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Physics (New Scheme)

Paper : I

SWL   Roll No._____ Annual 2019

(INTER PART - I CLASS 11ᵗʰ)(II)   Time : 20 Minutes
                                          Marks : 17

Objective   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 with marker or pen. Cutting or filling two or more circles will result
in zero mark in that question.

1. 1. The speed of efflux is equal to the velocity gained by the falling fluid under the action of gravity
through a certain height is called
(A) Torricelli's theorem (B) Bernoulli's theorem (C) Stoke's theorem (D) Venturi's theorem

2. Formula one racing cars have a
(A) streamlined design (B) turbulented design (C) rectangular design (D) elliptical design

3. The frequency of waves produced in microwave oven is
(A) 2850 MHz (B) 2450 MHz (C) 2400 MHz (D) 2750 M Hz

4. The number of beats produced per sec. in two tuning forks is equal to
(A) sum of two frequencies (B) ratio of two frequencies
(C) the frequency of either of two tuning fork (D) the difference of the frequencies of two tuning forks

5. When a mirror of Michelson interferometer is moved a distance of 0.5 mm, then 2000 frings are
observed, the wavelength of light used is
(A) $5000 \times 10^{-10} m$ (B) $5000 \times 10^{-9} m$ (C) $1000 \times 10^{-7} m$ (D) $5000 \times 10^{-7} m$

6. The waves which do not require any medium for their propagation are called:
(A) mechanical waves (B) matter waves (C) electromagnetic waves (D) longitudinal waves

7. Microphone converts
(A) electrical signal into sound signal (B) electrical signal into light signal
(C) light signal into electrical signal (D) sound signal into electrical signal

8. No entropy change takes place in
(A) isothermal process (B) adiabatic process (C) isobaric process (D) isochoric process

9. A system does 700 Joules of work and at the same time its internal energy increases to 400 Joules,
heat supplied by the source is
(A) 700 Joules (B) 400 Joules (C) 1100 Joules (D) 300 Joules

10. Light year is the unit of
(A) time (B) distance (C) energy (D) time and distance

11. How many years in one second
(A) $3.1536 \times 10^7 years$ (B) $3.1536 years$ (C) $3.1 \times 10^{-8} years$ (D) $3.1 \times 10^8 years$

12. Magnitude of unit vectors $\hat{i} \times \hat{j}$ is
(A) 1 (B) -1 (C) $-\hat{j}$ (D) $+\hat{k}$

13. If cross product of two vectors $\vec{A} \times \vec{B}$ points along positive z – axis, then the vectors $\vec{A}$ and $\vec{B}$
must lie in
(A) $yz – plane$ (B) $xz – plane$ (C) $xy – plane$ (D) No plane

14. If a shell explodes in mid air, its fragments fly off in different directions. The total momentum
of the fragments
(A) decreases (B) increases (C) becomes zero (D) remains the same

15. The maximum velocity required of an object to go out from the gravitational field in heavenly body is
(A) moon (B) mercury (C) mars (D) earth

16. When a body moves in a circular path, the angle between its linear velocity and angular velocity is
(A) 180° (B) zero degree (C) 90° (D) 45°

17. In one revolution the angular displacement covered is
(A) 60° (B) 360° (C) 90° (D) 180°

4. Write short answers to any Six parts: (6 x 2 = 12)

    i.   Define the term Wavefront.

    ii.   How would you manage to get more orders of spectra using a diffraction grating.

    iii. Explain whether the Young's experiment is an experiment for studying interference or diffraction effects of light.

    iv.   Why would it be advantageous to use blue light with a compound microscope?

    v.   Define critical angle and least distance of distinct vision.

    vi.   State First Law of Thermodynamics.

    vii. Does the entropy of a system increase or decrease due to friction?

    viii. Explain why molar specific heat at constant pressure is greater than specific heat at constant volume.

    ix.   A thermos flask containing milk as a system is shaken rapidly. Does the temperature of milk rise?

Section - II

Note:-   Attempt any three (3) questions: ($8 \times 3 = 24$)

5. (a)   Show that pressure exerted by the gas is directly proportional to the average translational kinetic energy of the gas molecules.   5

    (b)   Show that the expression $v_f = v_i + at$ is dimensionally correct, where v_i is the velocity at $t = 0$, a is acceleration and v_f is the velocity at time t.   3

6. (a)   What do you mean by torque? Derive the expression for the torque acting on a rigid body.   5

    (b)   A ball is thrown horizontally from a height of 10m with velocity of $21 ms^{-1}$.   3
          How far off it will hit the ground?

7. (a)   Describe Newton's formula for the speed of sound in air and explain how it was corrected by Laplace?   5

    (b)   A car of mass 800kg travelling at 54 km/h is brought to rest in 60 meter. Find average retarding force on car.   3

8. (a)   Define simple pendulum. Show that motion of simple pendulum is simple harmonic motion.   5
          Also derive expression for its time period.

    (b)   What should be the orbiting speed to launch a satellite in a circular orbit 900 km above the surface   3
          of the earth. Mass of earth = $6 \times 10^{24} kg$ and radius of earth = 6400 km.

9. (a)   Describe the Young's double slit experiment to derive the relation for fringe spacing.   5

    (b)   A telescope is made of a objective of focal length 20 cm and an eye piece of 5.0 cm,   3
          both are convex lenses. Find the angular magnification.

SUBJECTIVE

Note:- Section I is compulsory. Attempt any 3 questions from Section II.

(Section – 1)

2. **Write short answers to any Eight parts.** (8 x 2 = 16)

    i. Give the drawbacks to use the period of simple pendulum as time standards.

    ii. How the digit 5 , if insignificant, will be rounded off?

    iii. Define the terms (i) Unit Vector (ii) Position Vector and write their mathematical expressions.

    iv. Is it possible to add a vector quantity to a scalar quantity? Explain.

    v. How would the two vectors of the same magnitude have to be oriented, if they were to be combined to give the resultant equal to a vector of the same magnitude?

    vi. Calculate the work done in kilo joules in lifting a mass of 10 kg (at a steady velocity) through vertical height of 10 m?

    vii. What sort of energy is in the following ?

        (a) compressed spring (b) a moving car

    viii. A person is standing near a fast moving train. Is there any danger that he will fall towards it?

    ix. In an orbiting space station, would the blood pressure in major arteries in the legs ever be greater than the blood pressure in major arteries in the neck?

    x. What is meant by phase angle? Does it define the angle between maximum displacement and the driving force?

    xi. Differentiate between Resonance and Damping .

    xii. Under what conditions does the addition of two simple harmonic motions produce a resultant, which is also simple harmonic?

3. **Write short answers to any Eight parts.** (8 x 2 = 16)

    i. State Law of Conservation of Momentum. What is its limitation?

    ii. Explain the circumstances in which the velocity $\vec{v}$ and acceleration $\vec{a}$ are parallel and anti parallel.

    iii. If angle of projection of a projectile is 90°. Find its range.

    iv. How can acceleration be found by velocity- time graph?

    v. What is meant by weightlessness?

    vi. Prove that orbital angular momentum depends upon the radius of the orbit.

    vii. What is meant by moment of inertia? Explain its significance.

    viii. Derive relation $S = r\theta$.

    ix. What do you know about radar speed trap?

    x. What are the quantities which affect the frequency of standing waves along a string?

    xi. What are the conditions for points which are in phase and out of phase?

    xii. As we know PV^r = Constant. What do you know about r in this relation?