

Roll No. of Candidate . \_\_\_\_\_

## PHYSICS

Intermediate Part-I, Class 11<sup>th</sup> ( 1<sup>st</sup>A 324- IV ) · Paper: I Group – I

Time: 20 Minutes

OBJECTIVE

Code : 6477

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  $4.9 \text{ m/s}^2$  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  $v$ ,  $\omega$  and  $r$  are at  
 (A)  $90^\circ$  with each other ● (B)  $120^\circ$  with each other  
 (C)  $60^\circ$  with each other (D)  $30^\circ$  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)  $30^\circ$  ● (B)  $45^\circ$  (C)  $60^\circ$  (D)  $90^\circ$
- 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  $8000 \text{ Nm}^{-2}$ . If cross-sectional area of the piston is  $0.10 \text{ m}^2$ , 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)  $\pi$  (B)  $\pi/2$  (C)  $\pi/3$  (D)  $2\pi$  ●
- 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



**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)**

- What are significant figures? What is rule when first digit dropped is less than 5 while rounding off the data?
- What is absolute uncertainty? What is its value?
- Why do we find it useful to have two units for the amount of substance, the kilogram and the mole?
- Give the drawbacks to use the period of a pendulum as a time standard?
- Can a vector have a component greater than the vector's magnitude? Explain.
- If  $\vec{A} + \vec{B} = \vec{O}$ , what can you say about the components of the two vectors?
- What is position vector? Explain briefly.
- Discuss and draw the velocity time graph when car moves with constant acceleration?
- Explain the circumstances in which velocity  $\vec{v}$  and acceleration  $\vec{a}$  are
  - perpendicular to each other
  - anti-parallel
- What will happen when a light body collides with a massive body at rest in an elastic collision?
- 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.
- 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)**

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

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

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



## Gujranwala Board-G-1-2024

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- 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 ( $m = 9.1 \times 10^{-31} \text{ kg}$ ) from rest to a speed of  $2 \times 10^7 \text{ ms}^{-1}$  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  $1 \text{ ms}^{-1}$ . What should be the diameter of the nozzle if the water is to emerge at  $21 \text{ ms}^{-1}$ ? (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)



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# Gujranwala Board-G-2-2024

Roll No. of Candidate : \_\_\_\_\_

## PHYSICS

Intermediate Part-I, Class 11<sup>th</sup> ( 1<sup>st</sup>A 324- IV ) Paper : I Group – II

Time: 20 Minutes

OBJECTIVE

Code : 6478

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 - In angular motion, the centripetal force is  
(A)  $mr^2\omega^2$  (B)  $m^2r^2\omega$  (C)  $mr^2\omega$  (D)  $mr\omega^2$  ●
- 2 - If temperature of sink increases, the efficiency of Carnot Engine  
(A) decreases ● (B) increases  
(C) remains the same (D) first increases then decreases
- 3 - The detector in photo-phone is made up of  
(A) Germanium (B) Selenium ● (C) Cadmium (D) Silicon
- 4 - The dimensions of the relation  $\sqrt{\frac{F \times \ell}{m}}$  are equal to the dimensions of  
(A) Force (B) Impulse (C) Momentum (D) Velocity ●
- 5 - Dot product of force and velocity is  
(A) Work (B) Momentum (C) Power ● (D) Impulse
- 6 - In reversible process the entropy of system  
(A) increases (B) decreases (C) remains constant ● (D) becomes zero
- 7 - Newton rings are formed due to  
(A) diffraction (B) reflection (C) refraction (D) interference ●
- 8 - The maximum drag force on falling sphere is 9.8 N, its weight is  
(A) 9.8 N ● (B) 19.8 N (C) 4.9 N (D) 49 N
- 9 - Distance covered by a body in one vibration is 20 cm. The amplitude of vibration will be  
(A) 5 cm ● (B) 10 cm (C) 15 cm (D) 20 cm
- 10 - Torque is the rotational analogous of  
(A) Momentum (B) Impulse (C) Force ● (D) Power
- 11 - In which quadrant, vector  $3\hat{i} - 5\hat{j}$  lies?  
(A) 1<sup>st</sup> (B) 2<sup>nd</sup> (C) 3<sup>rd</sup> (D) 4<sup>th</sup> ●
- 12 - A fighter plane is chasing another plane, when it opens fire, its speed  
(A) increases (B) decreases ●  
(C) remains constant (D) first increases then decreases
- 13 - 2 revolutions are equal to  
(A)  $\frac{\pi}{2}$  rad (B)  $\pi$  rad (C)  $2\pi$  rad (D)  $4\pi$  rad ●
- 14 - Speed of sound is independent of  
(A) density (B) temperature (C) elasticity (D) pressure ●
- 15 - The unit of work in base units is  
(A)  $kg\ ms^2$  (B)  $kg\ m^2s^{-2}$  ● (C)  $kg\ m^{-2}s^2$  (D)  $kg\ m^2s^2$
- 16 - Star moving towards the earth shows  
(A) red shift (B) blue shift ● (C) yellow shift (D) green shift
- 17 - The distance covered by free falling body in 2 seconds is  
(A) 9.8 m (B) 19.6 m ● (C) 4.9 m (D) 49 m

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**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)**

- The period of pendulum is measured by a stop watch. What types of errors are possible in the time standard?
- Does a dimensional analysis give any information on constant of proportionality that may appear in algebraic expressions? Explain.
- Differentiate between precision and accuracy.
- How many seconds are there in one year? Explain.
- Can a vector have a component greater than the vector's magnitude?
- A force of 10 N makes an angle of 60° with x-axis. Find its x and y components.
- Give two factors on which turning effect depends.
- Explain the circumstances in which velocity  $\vec{v}$  and acceleration  $\vec{a}$  are perpendicular to one another.
- A rubber ball and a lead ball of same size are moving with same velocity. Which ball has greater momentum and why?
- How will you differentiate between uniform and variable velocity?
- An object has 1 J of potential energy. Explain.
- What is escape velocity? Write the formula of escape velocity.

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

- A disc and a hoop start moving down from the top of an inclined plane at the same time. Which one will be moving faster on reaching the bottom?
- Why centripetal force is required to keep a body moving on a circular track?
- State the direction of the following vectors in simple situations: angular momentum and angular velocity
- What does (INTELSAT) stand for?
- Explain the term viscosity.
- What is difference between laminar flow and turbulent flow?
- Does frequency depend on amplitude for harmonic oscillator?
- Differentiate between undamped and damped oscillations with the help of a graph between amplitude and time.
- Name two characteristics of simple harmonic oscillator.
- As a result of a distant explosion, an observer senses a ground tremor and then hears the explosion. Explain the time difference.
- How are beats useful in tuning musical instruments?
- How bats navigate their food?

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

- An oil film spreading over a wet footpath shows colours. Explain.
- How will you differentiate between interference and diffraction of light waves?
- 20000 lines per centimeter has been ruled on a diffraction grating. Find its grating element.
- How the power is lost in optical fibre through dispersion? Explain.
- Why would it be advantageous to use blue light with a compound microscope?
- Find magnifying power of convex lens of 15 cm focal length acts as a magnifying glass.
- Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why?
- Why is the average velocity of the molecules in a gas zero but the average of the square of velocities is not zero?
- State Second Law of Thermodynamics in terms of entropy.

**(Turn Over)**

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### SECTION – II



5. (a) What is an isolated system? State and explain law of conservation of linear momentum. (5)  
(b) Given that  $\vec{A} = \hat{i} - 2\hat{j} + 3\hat{k}$  and  $\vec{B} = 3\hat{i} - 4\hat{k}$ , find the projection of  $\vec{A}$  and  $\vec{B}$  (3)
6. (a) Discuss the interconversion of potential and kinetic energy when frictional force is not considered. (5)  
(b) The wavelength of the signals from a radio transmitter is 1500 m and the frequency is 200 KHz. What is wavelength for a transmitter operating at 1000 KHz and with what speed the radio waves travel? (3)
7. (a) What is meant by real and apparent weight? Develop a relation between real and apparent weight ( in case of an elevator ). (5)  
(b) What should be length of a simple pendulum whose period is 1.0 second at a place where  $g = 9.8 \text{ ms}^{-2}$  (3)
8. (a) Derive Bernoulli's Equation for an ideal fluid. (5)  
(b) 336 J of energy is required to melt 1 g of ice at  $0^\circ\text{C}$ . What is the change in entropy of 30 g of water at  $0^\circ\text{C}$  as it is changed to ice at  $0^\circ\text{C}$  by a refrigerator? (3)
9. (a) What is Michelson's interferometer? Explain its working and derive its equation. (5)  
(b) A glass light pipe in air will totally internally reflect a light ray if its angle of incidence is at least  $39^\circ$ . What is the minimum angle for total internal reflection if pipe is in water (Refractive index of water = 1.33) (3)

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# Gujranwala Board-2023

Roll No. of Candidate : \_\_\_\_\_

## PHYSICS

Intermediate Part-I, Class 11<sup>th</sup> (1<sup>st</sup> A 323- I)

Paper: I Group - I

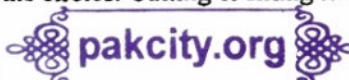
Time: 20 Minutes

OBJECTIVE

Code : 6471

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 - Dimension ratio of angular momentum to linear momentum is  
 (A)  $[M^0L^1T^0]$  (B)  $[M^1L^1T^1]$  (C)  $[ML^2T^{-1}]$  (D)  $[M^{-1}L^{-1}T^{-1}]$
- 2 - Time taken by light from moon to earth is  
 (A) 1 min 10 sec (B) 1 min 20 sec (C) 1 min 30 sec (D) 1 min 40 sec
- 3 - The angle of  $\vec{A} = A_x\hat{i} - A_y\hat{j}$  with x-axis will be in between  
 (A)  $0^\circ \rightarrow 90^\circ$  (B)  $90^\circ \rightarrow 180^\circ$  (C)  $180^\circ \rightarrow 270^\circ$  (D)  $270^\circ \rightarrow 360^\circ$
- 4 -  $AB\sin\theta\hat{n} \times AB\sin\theta\hat{n}$  is  
 (A)  $A^2B^2\sin^2\theta$  (B)  $A^2B^2$  (C)  $A^2B^2\hat{n}$  (D) 0
- 5 - The correct relation between height  $H$  and total time of flight  $T$  of a projectile is  
 (A)  $H = \frac{gT^2}{8}$  (B)  $H = \frac{8T^2}{g}$  (C)  $H = \frac{8g}{T^2}$  (D)  $H = \frac{8}{gT^2}$
- 6 - An athlete runs with a speed of  $12\text{ms}^{-1}$ , the longest jump he can undertake is ( $g = 10\text{ms}^{-2}$ )  
 (A) 12.2 m (B) 16.2 m (C) 14.4 m (D) 24.4 m
- 7 - Two electrons brought closer together the P.E. of the system will/will be  
 (A) zero (B) decrease (C) increase (D) infinity
- 8 - The largest satellite system is managed by countries  
 (A) 126 (B) 136 (C) 120 (D) 3
- 9 - If a body is moving counter clockwise then angular displacement is  
 (A) minimum (B) zero (C) negative (D) positive
- 10 - The velocity of rain drop attains constant value because of  
 (A) surface tension (B) up thrust of air (C) viscous force exerted by air (D) air currents
- 11 - The time period of seconds hand of a watch is  
 (A) 1 sec (B) 1 min (C) 1 hr (D) 12 hrs
- 12 - Types of waves used in sonar are  
 (A) sound waves (B) light waves (C) heat waves (D) water waves
- 13 - Speed of sound in helium gas at S.T.P. is  
 (A) 258 m/sec (B) 332 m/sec (C) 972 m/sec (D) 1286 m/sec
- 14 - The fringe spacing increases if we use  
 (A) red light (B) blue light (C) yellow light (D) green light
- 15 - In a compound microscope magnification produced by objective and eye piece is 5 cm and 10 cm respectively. Total magnification is  
 (A) 5 (B) 15 (C) 10 (D) 50
- 16 - The concept of entropy was introduced by Clausius in  
 (A) 1656 (B) 1856 (C) 1756 (D) 1956
- 17 - Average translational K.E. of molecules in a gas at temperature  $27^\circ\text{C}$  is  
 (A)  $8314 \times 10^3\text{J}$  (B)  $1.38 \times 10^{-23}\text{J}$  (C)  $6.21 \times 10^{-21}\text{J}$  (D)  $8.314 \times 10^{-3}\text{J}$

# Gujranwala Board-2023

PHYSICS

Intermediate Part-I, Class 11<sup>th</sup> (1<sup>st</sup>A 323)

Paper : I Group – I

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

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

## SECTION – I

(2 x 8 = 16)

2. Write short answers to any EIGHT questions.

- Define supplementary units.
- What are significant figures? How many are the significant figures in 0.04670?
- Does a dimensional analysis give any information on constant of proportionality? Explain.
- Name several repetitive phenomenon occurring in nature which could serve as reasonable time standards.
- Define position vector and give its formula.
- The vector sum of three vectors gives a zero resultant. What can be the orientation of the vectors?
- Is it possible to add a vector quantity to a scalar quantity?
- What information can we get from velocity-time graphs?
- What is an isolated system? State law of conservation of linear momentum.
- Motion with constant velocity is a special case of motion with constant acceleration, is this statement true? Discuss.
- An object is thrown vertically upward. Discuss the sign of acceleration due to gravity, relative to velocity, while the object is in air.
- Explain the working of a carburetor of a motor car using Bernoulli's principle.

(2 x 8 = 16)

3. Write short answers to any EIGHT questions.

- Show that power is a dot product of force and velocity.
- A boy uses a catapult to throw a stone which accidentally smashes a greenhouse window. List the possible energy changes.
- An object has 1 J of potential energy. Explain what does it mean?
- Show that work done by centripetal force is zero.
- When mud flies off the tyre of a moving bicycle, in what direction does it fly? Explain.
- Why does a diver change his body positions before and after diving the pool?
- Explain by graph that for a body executing SHM, its velocity leads displacement by 90°.
- Does the acceleration of a simple harmonic oscillator remain constant during its motion? Is the acceleration ever zero?
- What happens to period of pendulum if its length is doubled? What happens if the suspended mass is doubled?
- What is the effect of density on speed of sound?
- What features do longitudinal waves have in common with transverse waves?
- Open organ pipes are richer in harmonic than closed organ pipes. Explain

(2 x 6 = 12)

4. Write short answers to any SIX questions.

- What are the conditions for detectable interference of light waves?
- An oil film spreading over a wet footpath shows colours. Explain how does it happen?
- Could you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?
- Define resolving power and give formula for its calculation in case of diffraction grating.
- One can buy a cheap microscope for use by the children. The images seen in such a microscope have coloured edges. Why is this so?

(Turn Over)

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## Gujranwala Board-2023

- vi. State 2<sup>nd</sup> law of Thermodynamics. Support your answer with a schematic diagram.
- vii. How would you elaborate four steps of Carnot cycle? Support your answer with a diagram.
- viii. Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why?
- ix. Give an example of a process in which no heat is transferred to or from the system but the temperature of the system changes.

### SECTION – II



Note: Attempt any THREE (3) questions.

- 5. (a) Define the term torque. What are factors upon which torque depends. Calculate torque due to force acting on rigid body. (5)  
(b) A force (thrust) of 400 N is required to overcome road friction and air resistance in propelling an automobile at 80 Km<sup>h</sup><sup>-1</sup>. What power (KW) must the engine develop? (3)
- 6. (a) Define projectile motion. Derive formulas for (5)  
i) Horizontal range ii) Height of projectile  
(b) A 1000 Kg car is travelling with a speed of 144 Km<sup>h</sup><sup>-1</sup> around a curve of radius 100 m. Find the necessary centripetal force. (3)
- 7. (a) Define molar specific heat at constant volume and at constant pressure and prove that  $C_p - C_v = R$  (5)  
(b) How large must a heating duct be if air moving 3.0 ms<sup>-1</sup> along it can replenish the air in a room at 300 m<sup>3</sup> volume every 15 min? Assume the air's density remains constant (3)
- 8. (a) Discuss the motion of horizontal mass spring system. Also derive the expression for time period, displacement and velocity of the mass attached to the spring. (5)  
(b) An organ pipe has a length of 50 cm. Find the frequency of its fundamental note and the next harmonic when it is closed at one end. (speed of sound = 350 ms<sup>-1</sup>) (3)
- 9. (a) Describe the construction of a simple microscope and derive an expression for its magnifying power. (5)  
(b) A light is incident normally on a grating which has 2500 lines per centimeter. Compute the wavelength of a spectral line for which the deviation in second order is 15.0°. (3)

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# Gujranwala Board-2023

Roll No. of Candidate : \_\_\_\_\_

## PHYSICS

Intermediate Part-I, Class 11<sup>th</sup> (1<sup>st</sup>A 323- I)

Paper : I Group – II

Time: 20 Minutes

OBJECTIVE

Code : 6472

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 - Silicon is obtained from  
 (A) space (B) sand (C) moon (D) air
- 2 -  $[ML^{-1}T^{-1}]$  is dimension of  
 (A) force (B) viscosity (C) power (D) energy
- 3 - The vector of zero magnitude and arbitrary direction is called  
 (A) equal vector (B) null vector (C) unit vector (D) resultant vector
- 4 - 1<sup>st</sup> condition of equilibrium is written as  
 (A)  $\vec{F} = 0$  (B)  $\sum \vec{F} = 0$  (C)  $\sum \vec{\tau} = 0$  (D)  $\vec{\tau} = 0$
- 5 - A mass of fuel consumed by a typical rocket to overcome earth's gravity is  
 (A) 10000 Kgs<sup>-1</sup> (B) 1000 Kgs<sup>-1</sup> (C) 100 Kgs<sup>-1</sup> (D) 10 Kgs<sup>-1</sup>
- 6 - Projectile motion is a  
 (A) three dimensional motion (B) one dimensional motion  
 (C) two dimensional motion (D) no dimensional motion
- 7 - The total work done in a closed path in gravitational field is  
 (A) maximum (B) positive (C) zero (D) minimum
- 8 - The relation for centripetal acceleration is given by  
 (A)  $\frac{v^2}{r}$  (B)  $v\omega$  (C)  $r\omega^2$  (D)  $a = \frac{f}{m}$
- 9 - 1 GHz =  
 (A)  $10^{13}$  Hz (B)  $10^6$  Hz (C)  $10^{15}$  Hz (D)  $10^9$  Hz
- 10 - Human blood pressure is measured in  
 (A)  $Nm^{-1}$  (B)  $Nm^{-3}$  (C)  $Nm^{-2}$  (D) torr
- 11 - Tuning of radio is an example of resonance  
 (A) mechanical (B) physical (C) magnetic (D) electrical
- 12 - Ripples produced in water is an example of  
 (A) light waves (B) electromagnetic waves  
 (C) electronic waves (D) progressive waves
- 13 - The speed of sound does not depend upon  
 (A) compressibility of fluids (B) inertia of fluids  
 (C) density of fluids (D) viscosity of fluids
- 14 - In Young's double slit experiment, the position of dark fringe is expressed as  
 (A)  $y_m = \left(m + \frac{1}{2}\right) \frac{\lambda L}{d}$  (B)  $y_m = \left(m - \frac{1}{4}\right) \frac{\lambda L}{d}$   
 (C)  $y_m = \frac{m\lambda L}{d}$  (D)  $y_m = \frac{m\lambda d}{2L}$
- 15 - Spectrometer consists of  
 (A) four parts (B) three parts (C) five parts (D) two parts
- 16 - The sum of all molecular energies of a substance is called  
 (A) K.E. (B) P.E. (C) internal energy (D) Chemical energy
- 17 - Heat engine converts thermal energy into  
 (A) mechanical work (B) electrical energy (C) hydro energy (D) solar energy

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# Gujranwala Board-2023

PHYSICS

Intermediate Part-I, Class 11<sup>th</sup> (1<sup>st</sup> A 323)

Paper : I Group – II

Time: 2:40 Hours

SUBJECTIVE

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 × 8 = 16)

- The period of simple pendulum is measured by a stop watch. What type of errors are possible in the time period?
- Does a dimensional analysis give any information on constant of proportionality that may appear in an algebraic expression? Explain.
- How much distance is covered by light in one year?
- Define significant figures and give its example.
- Define the terms (i) unit vector (ii) components of a vector
- Can you add zero to a null vector?
- What is the unit vector in the direction of the vector  $\vec{A} = 3\hat{i} + 2\hat{j}$
- An object is thrown vertically upward. Discuss the sign of acceleration due to gravity, relative to velocity, while the object is in air.
- Explain the circumstances in which the velocity  $\vec{v}$  and acceleration  $\vec{a}$  of a car are (i) Antiparallel (ii) Perpendicular to one another
- Define elastic collision and inelastic collision with examples.
- State law of conservation of momentum.
- Explain the term viscosity.

3. Write short answers to any EIGHT questions.

(2 × 8 = 16)

- An object has 1J of P.E. Explain what does it mean?
- Show that  $K.E = \frac{p^2}{2m}$ , where  $p$  is momentum.
- How can we get energy from tides?
- Define critical velocity, write its formula.
- Explain what is meant by centripetal force and why it must be furnished to an object if the object is to follow a circular path?
- Why does a diver change his body positions before and after diving in the pool?
- If mass attached to a vibrating spring-mass is increased by four times, what is the effect on its frequency?
- Why the soldiers are advised to break their steps while marching on a bridge of long span?
- Describe some common phenomena in which resonance plays an important role.
- Is it possible for two identical waves travelling in the same direction along a string to give rise to stationary wave?
- Why does sound travel faster in solids than in gases?
- State the principle of super position.

4. Write short answers to any SIX questions.

(2 × 6 = 12)

- Write down two parts of Huygen's principle.
- How is the distance between interference fringes affected by the separation between the slits of Young's experiment?
- How would you distinguish between un-polarized and plane-polarized lights?
- Find the refractive index of the medium if critical angle is  $39^\circ$ .

(Turn Over)

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## Gujranwala Board-2023

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- v. What do you understand by linear magnification and angular magnification ?
- vi. Define triple point of water and give its value for water.
- vii. Give two postulates of kinetic theory of gases.
- viii. Explain that the average velocity of the molecules in a gas is zero but the average of the square of velocities is not zero.
- ix. Is it possible to convert internal energy into mechanical energy? Explain with an example.

### SECTION - II



Note: Attempt any THREE (3) questions.

- 5. (a) Write down a note on addition of vectors by their rectangular components. (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  $2 \times 10^7$  m/s, through a distance of 5.0 cm ? (3)
- 6. (a) Derive the equations for final velocities in one dimensional elastic collision. (5)  
(b) A 1000 Kg car travelling with a speed of 144 km/h, round a curve of radius 100m. Find the necessary centripetal force. (3)
- 7. (a) State and explain Bernoulli's equation. (5)  
(b) 336 J of energy is required to melt 1g of ice at  $0^\circ\text{C}$ . What is the change in entropy of 30 g of water at  $0^\circ\text{C}$  as it is changed to ice at  $0^\circ\text{C}$  by a refrigerator? (3)
- 8. (a) Discuss the motion of horizontal mass spring system and also derive formula for time period, displacement and velocity. (5)  
(b) A stationary wave is established in a string which is 120 cm long and fixed at both ends. The string vibrates in four segments, at a frequency of 120 Hz. Determine its wavelength and fundamental frequency. (3)
- 9. (a) Describe construction and working of compound microscope. Also derive relation for its magnifying power. (5)  
(b) A light is incident normally on a grating which has 2500 lines per centimeter. Compute the wave length of a spectral line for which deviation in second order is  $15.0^\circ$ . (3)

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**PHYSICS**

**(Intermediate Part-I, Class 11<sup>th</sup>) 322 - (I)**

**Paper I (Group – I)**

**Time: 20 Minutes**

**OBJECTIVE - - - - Code : 6471**

**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. Attempt as many questions as given in objective type question paper and leave others blank.



1. 1 - The unit of solid angle is \_\_\_\_\_.  
 (A) radian (B) degree (C) steradian (D) revolution
- 2 - Light year is the unit of \_\_\_\_\_.  
 (A) speed (B) intensity (C) time (D) distance
- 3 - What is the angle between  $\hat{i} + \hat{j}$  and  $\hat{i} - \hat{j}$  vectors?  
 (A)  $0^\circ$  (B)  $45^\circ$  (C)  $90^\circ$  (D)  $180^\circ$
- 4 - \_\_\_\_\_ is not scalar.  
 (A) work (B) power (C) wavelength (D) torque
- 5 - When rocket moves upward its acceleration \_\_\_\_\_.  
 (A) increases (B) decreases (C) becomes zero (D) remains constant
- 6 - Shape of trajectory of projectile is \_\_\_\_\_.  
 (A) parabola (B) hyperbola (C) circle (D) straight line
- 7 - The rocks containing hot water are called \_\_\_\_\_.  
 (A) geyser (B) aquifer (C) magma (D) tor
- 8 - The angular displacement for daily rotation of the earth is \_\_\_\_\_.  
 (A) 0 rad (B)  $\pi$  rad (C)  $2\pi$  rad (D)  $4\pi$  rad
- 9 - A body of 1 kg moving up with  $a = g$  then its apparent weight is \_\_\_\_\_.  
 (A) 19.6 N (B) 9.8 N (C) 0 N (D) 10 N
- 10 - Pressure is high where speed is \_\_\_\_\_.  
 (A) high (B) low (C) constant (D) zero
- 11 - Frequency of second's pendulum is \_\_\_\_\_.  
 (A) 0.5 Hz (B) 5.0 Hz (C) 0.2 Hz (D) 2.0 Hz
- 12 - Distance between two consecutive nodes is \_\_\_\_\_.  
 (A)  $2\lambda$  (B)  $\frac{\lambda}{2}$  (C)  $4\lambda$  (D)  $\frac{\lambda}{4}$
- 13 - Speed of sound is independent of \_\_\_\_\_.  
 (A) density (B) temperature (C) elasticity (D) pressure
- 14 - \_\_\_\_\_ proves that light waves are transverse.  
 (A) reflection (B) polarization (C) diffraction (D) interference
- 15 - Single mode step index fibre can transmit T.V channels more than \_\_\_\_\_.  
 (A) 3 (B) 5 (C) 7 (D) 14
- 16 - If the temperature of sink decreases then efficiency of engine \_\_\_\_\_.  
 (A) increases (B) decreases (C) remains same (D) becomes zero
- 17 - One Pascal is the unit of \_\_\_\_\_.  
 (A) volume (B) pressure (C) force (D) power

**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. How the accuracy is increased by decreasing the limit of precision?
- ii. How many expected number of significant figures are in 8000 kg?
- iii. Check the homogeneity of the relation  $V = \sqrt{\frac{F \times \ell}{m}}$ .
- iv. Name the several repetitive phenomena occurring in nature which could serve as reasonable time standards.
- v. Is it necessary, when the acceleration of a body is zero then its velocity is also zero?
- vi. Find angle of projection of a projectile for which its max. height and horizontal range are equal.
- vii. Write down two significance of velocity-time graph.
- viii. Define impulse and show how it is related to linear momentum?
- ix. How can we differentiate between reversible and irreversible processes on the basis of entropy?
- x. Why molar specific heat at constant pressure is greater than molar specific heat at constant volume?
- xi. Why the curve of adiabatic process is steeper than isothermal process?
- xii. If  $PV^{\gamma} = \text{constant}$ ; prove that  $TV^{\gamma-1} = \text{constant}$ .

**3. Write short answers to any EIGHT questions.**

**(2 x 8 = 16)**

- i. How a vector can be determined when rectangular components are known?
- ii. Is it possible to add a vector quantity to a scalar quantity? Explain.
- iii. Describe the method to find the direction of cross product?
- iv. When a rocket re-enters the atmosphere, its nose cone becomes very hot. Where does this heat energy come from?
- v. What sort of energy is in the following:  
(a) Compressed Spring (b) Water in high dam.
- vi. Point out the positions where gravitational potential energy is taken as zero.
- vii. Derive relation between linear and angular velocity.
- viii. Explain how many minimum number of geostationary satellites are required for global coverage of T.V. transmission?
- ix. A disc without slipping rolls down a hill of height 10 meters. If the disc starts from rest at the top of the hill, then what is its speed at the bottom?
- x. Can the visible light produce interference fringes? Explain.
- xi. How would you distinguish between un-polarized and plane polarized light?
- xii. What are Newton's rings? Why is the centre of Newton's rings dark?

**4. Write short answers to any SIX questions.**

**(2 x 6 = 12)**

- i. Explain the working of carburetor of a motor car using Bernoulli's principle.
- ii. What are free, forced and damped oscillations?
- iii. Does frequency depend on amplitude for harmonic oscillator?
- iv. Describe some common phenomena in which resonance plays an important role.
- v. State principle of superposition.

**(Turn Over)**



# Gujranwala Board-2022

- 2 -

- vi. Differentiate between in phase and out of phase points in transverse periodic waves with the help of a diagram.
- vii. How beats are useful in tuning the musical instruments?
- viii. Why it be advantageous to use blue light with a compound microscope?
- ix. If a person was looking through a telescope at full moon, how would the appearance of the moon be changed by covering half of the objective lens.



## (SECTION – II)

**Note: Attempt any THREE (3) questions from Section II.**

- 5. (a) Define vector product and write down its four characteristics. (5)  
 (b) A force of 400 N is required to overcome road friction and air resistance in propelling an automobile at  $80 \text{ kmh}^{-1}$ . What power (KW) must the engine develop? (3)
- 6. (a) Explain velocity-time graph and how would you figure out the slope and distance covered from the graphs. (5)  
 (b) A ball tied to the end of a string, is swung in a vertical circle of radius 'r' under the action of gravity as shown in the fig. What will be the tension in the string when the ball is at the point 'A' of the path and speed is 'V' at this point. (3)



- 7. (a) How would you elaborate the effects of pressure and density on the speed of sound in air. Also, derive a relation for the effect of temperature on the speed of sound in air. (5)  
 (b) Water flows through a hose, whose internal diameter is 1 cm at a speed of  $1 \text{ m/s}$ . What should be the diameter of the nozzle if the water is to emerge at  $21 \text{ m/s}$ . (3)
- 8. (a) What is simple pendulum? Show that motion of simple pendulum is SHM. Also find relation for its time period and frequency. (5)  
 (b) A light is incident normally on a grating which has 2500 lines per centimeter. Compute the wavelength of the spectral line for which the deviation in second order is  $15^\circ$ . (3)
- 9. (a) What is spectrometer? Discuss its different parts. Write down its uses. (5)  
 (b) The turbine in a steam power plant takes steam from boiler at  $427^\circ\text{C}$  and exhausts into low temperature reservoir at  $77^\circ\text{C}$ . What is maximum possible efficiency? (3)

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# Gujranwala Board-2022

Roll No. of Candidate : \_\_\_\_\_

## PHYSICS

(Intermediate Part-I, Class 11<sup>th</sup>) 322 - (III)

Paper I (Group – II)

Time: 20 Minutes

**OBJECTIVE** - - - - - **Code : 6476**

**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. Attempt as many questions as given in objective type question paper and leave others blank.



1. 1 - Carnot engine is a \_\_\_\_\_.  
 (A) real (B) ideal (C) both (A) & (B) (D) none of these
- 2 - The slope at any point on the velocity-time graph gives \_\_\_\_\_.  
 (A) distance (B) acceleration (C) average velocity (D) average speed
- 3 - If the initial phase is  $\frac{\pi}{2}$ , the displacement of SHM is \_\_\_\_\_.  
 (A)  $x = x_0 \sin \omega t$  (B)  $x = \sin \omega t$  (C)  $x = x_0 \cos \omega t$  (D) zero
- 4 - Radius of Geo-stationary satellite is \_\_\_\_\_.  
 (A)  $4.23 \times 10^4$  m (B)  $4.23 \times 10^4$  km (C)  $4.23 \times 10^7$  m (D)  $4.23 \times 10^3$  m
- 5 - The speed of light in different medium is always \_\_\_\_\_.  
 (A) equal to 'c' (B) different (C) greater than c (D) becomes zero
- 6 - Intensity of light depends upon \_\_\_\_\_.  
 (A) wavelength (B) amplitude (C) velocity (D) frequency
- 7 - The value of 'g' at the centre of the earth is \_\_\_\_\_.  
 (A) infinite (B) 2 g (C) 3 g (D) zero
- 8 - Dimensions of  $\sqrt{\frac{F \times \ell}{m}}$  are \_\_\_\_\_.  
 (A)  $[M^0 L T^{-1}]$  (B)  $[M L^{-1} T]$  (C)  $[M L^2 T^{-3}]$  (D)  $[M L^{-1} T^{-1}]$
- 9 - SI unit of molar specific heat are \_\_\_\_\_.  
 (A)  $J \text{ mol}^{-1} \text{ K}^{-1}$  (B)  $J \text{ mol} \text{ K}^{-1}$  (C)  $J \text{ mol} \text{ K}$  (D)  $J \text{ mol}^{-1}$
- 10 - The ballistic missiles are only for \_\_\_\_\_.  
 (A) short range (B) long range (C) zero range (D) none of these
- 11 - The value of constant 'γ' for mono-atomic gas is \_\_\_\_\_.  
 (A) 1.67 (B) 1.40 (C) 1.0 (D) 1.2
- 12 - If least count is 10 kg then  $8.00 \times 10^3$  has significant digit \_\_\_\_\_.  
 (A) 1 (B) 2 (C) 3 (D) 4
- 13 - The angle between rectangular components is \_\_\_\_\_.  
 (A)  $60^\circ$  (B)  $90^\circ$  (C)  $180^\circ$  (D) Zero
- 14 - Projection of  $\vec{B}$  on  $\vec{A}$  is \_\_\_\_\_.  
 (A)  $A \cos \theta$  (B)  $B \cos \theta$  (C)  $A \sin \theta$  (D)  $B \sin \theta$
- 15 - Gravity performs no work, if the body moves \_\_\_\_\_.  
 (A) vertically (B) horizontally (C)  $60^\circ$  vertical (D) none of these
- 16 - The droplet of water has terminal velocity the acceleration is \_\_\_\_\_.  
 (A) maximum (B) minimum (C) zero (D) changed
- 17 - Speed of sound in copper is \_\_\_\_\_.  
 (A)  $38000 \text{ m s}^{-1}$  (B)  $3600 \text{ m s}^{-1}$  (C)  $3500 \text{ m s}^{-1}$  (D)  $3400 \text{ m s}^{-1}$



**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. Give the drawbacks to use period of a simple pendulum as a time standard.
- ii. What are the dimensions and units of gravitational constant  $G$  in the formula  $F = G \frac{m_1 m_2}{r^2}$  ?
- iii. What are the three main frontiers of fundamental science?
- iv. Differentiate between precise measurement and accurate measurement.
- v. Can the velocity of an object reverse the direction when acceleration is constant?  
If so, give an example.
- vi. An object is thrown vertically upward. Discuss the sign of acceleration due to gravity, relative to velocity, while the object is in air.
- vii. What is velocity-time graph? What does its slope represent?
- viii. A projectile is thrown horizontally from a height with velocity of  $10 \text{ m s}^{-1}$  and reaches the ground after 2 sec. Find the horizontal distance covered by the projectile.
- ix. Calculate the entropy change when 1.0 kg of ice at  $0^\circ\text{C}$  melts into water at  $0^\circ\text{C}$ .  
Latent heat of fusion of ice is  $L_f = 3.36 \times 10^5 \text{ J kg}^{-1}$ .
- x. What happens to the temperature of the room, when an air conditioner is left running on a table in the middle of the room?
- xi. Give an example of a natural process that involves an increase in entropy.
- xii. 100 J of heat is supplied to a gas which increases its internal energy by 20 J.  
Find the work done by the system.

**3. Write short answers to any EIGHT questions.**

**(2 x 8 = 16)**

- i. Define null vectors and equal vectors.
- ii. Explain right hand rule to find the direction of vector product.
- iii. Can a body rotate about its centre of gravity under the action of its weight?
- iv. When rocket re-enters the atmosphere, its nose cone becomes very hot.  
Where does this heat energy come from?
- v. A girl drops a cup from certain height, which breaks into pieces.  
What energy changes are involved?
- vi. Name different sources of geothermal energy with brief discussion.
- vii. What is meant by moment of inertia? Explain its significance.
- viii. Show that orbital angular momentum  $L_0 = mvr$ .
- ix. What is the minimum orbital velocity for close orbiting satellite?
- x. Write down the postulates of Huygens's principle.
- xi. Can visible light produce interference fringes? Explain.
- xii. Explain whether the Young's experiment is an experiment for studying interference or diffraction effects of light.

**(Turn Over)**

**4. Write short answers to any SIX questions.**

**(2 x 6 = 12)**

- i. Explain, how the swing is produced in a fast moving cricket ball?
- ii. Show that in SHM the acceleration is zero when the velocity is greatest and the velocity is zero when the acceleration is greatest.
- iii. What are damping devices? Give at least one example.
- iv. If length of simple pendulum is increased four times, then what will be effect on its time period?
- v. How are beats useful in tuning musical instruments?
- vi. What features do longitudinal waves have in common with transverse waves?
- vii. What is the frequency and wavelength of 3<sup>rd</sup> mode of stationary waves in closed organ pipe?
- viii. Why would it be advantageous to use blue light with a compound microscope?
- ix. How the light signal is transmitted through the optical fibre?



**(SECTION – II)**

**Note: Attempt any THREE (3) questions from Section II.**

5. (a) What is gravitational field? Show that gravitational field is conservative field. (5)  
 (b) The magnitude of dot and cross products of two vectors are  $6\sqrt{3}$  and 6 respectively. (3)  
 Find the angle between the vectors.
6. (a) State and explain law of conservation of linear momentum. (5)  
 (b) The earth rotates on its axis once a day. Suppose by some process the earth contracts so that its radius is only half as large as at present. How fast will it be rotating then? (3)
7. (a) What is meant by Doppler's effect? Discuss this effect for these two cases. (5)  
 i) An observer moving towards a stationary source of sound.  
 ii) Source of sound moving away from a stationary observer.  
 (b) What gauge pressure is required in the city mains for a stream from a fire hose connected to the mains to reach a vertical height of 15.0 meter? (3)
8. (a) What is simple pendulum? Show that its motion is SHM. Derive an expression for its time period. Also find its frequency. (5)  
 (b) A mono-chromatic light of  $\lambda = 588 \text{ nm}$  is allowed to fall on a half silvered glass plate  $G_1$  in Michelson interferometer. If mirror M is moving through 0.233 mm. How many fringes will be observed to shift? (3)
9. (a) State and explain carnot engine and carnot theorem in detail and how would you determine which fact makes carnot engine a superior one? (5)  
 (b) A telescope is made of an objective of focal length 20 cm and an eye piece of 5.0 cm, both convex lenses. Find the angular magnification. (3)



# Gujranwala Board-2021

Roll No. of Candidate : \_\_\_\_\_

## PHYSICS

Time: 20 Minutes

(INTERMEDIATE PART - I) 321 - (I)

**OBJECTIVE** ----- **Code: 6471**

**Paper-I Group-I**

**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. Attempt as many questions as given in objective type question paper and leave others blank.



1. Which of the following is correct  
 (A)  $f = V\lambda$       ☒ (B)  $f = \frac{V}{\lambda}$       (C)  $f = \frac{1}{V\lambda}$       (D)  $f = \frac{\lambda}{V}$
2. The SI unit of co-efficient of viscosity is  
 (A)  $\text{kg m s}$       (B)  $\text{kg m}^{-1} \text{s}$       ☒ (C)  $\text{kg m}^{-1} \text{s}^{-1}$       (D)  $\text{kg m s}^{-1}$
3.  $\vec{A} \times \vec{A} =$   
 (A)  $2\vec{A}$       (B)  $A^2$       ☒ (C)  $\vec{0}$       (D)  $0$
4. The direction of a vector in a plane is denoted by the angle which the representative line of the vector makes with  
☒ (A) positive x-axis in the anti-clock wise direction  
 (B) positive x-axis in the clock wise direction  
 (C) negative x-axis in the anti-clock wise direction  
 (D) negative x-axis in the clock wise direction
5. If mass  $m$  of the water strikes the wall in time ' $t$ ' then force  $F$  on the wall is  
☒ (A)  $F = \frac{mv}{t}$       (B)  $F = \frac{mt}{v}$       (C)  $F = \frac{vt}{m}$       (D)  $F = \frac{m}{vt}$
6. A typical rocket consumes fuel about  
 (A)  $100 \text{ kg s}^{-1}$       (B)  $1000 \text{ kg s}^{-1}$       ☒ (C)  $10000 \text{ kg s}^{-1}$       (D)  $100000 \text{ kg s}^{-1}$
7. The value of escape velocity is maximum for  
 (A) Moon      (B) Earth      ☒ (C) Jupiter      (D) Mercury
8. The moment of inertia for a cylinder is  
 (A)  $mr^2$       ☒ (B)  $\frac{1}{2}mr^2$       (C)  $\frac{2}{5}mr^2$       (D)  $\frac{1}{12}mr^2$
9. The rotational K.E. of a disc is  
 (A)  $K.E_{\text{rot}} = mv^2$       (B)  $K.E_{\text{rot}} = \frac{1}{2}mv^2$       ☒ (C)  $K.E_{\text{rot}} = \frac{1}{4}mv^2$       (D)  $K.E_{\text{rot}} = 2mv^2$
10. The Bernoulli's equation is for a fluid which is  
 (A) viscous      (B) compressible      (C) inturbulent flow      ☒ (D) in steady flow
11. In a microwave oven, the waves produced have a wavelength of  
 (A) 10 cm      ☒ (B) 12 cm      (C) 14 cm      (D) 16 cm
12. It becomes difficult to recognize the beats if the difference between the frequencies of the two sounds is more than about  
 (A) 6 Hz      (B) 8 Hz      (C) 4 Hz      ☒ (D) 10 Hz
13. If a string vibrates in four segments at a frequency of 120 Hz, its fundamental frequency will be  
☒ (A) 30 Hz      (B) 60 Hz      (C) 120 Hz      (D) 480 Hz
14. The distance between two adjacent dark fringes is equal to  
☒ (A)  $\frac{\lambda L}{d}$       (B)  $\frac{\lambda d}{L}$       (C)  $\frac{dL}{\lambda}$       (D)  $\frac{d}{L\lambda}$
15. The equation used to determine the speed of light by Michelson is  
 (A)  $c = 8fd$       ☒ (B)  $c = 16fd$       (C)  $c = \frac{8}{fd}$       (D)  $c = \frac{16}{fd}$
16. By kinetic theory of gases, the gas molecules are in  
 (A) angular motion      (B) circular motion      ☒ (C) random motion      (D) linear motion
17. The conversion of available heat energy into work by a petrol engine is about  
☒ (A) 10%      ☒ (B) 15%      ☒ (C) 20%      ☒ (D) 25%

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# Gujranwala Board-2021

## PHYSICS

(INTERMEDIATE PART - I) 321

Paper- I Group - I

Time: 2:40 Hours

SUBJECTIVE

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)

- Calculate the dimension of physical quantities, if possible,  $2\pi$  and rupees hundred.
- Add the following masses given in kg upto appropriate precision 2.189, 0.089, 11.8 and 5.32.
- State the principle of homogeneity of physical quantities equation.
- What are the dimensions and units of gravitational constant  $G$  in the formula  $F = \frac{G m_1 m_2}{r^2}$ ?
- Find the dot product of two vectors, if  $\vec{A} = 3\hat{k}$  and  $\vec{B} = -5\hat{j}$ .
- Write down the five steps to find addition of vectors by rectangular components.
- Suppose the sides of a closed polygon represent vectors arranged by head-to-tail rule. What is the sum of these vectors?
- Add a vector  $\vec{A} = 2\hat{i} + 3\hat{j}$  and thirty chairs.
- When two identical masses collide with each other in elastic collision. What will be the velocities after collision?
- Is momentum is conserved in an inelastic collision? Explain the reason.
- How the hair acts like a crumple zone on your skull?
- Is law of conservation of momentum is valid in an inelastic collision?

#### 3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- An object has one J of potential energy. Explain what does it mean?
- Calculate the work done in kilo joules in lifting a mass of 10 kg through a vertical height of 10 m.
- State law of conservation of energy.
- Define escape velocity. Give its units.
- State law of conservation of angular momentum. Also define isolated system.
- State the direction of following in simple situation, angular momentum, angular velocity.
- Is it possible for two identical waves travelling in same direction along a string to give rise to a stationary wave?
- How are beats useful in tuning musical instruments?
- What is relation between total energy, potential energy and kinetic energy of a body executing SHM?
- What is meant by phase angle; does it define angle between maximum displacement and driving force?
- Describe some common phenomena in which resonance plays an important role.
- Define free and forced oscillations.

#### 4. Write short answers to any SIX questions.

(2 x 6 = 12)

- How would you get more orders of spectra using a diffraction grating?
- Could you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?
- Define diffraction grating. Write the formula for grating element.
- Why would it be advantageous to use blue light with compound microscope?

(Turn Over)



## Gujranwala Board-2021

- v. Define isothermal process and adiabatic process.
- vi. Differentiate between reversible and irreversible processes.
- vii. Is it possible to construct a heat engine that will not expel heat into the atmosphere?
- viii. Briefly explain total internal reflection.
- ix. Derive Boyles law from kinetic molecular theory of gases.

### (SECTION - II)

5. (a) Define elastic collision. Show that relative speed of approach is equal to relative speed of separation for one dimensional collision. 5
- (b) The magnitude of dot and cross product of two vectors are  $6\sqrt{3}$  and 6 respectively. Find the angle between the vectors. 3
6. (a) Define stationary waves. Show that frequencies of stationary waves in a stretched string are quantized. 1+4
- (b) A car of mass 800 kg travelling at  $54 \text{ km/h}$  is brought to rest in 60 metres. Find the average retarding force on the car. 3
7. (a) Define moment of inertia. Give its unit and dimension. Derive its relation for a rigid body. 5
- (b) Certain globular protein particle has a density of  $1246 \text{ kg m}^{-3}$ . It falls through pure water ( $\eta = 8.0 \times 10^{-4} \text{ kg m}^{-1} \text{ s}^{-1}$ ) with a terminal speed  $3.0 \text{ cm h}^{-1}$ . Find radius of the particle. 3
8. (a) What is SHM? Derive a relation for instantaneous velocity and acceleration in terms of  $\omega$  in SHM and uniform circular motion. 1+4
- (b) A thermodynamic system under goes a process in which its internal energy decreases by 300 J. If at the same time 120 J of work is done on the system. Find the heat lost by the system. 3
9. (a) What is a simple microscope? Calculate its magnifying power. 5
- (b) A second order spectrum is formed at an angle of  $38^\circ$  when light falls normally on a diffraction grating having 5400 lines per centimetre. Determine wavelength of the light used. 3

214-321-45000



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# Gujranwala Board-2021

Roll No. of Candidate : \_\_\_\_\_

## PHYSICS

## (INTERMEDIATE PART - I) 321 - (I)

## Paper- I Group-II

Time: 20 Minutes

**OBJECTIVE** ----- **Code: 6472**

**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. Attempt as many questions as given in objective type question paper and leave others blank.



1. The dimensions of pressure are  
 (A)  $MLT^{-2}$  (B)  $ML^2T^{-2}$  (C)  $ML^{-1}T^{-2}$  (D)  $MLT^{-3}$
2. If  $r = 2.25 \pm 0.01$  cm then (%) percentage uncertainty in  $r$  is  
 (A) 0.225% (B) 22.5% (C) 0.2% (D) 0.4%
3. If  $\vec{A} = 4\hat{i} + 3\hat{j}$  then  $\hat{A} =$   
 (A)  $\frac{4\hat{i} + 3\hat{j}}{7}$  (B)  $\frac{4\hat{i} + 3\hat{j}}{5}$  (C)  $\frac{4\hat{i} + 3\hat{j}}{12}$  (D)  $\frac{4\hat{i} + 3\hat{j}}{6}$
4. The SI unit for torque is  
 (A) Nm (B)  $Nm^{-1}$  (C)  $mN^{-1}$  (D)  $N^{-1}m^{-1}$
5. If the water flows out from a pipe at  $3 \text{ kg s}^{-1}$  and its velocity changes from  $5 \text{ ms}^{-1}$  to zero on striking the wall then applied force is equal to  
 (A) 5N (B) 8N (C) 15N (D) 1.66N
6. The fuel consumed by a typical rocket is about  
 (A)  $100 \text{ kg s}^{-1}$  (B)  $1000 \text{ kg s}^{-1}$  (C)  $10000 \text{ kg s}^{-1}$  (D)  $100000 \text{ kg s}^{-1}$
7. Kilowatt hour is a unit for  
 (A) energy (B) power (C) time (D) momentum
8. One revolution =  
 (A)  $\frac{\pi}{2}$  rad (B)  $\pi$  rad (C)  $2\pi$  rad (D)  $4\pi$  rad
9. The moment of inertia of a sphere is given as  
 (A)  $\frac{1}{2}mr^2$  (B)  $\frac{2}{5}mr^2$  (C)  $\frac{1}{5}mr^2$  (D)  $\frac{1}{12}mr^2$
10. Torricelli's theorem can be written as  
 (A)  $V = \sqrt{2g(h_1 - h_2)}$  (B)  $V = 2g(h_1 - h_2)$  (C)  $V = 2g\sqrt{(h_1 - h_2)}$  (D)  $V = \sqrt{2g}(h_1 - h_2)$
11. The total distance travelled by an object with SHM, having amplitude  $A$ , in a time equal to its period is  
 (A)  $\frac{A}{4}$  (B)  $\frac{A}{2}$  (C)  $2A$  (D)  $4A$
12. If the wavelength of a wave is 1500 m and moves with a velocity of  $3 \times 10^8 \text{ ms}^{-1}$ , its frequency will be  
 (A)  $5 \times 10^{-6} \text{ Hz}$  (B)  $2 \times 10^5 \text{ Hz}$  (C)  $45 \times 10^{10} \text{ Hz}$  (D)  $3.15 \times 10^6 \text{ Hz}$
13. Waves transport  
 (A) energy (B) wavelength (C) power (D) mass
14. Bragg equation is given as  
 (A)  $2d \sin\theta = n\lambda$  (B)  $d \sin\theta = n\lambda$  (C)  $2d = n\lambda$  (D)  $2d = (n + \frac{1}{2})\lambda$
15. The least distance of distinct vision is  
 (A) 10 cm (B) 15 cm (C) 20 cm (D) 25 cm
16. Operating between the same two temperatures which heat engine is the most efficient?  
 (A) carnot engine (B) diesel engine (C) petrol engine (D) steam engine
17. The value of universal gas constant 'R' is  
 (A)  $1.6 \text{ J mol}^{-1} \text{ K}^{-1}$  (B)  $1.38 \text{ J mol}^{-1} \text{ K}^{-1}$  (C)  $8.314 \text{ J mol}^{-1} \text{ K}^{-1}$  (D)  $6.02 \text{ J mol}^{-1} \text{ K}^{-1}$

215-(I)-321-45000



# Gujranwala Board-2021

## PHYSICS

(INTERMEDIATE PART - I) 321

Paper- I Group - II

Time: 2:40 Hours

SUBJECTIVE

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)

- Describe the methods to find uncertainty in the average value of many measurements.
- The time of 30 vibrations of simple pendulum recorded by a stop watch accurate upto one tenth of a second is 54.6 seconds. Find its uncertainty.
- By using dimensional analysis, find the dimension of power.
- Find the percentage uncertainty in the volume of a cylinder, if the percentage uncertainties in length and diameter of cylinder are 0.3% and 0.6% respectively.
- Write down the five steps to find addition of vectors by rectangular components.
- If  $\vec{A} = 3\hat{i} - \hat{j}$  and  $\vec{B} = 5\hat{k}$ . Find the dot product of  $\vec{A}$  and  $\vec{B}$  vectors.
- Suppose the sides of a closed polygon represent vectors arranged by head-to-tail rule. What is the sum of these vectors?
- Show that impulse and momentum has same unit.
- At what point or points in its path does a projectile has its minimum speed, its maximum speed?
- In the absence of friction, then how the vertical and horizontal components of velocity change?
- How does the rocket propulsion take place?
- Explain what do you understand the term viscosity?

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- A girl drops a cup from a certain height, which breaks into pieces, what energy changes are involved?
- When a rocket re-enters the atmosphere, its nose cone becomes very hot. Where does this heat energy come from?
- State work energy principle.
- Give the units and dimensions of angular velocity.
- Define moment of inertia. Give its units and dimension.
- Show that orbital angular momentum  $L_o = mvr$ .
- Define resonance. What are its types?
- What is difference between free and forced oscillations?
- What is relation between total energy, potential energy and kinetic energy of a body executing SHM?
- Why does sound travel faster in solids than in gases?
- How are beats useful in tuning musical instruments?
- Define node and antinode.

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- Explain whether the Young's experiment is an experiment for studying interference or diffraction effects of light.
- The centre of Newton's rings is dark. why?
- How is the distance between interference fringes affected by the separation between the slits of Young's experiment?
- Why would it be advantageous to use blue light with a compound microscope?
- Write down two advantages of fibre optics over radio wave carriers.

(Turn Over)

## Gujranwala Board-2021

- vi. Explain that the average velocity of the molecules in a gas is zero but the average of the square of velocities is not zero.
- vii. Is it possible to convert internal energy into mechanical energy? Explain with an example.
- viii. Define isothermal and adiabatic processes.
- ix. State second law of thermodynamics.

### (SECTION - II)



- 5. (a) Define projectile motion. Derive expressions for the height of the projectile and time of flight of the projectile. 1+2+2
- (b) Two forces of magnitude 10 N and 20 N act on a body in directions making angles  $30^\circ$  and  $60^\circ$  with x-axis respectively. Find the resultant force. 3
- 6. (a) Define conservative field and prove that work done is independent of the path followed by the body in gravitational field. 5
- (b) A car of mass 800 kg travelling at  $54 \text{ km h}^{-1}$  is brought to rest in 60 metres. Find the average retarding force on the car. 3
- 7. (a) State the Stokes' law and derive the equation of continuity. 1+4
- (b) What is the least speed at which an aeroplane can execute a vertical loop of 1.0 km radius So that there will be no tendency for the pilot to fall down at the highest point? 3
- 8. (a) What is simple pendulum? Show that the motion of pendulum is SHM. Also derive relation for its time period. 5
- (b) A heat engine performs 100 J work and at the same time rejects 400 J of heat energy to the cold reservoirs. What is the efficiency of the engine? 3
- 9. (a) Describe the principle, construction and working of Michelson's interferometer. How can you find the wavelength of light used? 5
- (b) An astronomical telescope having magnifying power of 5 consist of two thin lenses 24 cm apart. Find the focal lengths of the lenses. 3

215-321-45000



Roll No. of Candidate: \_\_\_\_\_

Physics (New Scheme)

(INTERMEDIATE PART-I) 319-(II)

Group: I

Paper: I

Time: 20 Minutes

OBJECTIVE

Marks: 17

Code: 6473

**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. Attempt as many questions as given in objective type question paper and leave other blank.

- The magnifying power of convex lens of focal length 10cm is:  
A) 7 B) 9.6 C) 3.5 D) 11
- If  $AB \sin \theta = AB \cos \theta$  then the angle between  $\vec{A}$  and  $\vec{B}$  is:  
A)  $30^\circ$  B)  $45^\circ$  C)  $60^\circ$  D)  $180^\circ$
- As the speed of object moving through a fluid increases then the drag force experienced by it:  
A) increases B) decreases C) remains constant D) becomes zero
- In a Michelson Interferometer by moving the mirror through a distance of  $\frac{\lambda}{4}$ , the path difference changes by:  
A)  $\frac{\lambda}{4}$  B)  $\frac{\lambda}{2}$  C)  $\lambda$  D)  $2\lambda$
- The ratio of moment of inertia of disc and hoop is:  
A)  $\frac{1}{4}$  B)  $\frac{1}{2}$  C)  $\frac{3}{4}$  D)  $\frac{3}{2}$
- \_\_\_\_\_ has the same dimensions.  
A) work and power B) momentum and energy  
C) work and torque D) power and pressure
- The louder the sound, the greater will be its:  
A) wavelength B) amplitude C) speed D) frequency
- If the resultant of two vectors each of magnitude 'F' is also of magnitude 'F' then the angle between them will be:  
A)  $30^\circ$  B)  $60^\circ$  C)  $90^\circ$  D)  $120^\circ$
- \_\_\_\_\_ is derived unit.  
A) candela B) ampere C) kelvin D) newton
- At constant temperature, if pressure is halved then its volume is:  
A) constant B) halved C) four times D) doubled
- \_\_\_\_\_ is non-conservative force.  
A) electric force B) magnetic force C) gravitational force D) frictional force
- Change in entropy of reversible process is:  
A) positive B) negative C) zero D) maximum
- The total energy of mass-spring system is independent of:  
A) mass of the body B) amplitude  
C) spring constant D) nature of material of spring
- Pull of earth on a mass of 10 Kg on the surface of the earth is:  
A) 95 N B) 96 N C) 97 N D) 98 N
- One radian is equal to:  
A)  $77.3^\circ$  B)  $67.3^\circ$  C)  $57.3^\circ$  D)  $47.3^\circ$
- Pascal is the unit of:  
A) pressure B) force C) tension D) weight
- Distance between two adjacent crests and troughs is:  
A)  $\lambda$  B)  $\frac{\lambda}{2}$  C)  $\frac{\lambda}{4}$  D)  $2\lambda$

**(SECTION - I)**

**2. Write short answers to any EIGHT questions.**



**(2 × 8 = 16)**

- i. How many nanoseconds are there in one year?
- ii. Give the drawbacks to use the period of a pendulum as a time standard.
- iii. State right hand rule for the cross product of two vectors.
- iv. If  $\vec{A} = \hat{i} - 2\hat{j} + 3\hat{k}$  and  $\vec{B} = 2\hat{i} - \hat{j} + \hat{k}$ , then find  $\vec{A} \cdot \vec{B}$
- v. Can a body rotate about its centre of gravity under the action of its weight?
- vi. What is the biomass? Write the names of two methods to obtain energy from biomass.
- vii. What is Aquifer?
- viii. State Bernoulli's relation for a liquid in motion and describe some of its applications.
- ix. A person is standing near a fast moving train. Is there any danger that he will fall towards it?
- x. Define free oscillations and forced oscillations.
- xi. Can we realize an ideal simple pendulum? Explain briefly.
- xii. Does frequency depends on amplitude for harmonic oscillators?

**3. Write short answers to any EIGHT questions.**

**(2 × 8 = 16)**

- i. An object is thrown vertically upward. Discuss the sign of acceleration due to gravity, relative to velocity, while the object is in air.
- ii. Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true? Discuss.
- iii. Which quantity remains same at all points on the trajectory of a projectile; either velocity or acceleration? Explain.
- iv. Define impulse. Does a moving object having uniform velocity has impulse?
- v. Explain how many minimum number of geo-stationary satellites are required for global coverage of T.V transmission?
- vi. Why does a diver change his body positions before and after diving in the pool?
- vii. A disc without slipping rolls down a hill of height 10.0 m. If the disc starts from rest at the top of hill, what is its speed at the bottom?
- viii. Define angular acceleration. Write its unit.
- ix. Why does sound travel faster in solids than in gases?
- x. As a result of a distant explosion, an observer senses a ground tremor and then hears the explosion. Explain the time difference.
- xi. What do you mean by harmonic series?
- xii. What is the effect of density on speed of sound in a gas?

**4. Write short answers to any SIX questions.**

**(2 × 6 = 12)**

- i. Explain whether the Young's experiment is an experiment for studying interferences or diffraction effect of light.
- ii. What is the function of collimator in a spectrometer?
- iii. Why central spot of Newton's ring is dark?
- iv. Could you obtain Newton's ring with transmitted light? If yes, would the pattern be different from that obtained with reflected light?
- v. How the light signal is transmitted through the optical fibre?
- vi. Give an example of natural process that involves an increase in entropy.
- vii. A thermo flask containing milk as a system is shaken rapidly. Does the temperature of milk rise?
- viii. Is it possible to convert internal energy into mechanical energy? Explain with an example.
- ix. Define triple point, what is triple point of water?

**(Turn Over)**



## Gujranwala Board-2019

- 2 -

### (SECTION - II)



- |    |     |                                                                                                                                                                                                                   |     |
|----|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 5. | (a) | Differentiate between precision and accuracy with example.                                                                                                                                                        | 5   |
|    | (b) | Find the average speed of Nitrogen molecules in air under standard conditions of pressure and temperature.                                                                                                        | 3   |
| 6. | (a) | What are rectangular components, explain. How a vector is obtained from its rectangular components.                                                                                                               | 5   |
|    | (b) | A truck weighing 2500 Kg and moving with velocity of $21 \text{ ms}^{-1}$ collides with a stationary car weighing 1000 Kg. The truck and the car move together after the impact. Calculate their common velocity. | 3   |
| 7. | (a) | Define standing waves. Find the relations for frequencies of these waves in different air columns.                                                                                                                | 5   |
|    | (b) | A force (thrust) of 400 N is required to overcome road friction and air resistance propelling an automobile at $80 \text{ Km h}^{-1}$ . What power must the engine develop?                                       | 3   |
| 8. | (a) | Derive the relation for Artificial Gravity.                                                                                                                                                                       | 5   |
|    | (b) | What should be the length of a simple Pendulum whose period is 1.0 second at a place where $g = 9.8 \text{ ms}^{-2}$ ? What is the frequency of such a pendulum?                                                  | 3   |
| 9. | (a) | What is a bandwidth? Discuss the fibre optic principles?                                                                                                                                                          | 1+4 |
|    | (b) | A light is incident normally on a grating which has 2500 lines per centimeter. Compute the wavelength of a spectral line for which the deviation in a second order is $15.0^\circ$ ?                              | 3   |

215-319-39000

Roll No. of Candidate: \_\_\_\_\_

**Physics (New Scheme) (INTERMEDIATE PART-I) 319-(III) Group: II Paper: I**  
**Time: 20 Minutes OBJECTIVE Marks: 17**  
**Code: 6476**

**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. Attempt as many questions as given in objective type question paper and leave other blank.

1. A layer over the central core of the jacket is called:  
 A) jacket B) plastic C) cladding D) rubber
2. The direction of angular momentum of a body moving along a circle is:  
 A) along the tangent B) perpendicular to the plane of the circle  
 C) radially outward D) radially inward
3. When the temperature increases, the viscosity of the gases:  
 A) decreases B) remains constant C) increases D) none of these
4. For which of the following colours will the fringe width be minimum in the double slit experiment:  
 A) violet B) red C) green D) yellow
5. Choose the quantity which plays the same role in angular motion as that of mass in linear motion:  
 A) angular acceleration B) torque C) moment of inertia D) angular momentum
6. The dimension  $[M^0 L T^0]$  represents the quantity:  
 A) Length B) Mass C) Time D) Velocity
7. Tuning fork is a source of:  
 A) energy B) heat C) light D) sound
8. If a force of 10 N is acting along x-axis then its component along y-axis is:  
 A) zero B) 5 N C) 10 N D) 15 N
9. The significant figures in 0.0004813 are:  
 A) 8 B) 7 C) 4 D) 3
10. According to first law of thermodynamics the quantity which is conserved is:  
 A) force B) momentum C) power D) energy
11. If the velocity of an object is doubled then its K.E becomes:  
 A) double B) constant C) four times D) sixteen times
12. What remains constant in adiabatic process?  
 A) volume B) pressure C) entropy D) temperature
13. When the bob of simple pendulum is at extreme position then its K.E is:  
 A) maximum B) minimum C) zero D) small
14. If the force acting on a body is doubled, then the acceleration becomes:  
 A) constant B) double C) half D) one fourth
15. The dot product of  $\vec{A}$  with itself is equal to:  
 A)  $A$  B)  $A^2$  C) zero D)  $2A$
16. On the average for normal healthy person diastolic pressure is:  
 A) 120 torr B) 110 torr C) 100 torr D) 75 - 80 torr
17. Longitudinal waves do not exhibit:  
 A) reflection B) refraction C) diffraction D) polarization



# Gujranwala Board-2019

Physics (New Scheme)

(INTERMEDIATE PART-I) 319

Group: II

Paper: I

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

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

(SECTION - I)

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2. Write short answers to any EIGHT questions.

(2 × 8 = 16)

- Name several repetitive phenomenon occurring in nature which could serve as reasonable time standards.
- Define random error and systematic error.
- Define null vector. Give example.
- Is it possible to add a vector quantity to a scalar quantity?
- Can a body rotate about its centre of gravity under the action of its weight?
- What do you mean by geothermal energy?
- An object has 1 J of potential energy. Explain what does it mean?
- A person is standing near a fast moving train. Is there any danger that he will fall towards it?
- Define terminal velocity.
- In relation to SHM, explain the equation:  $a = -\omega^2 x$
- What are free and forced oscillations?
- Does frequency depends on amplitude for harmonic oscillator?

3. Write short answers to any EIGHT questions.

(2 × 8 = 16)

- State superposition principle.
- Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave?
- Explain why sound travels faster in warm air than in cold air?
- What is the effect on the phase of a wave if it is reflected from the boundary of a:  
a) rare medium      b) denser medium
- Derive relation between linear and angular acceleration.
- Explain how many minimum number of geostationary satellites are required for global coverage of T.V transmission?
- Define angular momentum and also state law of conservation of angular momentum.
- Define angular velocity, how its direction is determined?
- An object is thrown vertically upwards. Discuss the sign of acceleration due to gravity, while the object is in air.
- Define inertial frame of reference.
- How the acceleration and distance are determined from velocity time graph?
- Define centripetal force and centripetal acceleration. Also write their relations. (do not derive)

4. Write short answers to any SIX questions.

(2 × 6 = 12)

- An oil film spreading over a wet footpath shows colours. Explain how does it happen?
- How would you distinguish between un-polarized and plane polarized lights?
- Why adiabat is steeper than isotherm? Explain.
- What do you understand by linear magnification and angular magnification?
- Define the critical angle.
- What is negative entropy? Give example and its unit.
- What is degradation of energy?
- Why is the average velocity of molecules in a gas zero but the average of square of the velocities is not zero?
- Why does the pressure of gas in car tyre increase when it is driven through some distance?

(Turn Over)

## Gujranwala Board-2019

- 2 -

### (SECTION - II)

5. (a) Completely describe the Carnot Engine. Derive formula for its efficiency. 5  
 (b) i) How many seconds are there in 1 year? 3  
 ii) How many nano seconds in 1 year?  
 iii) How many years in 1 second?
6. (a) Define elastic Collision. Considering the elastic collision in one-dimension of two bodies, show that speed of approach is equal to speed of separation. 5  
 (b) A spherical ball of weight 50 N is to be lifted over a step as shown in figure. Calculate the minimum force needed just to lift it above the floor. 3
- The diagram shows a spherical ball of radius 10 cm. A horizontal force  $F$  is applied to the left at the top of the ball. The ball is in contact with a horizontal floor and a vertical step of height 5 cm. The distance from the point of application of force to the corner of the step is 20 cm.
7. (a) Derive the relation for absolute potential energy. 5  
 (b) Find the temperature at which the velocity of sound in air is two times of its velocity at  $10^\circ\text{C}$ . 3
8. (a) What is a difference between centripetal force and centrifugal force? Derive the relation for it  $F_c = m r \omega^2$ ? 1+4  
 (b) A block of mass 4.0 kg is dropped from a height of 0.80m on to a spring of spring constant  $k = 1960\text{Nm}^{-1}$ . Find the maximum distance through which the spring will be compressed? 3
9. (a) Define interference. Derive conditions for minima and maxima in Young's Double-slit interference experiment. 5  
 (b) An astronomical telescope having magnifying power of 5 consists of two thin lenses 24cm apart. Find the focal lengths of the lenses. 3

216-319-37000



**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 more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

- 1- 1- The cross product of two anti-parallel vectors is:  
(A) 0 (B) 1 (C) Maximum (D) Negative
- 2- Michelson interferometer can be used to find:  
(A) wavelength of light (B) wavelength of sound (C) velocity of sound (D) velocity of light
- 3- The magnifying power of an astronomical telescope is 10. If the focal length of objective is 100 cm then what is the focal length of eye-piece?  
(A) 10 cm (B) 100 cm (C) 1000 cm (D) 5 cm
- 4- When speed of a body is doubled then its:  
(A) K.E is doubled (B) P.E is doubled  
(C) acceleration is doubled (D) momentum is doubled
- 5- When temperature of source and sink of a heat engine becomes equal then the entropy change will be:  
(A) zero (B) minimum (C) maximum (D) negative
- 6- The distance between two consecutive crests is called:  
(A) displacement (B) amplitude (C) wave front (D) wavelength
- 7- If a body of mass 1kg is allowed to fall freely then its weight becomes:  
(A) 1 N (B) 9.8 N (C) 980 N (D) zero
- 8- If the time period of a pendulum is 2 seconds then its frequency will be:  
(A) 1 Hz (B) 2 Hz (C) 0.5 Hz (D) 0.25 Hz
- 9- If blue light is used as compared to red light then fringe spacing:  
(A) increases (B) decreases (C) remains same (D) becomes zero
- 10- If  $\vec{A} = 2\hat{i} + 3\hat{j} - \hat{k}$  and  $\vec{B} = 4\hat{i} + 6\hat{j} - 2\hat{k}$ . The angle between them will be:  
(A)  $0^\circ$  (B)  $45^\circ$  (C)  $60^\circ$  (D)  $90^\circ$
- 11- Error in the measurement of radius of sphere is 1%. The error in the calculated value of its area is:  
(A) 1 % (B) 2 % (C) 3 % (D) 4 %
- 12- If the mass of a body is doubled, then acceleration becomes:  
(A) one fourth (B) half (C) double (D) constant
- 13- The diastolic pressure of a normal healthy person is:  
(A) 70 to 75 torr (B) 75 to 80 torr (C) 80 to 85 torr (D) 70 to 80 torr
- 14- If a stretched string is 2m, and it has 2 loops of stationary waves then wavelength is:  
(A) 4 m (B) 3 m (C) 2 m (D) 1 m
- 15- Which one of the following processes is irreversible?  
(A) slow compression of an elastic spring (B) slow evaporation of a substance in an isolated vessel  
(C) slow compression of a gas (D) a chemical explosion
- 16- The dimensions of centripetal force are:  
(A)  $[MLT^{-1}]$  (B)  $[ML^2T^{-2}]$  (C)  $[MLT^{-2}]$  (D)  $[ML^{-2}T^{-2}]$
- 17- Work has the same dimensional formula as:  
(A) torque (B) momentum (C) force (D) angular acceleration



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- Define metre and kilogram.
- ii- What is meant by scientific notation? Explain.
- iii- How do you assess the total uncertainty in the final result for multiplication and division? Explain with example.
- iv- Write down the two uses of dimensional analysis.
- v- To get the sum of two vectors equal to null vector, what are conditions?
- vi- What is the orientation of vector  $\vec{R}$  when  $R_x$  and  $R_y$  have opposite signs?
- vii- If  $\vec{A} = 4\hat{i} + 3\hat{j}$  then find  $\hat{A}$ .
- viii- How the acceleration and distance covered by a body can be measured from velocity-time graph?
- ix- State Newton's third law of motion and give its two examples.
- x- What are the circumstances for which the velocity and acceleration of a car are i) parallel , ii) perpendicular to each other?
- xi- Explain, how the swing is produced in a fast moving tennis ball?
- xii- What is meant when we say fluid is non-viscous and incompressible?

Write short answers to any Eight questions:

(2 x 8 = 16)

- i- Calculate the velocity of a body with which it should be projected upward so that it does not come back to earth.
- ii- An object has 1 J of potential energy. Explain what does it mean?
- iii- How can you calculate work done by a force acting on an object from force-displacement graph?
- iv- Derive the relation between radian, degree and revolution.
- v- Give an example to illustrate law of conservation of angular momentum.
- vi- What is meant by moment of inertia? Explain its significance?
- vii- Describe some common phenomena in which resonance plays an important role.
- viii- Does frequency depend on amplitude for harmonic oscillators?
- ix- What happens to the period of simple pendulum if length is doubled?
- x- Why does sound travel faster in solids than in gases?
- xi- Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave?
- xii- What do you mean by "Sonar Technique"?

4. Write short answers to any SIX questions:

(2 x 6 = 12)

- i- How would you distinguish between the unpolarized light and polarized light?
- ii- An oil film spreading over a wet footpath shows colours. Explain how does it happen?
- iii- Define diffraction of light.
- iv- Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why?
- v- Is it possible to construct a heat engine that will not expel heat into the atmosphere? Explain.
- vi- What is a Diesel engine? Explain.
- vii- Give any four postulates of kinetic theory of gases.
- viii- Draw the schematic diagram of refrigerator.
- ix- How the power is lost in optical fibre through dispersion?

(Turn Over)