectrum of light (B) measure refractive index of material of prism
(C) study polarization of light (D) measure wavelength of light

11 - If frequency of stationary waves are increased to higher harmonic which of the following decreases
(A) speed (B) wavelength (C) tension in the string (D) density of string

12 - Which is renewable source of energy
(A) Biomass (B) Coal (C) Oil (D) Uranium

13 - Heat is transferred slowly to a gas in a cylinder, the piston is pushed up through 4.0 cm at constant pressure of $8000 Nm^{-2}$. If cross-sectional area of the piston is $0.10 m^2$, work done by the gas is
(A) 32 j (B) 64 j (C) 16 j (D) 96 j

14 - The complete requirement for a body to be in equilibrium are
(A) $\sum\vec{F} = 0$ (B) $\sum\vec{F}_x = 0$ (C) $\sum\tau = 0$ (D) $\sum\vec{F} = 0$ and $\sum\tau = 0$

15 - If the percentage uncertainty in the radius of a sphere is 3%, then percentage uncertainty in its area is
(A) 3% (B) 6% (C) 9% (D) 4%

16 - Two points in a wave $\frac{\lambda}{4}$ distance apart have phase difference
(A) π (B) $\pi/2$ (C) $\pi/3$ (D) 2π

17 - Bernoulli's equation relates to
(A) pressure, speed and height (B) pressure, force and height
(C) force, speed and pressure (D) force, height and speed

PHYSICS **Intermediate Part-I , Class 11th (1stA 324)** **Paper : I** **Group – I**

Time: 2:40 Hours **SUBJECTIVE** GUJ-I-24 **Marks: 68**

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

SECTION – I

2. Write short answers to any EIGHT questions. **(2 x 8 = 16)**

i. What are significant figures? What is rule when first digit dropped is less than 5 while rounding off the data?
ii. What is absolute uncertainty? What is its value?
iii. Why do we find it useful to have two units for the amount of substance, the kilogram and the mole?
iv. Give the drawbacks to use the period of a pendulum as a time standard?
v. Can a vector have a component greater than the vector's magnitude? Explain.
vi. If $\vec{A}+\vec{B}=\vec{O}$, what can you say about the components of the two vectors?
vii. What is position vector? Explain briefly.
viii. Discuss and draw the velocity time graph when car moves with constant acceleration?
ix. Explain the circumstances in which velocity $\bar{v}$ and acceleration $\bar{a}$ are
(i) perpendicular to each other (ii) anti-parallel
x. What will happen when a light body collides with a massive body at rest in an elastic collision?
xi. A 70 kg man runs up a long flight of stairs in 4.0 s. The vertical height of the stairs is 10 m. Calculate his power output in watts.
xii. Calculate the work done in kilo joules in lifting a mass of 10 kg (at a steady velocity) through a vertical height of 10 m.

3. Write short answers to any EIGHT questions. **(2 x 8 = 16)**

i. If a lift is falling freely under gravity, how weightlessness is produced. Use mathematical equations to support your answer.
ii. How do you create a gravity free system?
iii. What is meant by centripetal force and why it must be furnished to an object, if the object is to follow a circular path?
iv. What is meant by moment of inertia with its physical significance? Use equations to support your answer.
v. How Bernoulli's equation is reduced? When
a) height difference is negligible b) velocity is constant.
vi. What do you understand by the term viscosity? Also give its unit.
vii. Define damping process. Use a graph to support your answer.
viii. If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?
ix. Explain the relation between total energy, potential energy and kinetic energy of a body oscillating with S.H.M
x. How Doppler Effect is used to monitor blood flow? Use diagrammatic explanation to support your answer.
xi. Explain why sound travels faster in warm air than in cold air?
xii. How are beats useful in tuning musical instrument?

4. Write short answers to any SIX questions. **(2 x 6 = 12)**

i. Under what conditions two or more sources of light behave as coherent sources?
ii. What are the conditions for detectable interference?
iii. 10000 lines per centimeter has been ruled on diffraction grating. Find its grating element.
iv. Why would it be advantageous to use blue light with a compound microscope?
v. Why is meant by " least distance of distinct vision "?

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(Turn Over)

vi. Find magnifying power of convex lens of 25 cm focal length acts as a magnifying glass.
vii. Does entropy of a system increase or decrease due to friction?
viii. Is it possible to construct a heat engine that will not expel heat into the atmosphere?
ix. Derive Charles' law from Kinetic theory of gases

SECTION – II

5. **(a)** Does the inertia depend on the momentum of a body? Give its reason. Also state and explain the law of conservation of linear momentum. **(5)**
   (b) Show that the three vectors $\hat{i}+\hat{j}+\hat{k}$, $2\hat{i}-3\hat{j}+\hat{k}$ and $4\hat{i}+\hat{j}-5\hat{k}$ are mutually perpendicular. **(3)**

6. **(a)** Stationary waves are also called standing waves, why? Discuss stationary waves in air column of an open organ pipe. **(5)**
   (b) How large a force is required to accelerate an electron ($m = 9.1 \times 10^{-31}$kg) from rest to a speed of $2 \times 10^{7} ms^{-1}$ through a distance of 5cm? **(3)**

7. **(a)** How does a space satellite acquire an artificial gravity? **(5)**
   (b) A block weighing 4.0 Kg extends a spring by 0.16 m from its unstretched position. If the block is removed and 0.50 kg body is hung from same spring, now what is its period of vibration? **(3)**

8. **(a)** Explain four stroke petrol engine in detail. What is the efficiency of a diesel engine? **(5)**
   (b) Water flows through a hose, whose internal diameter is 1cm at a speed of 1 ms^{-1}. What should be the diameter of the nozzle if the water is to emerge at $21 ms^{-1}$? **(3)**

9. **(a)** What is meant by diffraction of light? Also discuss the diffraction of light through a narrow slit. **(5)**
   (b) An astronomical telescope having magnifying power of 5 consists of two thin lenses 24 cm apart. Find the focal lengths of the lenses. **(3)**