D

PAPER CODE - 6478

719795

11th CLASS – 12021

PHYSICS
GROUP : SECOND

DGK-G2-21

OBJECTIVE

TIME: 20 MINUTES
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.

QUESTION NO. 1

1	When droplet of water has terminal velocity the acceleration is (A) Maximum (B) Minimum (C) Zero (D) Constant
2	If the mass of the bob of a pendulum is doubled then its time period is (A) Halved (B) Doubled (C) Four times (D) Unchanged
3	Speed of sound in lead at 20 °C is (A) 1320 m/s (B) 1330 m/s (C) 1340 m/s (D) 1350 m/s
4	It becomes difficult to recognize the beats when the difference between the frequencies of two sounds more than about (A) 8 Hz (B) 10 Hz (C) 12 Hz (D) 6 Hz
5	In Michelson interferometer by moving the mirror through a distance of $\lambda/4$, the path difference changed by (A) $\lambda/4$ (B) $\lambda/2$ (C) $\frac{3}{4}\lambda$ (D) λ
6	The unit of magnifying power of a lens are (A) Watt (B) Joule (C) No unit (D) N – m
7	The value of Bolteman constant k is (A) 1.38×10^{-23} J K^{-1} (B) 1.38×10^{-25} J K^{-1} (C) 1.38×10^{-27} J K^{-1} (D) 1.38×10^{-29} J K^{-1}
8	If one mole of an ideal gas is heated at constant volume then (A) Qp = Cv ΔT (B) W = Cv ΔT (C) Qv = Cp ΔT (D) ΔU = Cv ΔT
9	In order to reduce the uncertainty in finding time period of a vibrating body, it is advised to count (A) Small number of swings (B) Large number of swings (C) Infinite number of swings (D) Both A and C
10	The dimensions of Einstein equation are E = mc^2 (A) [MLT^{-2}] (B) [ML^{-1}T^2] (C) [ML^{2}T^{-2}] (D) [ML^{-2}T^{-2}]
11	The magnitude of a vector $\vec{\gamma} = 3\hat{i} + 6\hat{j} + 2\hat{k}$ (A) 3 (B) 6 (C) 7 (D) 8
12	When line of action of applied force passes through the axis of rotation , then the torque is (A) Zero (B) 1 (C) Maximum (D) Minimum
13	If a force of 20 N acts on a body for 5 seconds then the change in momentum will be (A) 5 NS (B) 20 NS (C) 50 NS (D) 100 NS
14	A typical rocket eject the burn gases at speed of over (A) 400 m/s (B) 4000 m/s (C) 8000 m/s (D) 10,000 m/s
15	Which one the following is non-conservative force (A) Gravitational force (B) Electric force (C) Elastic spring force (D) Frictional force
16	One radian is equal to (A) 57.2° (B) 57.3° (C) 57.4° (D) 57.7°
17	The moment of inertia of solid disc or cylinder is (A) mr^2 (B) $\frac{1}{2}$ mr^2 (C) $\frac{1}{4}$ mr^2 (D) $\frac{1}{2}$ m^{2}r

PHYSICS
GROUP : SECOND

11th CLASS - 12021
SUBJECTIVE

TIME : 2.40 HOURS
MARKS : 68

SECTION-I

DGK-G2-21

QUESTION NO. 2 Write short answers of any Eight (8) parts of the following 16

(1) Three students measured the length of a needle with a scale on which minimum divisions is 1 mm and recorded as (i) 0.2145 m (ii) 0.21 m (iii) 0.214 m. which record is correct and why ?
(2) Find the dimensions and hence , the SI units of co-efficient of viscosity η in the Stoke's law $F = 6\pi\eta rv$
(3) Check the correctness of the relation $V = \sqrt{\frac{F \times l}{m}}$ dimensionally
(4) Write the dimensions of (i) Force (ii) Acceleration
(5) Define the terms (i) Unit vector (ii) Position vector
(6) Suppose the sides of a closed polygon represent vector arranged head to tail. What is the sum of these vectors ?
(7) What is the vector product of two vectors , give its two characteristics
(8) Define projectile motion. Derive an expression for the time of flight
(9) At what point or points in its path does a projectile have its minimum speed , its maximum speed ?
(10) Define impulse and show how it is related to linear momentum
(11) Find the velocities of two elastically colliding bodies when $m_1 = m_2$ after collision
(12) Explain the difference between laminar flow and turbulent flow

QUESTION NO. 3 Write short answers of any Eight (8) parts of the following 16

(1) How can you find the work done by variable force by graphical method ?
(2) What will be the velocity of the particle if its momentum and kinetic energy are equal in magnitudes ?
(3) When a rocket re-enters the atmosphere, its nose cone becomes very hot.Where does this heat energy come from ?
(4) Prove that $a_t = r\alpha$
(5) What is meant by angular momentum ? Explain the law of conservation of angular momentum
(6) When mud flies off the tyre of a moving bicycle , in what direction does it fly ? Explain
(7) What is the distance travelled by an object moving with simple harmonic motion in a time equal to its period , if its amplitude is A ?
(8) Does the acceleration of a simple harmonic oscillator remain constant during its motion ? Is acceleration ever zero ? Explain
(9) If equation for simple harmonic motion is $x = 10 \sin\left(\frac{\pi}{6}\right)t$, then calculate the instantaneous displacement after 3 seconds
(10) Explain why sound travels faster in warm air than in cold air
(11) Write the characteristics of stationary waves (12) Explain the terms node and anti-node

QUESTION NO. 4 Write short answers of any Six (6) parts of the following 12

(1) Can the mechanical energy be converted completely into heat energy ? If so give an example
(2) Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why ?
(3) Derive Boyle's law using kinetic theory of gases
(4) A system absorbs 100 J heat at absolute temperature of 300 k . Calculate the change in entropy
(5) If the magnifying glass has magnifying power 6 then find the focal length of convex lens
(6) Explain the difference between angular magnification and resolving power of an optical instrument. What limits the magnification of an optical instrument ?
(7) If 5000 lines/cm are ruled on a diffraction grating then find its grating element.
(8) Under what conditions two or more sources of light behave as coherent sources ?
(9) How would you manage to get more orders of spectra using a diffraction grating ?

SECTION-II

Note: Attempt any Three questions from this section 8 x 3 = 24

Q.5 (A) Define projectile motion. If a projectile is fired in a direction angle θ with the horizontal by velocity Vi then find the relations for (i) time of flight (ii) range of projectile 1+2+2
(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
Q.6 (A) Derive the relation for absolute potential energy to lift a body from certain position to infinity 5
(B) An organ pipe has a length of 50 cm. Find the frequency of its fundamental note and next harmonic when it is open at both ends 3
Q.7 (A) Define rotational kinetic energy , derive it's relation. Also derive it for a disc and hoop 5
(B) How large must be a heating duct if air moving at 3.0 m/s along. it can replenish the air in the room of 300 m^3 volume every 15 min. Assume air's density remains constant 3
Q.8 (A) What is Carnot engine ? Discuss Carnot cycle. Also derive the relation for its % efficiency 5
(B) A block of mass 4.0 kg is dropped from a height of 0.80 m on to a spring of spring constant $k = 1960\ Nm^{-1}$ Find the maximum distance through which the spring will be compressed 3
Q.9 (A) How compound microscope is formed ? Derive an expression for its total magnification 2+3
(B) In a double slit experiment the second order maximum occurs at $\theta = 0.25°$, the wave length is 650 nm. Determine slit separation 3