Paper : I | Group : I | Objective – (ii) | Marks : 17

filling up two or more circles will result no mark.

SECTION – A

Q.1	Questions	A	B	C	D
1.	Which electromagnetic wave is used for the satellite communication system?	Radio waves	Infrared waves	Ultraviolet waves	Microwaves
2.	2° is equal to:	0.035 rad.	0.300 rad.	0.350 rad.	0.0035 rad.
3.	The dimensions of $\frac{1}{2}\rho V^2$ is same as that of:	K.E	P.E	Pressure	Work
4.	A simple harmonic oscillator has a period of 0.01s and an amplitude of 0.2m. The magnitude of velocity at the centre of oscillation is:	20π	40π	60π	80π
5.	A block weighing 4.0 kg extends a spring by 0.16m from its unstretched position, stretching force is:	20.3 N	16.3 N	39.2 N	14.2 N
6.	Speed of sound at $O^\circ C$ is 332 ms^{-1}. The speed of sound at $30^\circ C$ will be:	332 m/sec	350 m/sec	340 m/sec	335 m/sec
7.	In Michelson interferometer, to switch the fringes from bright to dark, the mirror should be displaced by:	$\frac{\lambda}{2}$	$\frac{\lambda}{3}$	$\frac{\lambda}{4}$	λ
8.	The refractive index of water is 1.33 the speed of light in water is: ($c = 3\times10^8$m/sec)	3×10^8m/sec	1.8×10^8m/sec	2.3×10^8m/sec	1.3×10^8m/sec
9.	Absolute zero corresponds to:	–459°F	–360°F	O°F	460°F
10.	The change in internal energy is defined as:	Q – T	Q + P	Q – P	Q – W
11.	An electric motor produces a tension of 4500N in a load lifting cable and rolls it at the rate of $2ms^{-1}$. The power of the motor is:	4kW	2kW	15kW	9kW
12.	Acceleration of rocket is given by relation:	$a=\frac{M}{mv}$	$a=\frac{m}{Mv}$	$a=\frac{mv}{m}$	$a=\frac{mv}{M}$
13.	Speed of the earth around the sun in ms^{-1} is:	35500	20000	29600	50000
14.	Two forces of magnitudes 10N and 20N act on a body in directions making angles of 30° each with x-axis. The x-component of the resultant force will be:	25.98 N	30.98 N	20.98 N	17.98 N
15.	If $\lvert\vec{a}+\vec{b}\rvert=\lvert\vec{a}-\vec{b}\rvert$ then angle between $\vec{a}$ and $\vec{b}$ is:	0°	45°	90°	180°
16.	Which pair of physical quantities have same dimensions?	Work and power	Momentum and impulse	Force and torque	Momentum and force
17.	Velocity of an object has 1% uncertainty and mass has 2% uncertainty then total uncertainty in K.E will be:	3%	2%	4%	1%

Physics

H.S.S.C (11th) 1st Annual 2023

Paper : I | Group : I | Subjective | Time : 2:40 Ho | Marks : 68

Note: Section **B** is compulsory. Attempt any **Three** questions from Section C

SWL GRP-1

SEC

2. Write short answers to any Eight parts. x 2 =

i. Distinguish between base units and derived units.
ii. What are random error and systematic error?
iii. Write the dimensions of: (i) Pressure (ii) Power.
iv. The period of a simple pendulum is measured by a stop watch. What type of errors are possible in the time period
v. Define: (i) Null vector (ii) Equal vectors.
vi. Vector $\vec{A}$ lies in the xy-plane. For what orientation will both of its rectangular components be negative? For orientation will its components have opposite signs?
vii. Can a vector have component greater than the vector's magnitude?
viii. Water flows out from a pipe at $3kg\,s^{-1}$ and its velocity changes from $5ms^{-1}$ to zero on striking the wall. What will b force exerted by water on the wall?
ix. Derive formula for time of flight of projectile.
x. What is the difference between elastic and inelastic collision?
xi. What is the difference between uniform and variable velocity?
xii. Two row boats moving parallel in the same direction are pulled towards each other. Explain.

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

i. A girl drops a cup from a certain height which breaks into pieces. Which energy changes are involved?
ii. In which case more work is done? When a 50 kg bag of books is lifted through 50cm or when a 50 kg crate is pushe through 2m across a force of 50N?
iii. Potential energy is the property of a conservative field. Explain.
iv. What is geostationary satellite and geo-stationary radius?
v. Show that orbital angular momentum $L_o = mvr$
vi. What is meant by moment of inertia? Explain its significance.
vii. If a mass spring system is hung vertically and set into oscillation, why does the motion eventually stop?
viii. Show that when a pendulum moves from mean position to half of amplitude, time taken by it is $t = \frac{T}{12}$.
ix. What is meant by phase angle?
x. Explain 'red shift' and 'blue shift' in light.
xi. Why does sound travel faster in solids than in gases?
xii. How are beats useful in tuning musical instruments?

4. Write short answers to any Six parts.

i. State Huygen's principle. **(6 x 2 = 12)**
ii. How would you manage more orders of spectra by using a diffraction grating?
iii. How is the distance between interference fringes affected by the separation between the slits of Young's experiment Can fringes disappear?
iv. What is the least distance of distinct vision? Also, give the length of this distance.
v. If a person was looking through a telescope at the full moon, how would the appearance of the moon be changed by covering half of the objective lens?
vi. What is the average translational K.E of molecules in a gas at temperature $27^{\circ}C$?
vii. How would you explain the sign convention of First Law of Thermodynamics?
viii. Why is the average velocity of the molecules in a gas zero but the average of the square of velocities is not zero.
ix. Why does the pressure of a gas in a car tyre increase when it is driven through some distance?

SECTION–C

(Note: Attempt any Three questions. Each question carries Eight (8) Marks)

5. (a) What is gravitational field? Show that gravitational field is a conservative field. **(8x3=24)**
(b) Find the projection of vector $\vec{A} = 2\hat{i} - 8\hat{j} + \hat{k}$ in the direction of the vector $\vec{B} = 3\hat{i} - 4\hat{j} - 12\hat{k}$. (5)

6. (a) State and prove the law of conservation of linear momentum. (3)
(b) A body of moment of inertia $I = 0.80$ kg m^2 about a fixed axis, rotate with a constant angular velocity of 100 rad s^{-1}. Calculate its angular momentum and the torque to sustain this motion. (5)

7. (a) State and prove Bernoulli's equation for an ideal fluid. (3)
(b) A carnot engine whose low temperature reservoir is at 7°C has an efficiency of 50%. It is desired to increase the efficiency to 70%. By how many degrees the temperature of the source be increased? (5)

8. (a) Define simple harmonic motion. Discuss that energy is conserved for a body executing simple harmonic motion. (3)
(b) Find the temperature at which the velocity of sound in air is two times its velocity at 10°C. (5)

9. (a) Describe how Michelson measured the speed of light? (3)
(b) In a double slit experiment the second order maximum occurs at $\theta = 0.25^{\circ}$. The wavelength is 650 (5)
the slit separation.