(11th CLASS – 12018)

PHYSICS (NEW COURSE)
GROUP SECOND
ACADEMIC SESSION : 2015 -- 17 TO 2017 - 19

DGK-G2-11-18

TIME: 20 MINUTES
MARKS: 17

OBJECTIVE

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	Significant figure in 0.0045 are
	(A) 1 (B) 3 (C) 4 (D) 2
2	If $V = 5.2 \pm 0.1$ volt. The percentage uncertainty of V^3 will be
	(A) 2% (B) 4% (C) 6% (D) 1%
3	10 N and 20 N are acting on a body of mass 2 Kg , the minimum acceleration will be
	(A) 10 ms^{-2} (B) 20 ms^{-2} (C) 60 ms^{-2} (D) 5 ms^{-2}
4	$(\hat{i} \times \hat{j}) \times \hat{k} + (\hat{j} \times \hat{i}) \times \hat{i}$ will be
	(A) $-\hat{j}$ (B) $\hat{j}$ (C) $\hat{i}$ (D) $\vec{0}$
5	When projectile reaches the highest point of trajectory, the vertical component of velocity becomes
	(A) Small (B) Maximum (C) Zero (D) $V_i \cos\theta$
6	Which one is an example of non-renewable energy source ?
	(A) Oil (B) Wind (C) Sun light (D) Biomass
7	When a particle is moving in a circular path; its projection along diameter executes
	(A) Linear motion (B) Circular motion (C) Simple harmonic motion (D) Perpetual motion
8	Moment of inertia of solid sphere is
	(A) $m r^2$ (B) $\frac{2}{5} m r^2$ (C) $\frac{1}{12} m r^2$ (D) $\frac{1}{2} m r^2$
9	If the radius of droplet becomes half then its terminal velocity in the fluid will be
	(A) Half (B) Double (C) One fourth (D) One third
10	Stars moving towards Earth shows
	(A) Red shift (B) Blue shift (C) Compton's shift (D) Yellow shift
11	Tuning a radio is an example of resonance
	(A) Mechanical (B) Electrical (C) Magnetic (D) Physical
12	The basic principle of beats is
	(A) Interference (B) Diffraction (C) Polarization (D) Super position Principle
13	In case of point source , the shape of wave-front is
	(A) Plane (B) Spherical (C) Cylindrical (D) Circular
14	In interferometer ,shifting of one bright fringe to next by displacing the mirror
	(A) $\lambda/4$ (B) $\lambda/2$ (C) λ (D) $\lambda/8$
15	The diameter of the core of a single mode step index fiber is
	(A) $100 \mu m$ (B) $50 \mu m$ (C) $50 \mu m$ to $100 \mu m$ (D) $5 \mu m$
16	Efficiency of a heat engine working between temperature 27 °C and 327 °C will be
	(A) 50 % (B) 90 % (C) 40 % (D) 61 %
17	A cycle of petrol engine undergoes
	(A) Two processes (B) Three processes (C) Four processes (D) Single step

SECTION-I

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

(1) Show that the famous Einstein's Equation " $E = mc^2$ " is dimensionally correct .

(2) Does dimensional analysis give any information on constant of proportionality that may appear in an algebraic expression .Give one example?

(3) What is meant by the term precision? Explain briefly with one example.

(4) Differentiate between base quantities and derived quantities.

(5) Define position vector and equal vectors.

(6) Can a body rotate about the centre of gravity under the action of its weight ? Explain.

(7) Name two conditions that would make $\vec{A_1} \cdot \vec{A_2} = 0$

(8) State Newton's third law of motion. Explain briefly with one example.

(9) At what point or points in the path of a projectile it has maximum and minimum speed

(10) Define impulse and show that how it is related to linear momentum.

(11) Explain difference between Laminar flow and turbulent flow

(12) Why a fog droplet appears to be suspended in air.

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

(1) A girl drops a cup from a certain height, which breaks into pieces. What energy chages are involved ?

(2) What is geo-thermal energy?

(3) An object has 1 J of potential energy. What does it means. Explain.

(4) On what factors does moment of inertia depend?

(5) Why does a diver change his body position before and after diving in pool?

(6) Show that $Lo = mvr$

(7) Does frequency depend on the amplitude of harmonic oscillator?

(8) If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?

(9) Define resonance. Give its two examples in which resonance plays an important role.

(10) Differentiate between transverse and longitudinal waves .Give one example of each

(11) Explain the term nodes and antinodes.

(12) Explain why sound travel faster in warm air than in cold air ?

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

(1) Explain whether the young's experiment is an experiment for studying interference or diffraction effects of light?

(2) How would you distinguish between un-polarized and plane polarized lights?

(3) Write down the conditions for detectable interference.

(4) What are the two conditions for total internal reflection to take place?

(5) If, a person was looking through a telescope at full moon , how would the appearance of the full moon be changed by covering half of the objective lens?

(6) Why does the pressure of a gas in a car tyre increases when it is driven through some distance?

(7) A thermos flask containing milk, as a system is shaken rapidly. Does the temperature of milk rise?

(8) Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why?

(9) Define entropy. Give its mathematical form and SI unit.

SECTION-II

Note: Attempt any Three questions from this section $8 \times 3 = 24$

5. (a) State and explain Newton's second law of motion. And also derive this law in terms of momentum. 5

   (b) A load is suspended by two cords as shown in figure ,Determine the maximum load that can be suspended at 'P', if maximum breaking tension of the cord used is 50 N 3

6. (a) What is conservative field? Show that earth gravitational field is a conservative field 5

   (b) A gramophone record turntable accelerate from rest to an angular velocity of 45.0 rev min^{-1} in 1.60 s. What is the average angular acceleration? 3

7. (a) Define pressure of the gas. Derive its formula in terms of kinetic theory of gases. 5

   (b) A certain globular protein particles has a density of 1246 kg m^{-3}. It falls through pure water ($\eta + 8.0 \ 10^{-4}$ Nm^{-2}s) with a terminal speed of 3.0 cm h^{-1}. Find the radius of the particle 3

8. (a) What are stationary waves ? Describe the stationary waves produced in a stretched string and prove that their frequencies are quantized. 5

   (b) A 8.0 kg body executes SHM with amplitude 30 cm. The restoring force is 60 N when the displacement is 30 cm. Find the time period. 3

9. (a) What is compound microscope? Draw rays diagram and derive expression for the magnification of compound microscope. 5

   (b) A light is incident normally on a grating, which has 2500 lines per centimeter. Compute the wavelength of spectral line for which the deviation in second order is 15° 3