

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)  $[M^0L^2T^0]$  (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)  $8.314 \times 10^{-3}\text{J}$

215-(I)-1<sup>st</sup>A 323-48000

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

3  
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2. Write short answers to any EIGHT questions.

(2 x 8 = 16)

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

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

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

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- i. What are the conditions for detectable interference of light waves?
- ii. An oil film spreading over a wet footpath shows colours. Explain how does it happen?
- iii. Could you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?
- iv. Define resolving power and give formula for its calculation in case of diffraction grating.
- v. 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)

(4) Cuj-11-1-23

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- 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  
i) Horizontal range      ii) Height of projectile (5)
- (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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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.

- 2  
Cuj-11-2-23
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<sup>13</sup>Hz (B) 10<sup>6</sup>Hz (C) 10<sup>15</sup>Hz (D) 10<sup>9</sup>Hz
  10. Human blood pressure is measured in  
(A) Nm<sup>-1</sup> (B) Nm<sup>-3</sup> (C) Nm<sup>-2</sup> (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

216-(I)-1<sup>st</sup>A 323-47000

PHYSICS

Time: 2:40 Hours

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

SUBJECTIVE

3

Paper: I Group - II

Marks: 68

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

11-2-23

SECTION - I

(2 x 8 = 16)

2. Write short answers to any EIGHT questions.

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

(2 x 8 = 16)

3. Write short answers to any EIGHT questions.

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

(2 x 6 = 12)

4. Write short answers to any SIX questions.

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

(Turn Over)

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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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