

JH = 6

Roll No.

(To be filled in by the candidate)

Physics

H.S.S.C (11th)-A-2022

Time : 20 Minutes

Paper : I Group : I

Objective – (i)

Marks : 17

PX-1A¹ **Sewal-61-22** Paper Code **6 4 7 1**

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 in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION-A

Q.1	Questions	A	B	C	D
1.	The time taken by light from moon to earth is:	1 min. 10 sec	1 min 20 sec	1 min 30 sec	1 min 40 sec
2.	If $r = 2.25 \pm 0.01$ cm then %age uncertainty in 'r' is:	0.2%	0.3%	0.4%	0.5%
3.	Magnitude of resultant vector of 6N and 8N which is perpendicular to each other is:	2 N	14 N	48 N	10 N
4.	The dimensions of torque are:	$[MLT^{-2}]$	$[ML^2T^{-2}]$	$[ML^{-1}T^{-2}]$	$[ML^{-1}T^{-1}]$
5.	When velocity time graph is parallel to time axis, then acceleration of moving body is:	Negative	Positive	Maximum	Zero
6.	The range of projectile is same for angles:	$15^\circ, 55^\circ$	$30^\circ, 50^\circ$	$35^\circ, 55^\circ$	$40^\circ, 60^\circ$
7.	The dimension of kinetic energy is similar to that of:	Power	Torque	Momentum	Pressure
8.	Centripetal force performs:	Minimum work	Maximum work	Negative work	No work
9.	30° is equal to:	$\frac{\pi}{2}$ radian	$\frac{\pi}{4}$ radian	$\frac{\pi}{6}$ radian	$\frac{\pi}{8}$ radian
10.	As the water falls from a top, its cross-sectional area should decrease according to:	Bernoulli's equation	Continuity equation	Venturi relation	Torricelli's theorem
11.	$\sqrt{\frac{m}{k}}$ and $\sqrt{\frac{l}{g}}$ has same:	Units	Time period	Numerical value	Damping
12.	If 20 waves pass through a medium in 1 Sec. with speed of 20 m/s then the wavelength is:	1 m	20 m	40 m	400 m
13.	The velocity of sound in vacuum at $0^\circ C$ is:	280 m/s	332 m/s	335 m/s	Zero
14.	The wavelength of x-rays is of the order of:	10 cm	10 m	10^{10} m	10^{-10} m
15.	The detector in photo-diode is made of:	Germanium	Selenium	Cadmium	Silicon
16.	If the temperature of sink is absolute zero, then efficiency of heat engine will be:	Zero	50 %	100 %	Infinity
17.	No entropy change takes place in:	Isothermal process	Isochoric process	Isobaric process	Adiabatic process

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Physics

H.S.S.C (11th)-A-2022

Time : 2:40 Hours

Paper : I

Group : I

Subjective

91-22

Marks : 68

Note: Section B is compulsory. Attempt any 3 questions from Section C.

SECTION-B

2. Write short answers to any Eight parts. (8 x 2 = 16)
- Give the drawbacks to use the period of pendulum as time standard.
 - Write the dimension of (i) Pressure (ii) Density
 - Explain circumstances in which the velocity \vec{v} and acceleration \vec{a} of a car are (i) anti-parallel (ii) $V = 0$ but $a \neq 0$
 - Differentiate between uniform velocity and variable velocity. Give units.
 - Why does the pressure of a gas in a car tyre increases when it is driven through some distance?
 - Is it possible to convert internal energy into mechanical energy? Give example.
 - How many seconds are there in one year?
 - What are the dimension and unit of $\left[\frac{F \times l}{m}\right]^{1/2}$?
 - Why First Law of Motion also called Law of inertia?
 - Differentiate between elastic and in-elastic collision.
 - Give three postulates of kinetic theory of gases.
 - Define isothermal process.
3. Write short answers to any Eight parts. (8 x 2 = 16)
- How a vector is determined when its rectangular components are given?
 - Find the projection of $\vec{A} = 2\hat{i} - 8\hat{j} + \hat{k}$ in the direction of $\vec{B} = 3\hat{i} - \hat{j} - 12\hat{k}$
 - Can a body rotate about its centre of gravity under the action of its weight?
 - Define variable force and conservative field.
 - A body of mass 2Kg is dropped from a height of 10m, find its velocity just before striking the ground (ignoring friction)
 - Calculate the work done in kilo Joules in lifting a mass of 10 Kg (at a steady velocity) through a vertical height of 10m.
 - When mud flies off the tyre of a moving bicycle, in what direction does it fly?
 - What is meant by moment of inertia? Explain its significance.
 - Show that $V = r\omega$
 - An oil film spreading over a wet foot path shows colours. Explain how does this happen?
 - Write the conditions for detectable interference of light.
 - Name the various methods for obtaining the polarized light.
4. Write short answers to any Six parts. (6 x 2 = 12)
- Two row boats moving parallel in the same direction are pulled toward each other. Explain.
 - Show that in SHM the acceleration is zero when the velocity is greatest and the velocity is zero when the acceleration is greatest.
 - Can we realize an ideal simple pendulum?
 - What is damping? Where it is useful?
 - It is possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave?
 - Explain why sound travels faster in warm air than in cold air.
 - Explain reflection of waves.
 - Explain the difference between angular magnification and resolving power of an optical instrument.
 - What is critical angle? Explain by ray diagram.

SECTION-C

(Each question carries Eight (8) Marks)

5. (a) Define Absolute Gravitational P.E. Show that absolute gravitational P.E of an object at the earth surface is 5
$$U = -G \frac{mM}{R}$$
- (b) A force $\vec{F} = 2\hat{i} + 3\hat{j}$ units, has its point of application moved from point A(1,3) to the point B(5,7). Find the work done. 3
6. (a) What is Artificial Gravity? Derive an expression for frequency of spaceship to provide artificial gravity. 5
(b) Two masses 'm₁' and 'm₂' are initially at rest with a spring compressed between them. What will be the ratio of the magnitude of their velocities after the spring has been released? 3
7. (a) State and prove Bernoulli's Equation in dynamic fluid. 5
(b) A church organ consists of pipes, each with open at one end, of different lengths. The minimum length is 30mm and the largest is 4m. Calculate the frequency range of the fundamental notes. 3
8. (a) Derive a relation for the time period of a simple pendulum. 5
(b) A light is incident normally on a grating which has 2500 lines per centimetre. Compute the wavelength of a spectral line for which the deviation in second order is 15.0°. 3
9. (a) What is meant by Carnot Cycle and Carnot Engine? Calculate efficiency of an ideal Carnot engine and discuss 5 parameters on which it depends.
(b) An astronomical telescope having magnifying power 5 consists of two thin lenses 24 cm apart. Find focal lengths of 3 the lenses.

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(To be filled in by the candidate)

Physics

H.S.S.C (11th)-A-2022

Time : 20 Minutes

Paper : I

Group : II

Objective – (ii)

Marks : 17

PX-1A/ SWL-92-22 Paper Code

6	4	7	4
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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 in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION-A

Q.1	Questions	A	B	C	D
1.	Longitudinal waves do not exhibit:	Reflection	Refraction	Diffraction	Polarization
2.	Young's double slit experiment is used to study the interference of:	Light waves	Micro waves	Sound waves	Radio waves
3.	The image formed by eyepiece of compound microscope is:	Real and magnified	Real and diminished	Virtual and enlarged	Virtual and diminished
4.	Absolute uncertainty in a measuring instrument is equal to:	Least Count	Accuracy	Fractional uncertainty	Percentage uncertainty
5.	The numerical values of constants in any formula cannot be determined by dimensional analysis, however it can be found by:	Addition	Physical quantities	Experiments	Uncertainty
6.	Torque acting on a body determines its:	Linear acceleration	Impulse	Angular acceleration	Linear momentum
7.	The vector product ($\vec{A} \times \vec{A}$) is equal to:	0	1	A ²	0
8.	According to first law of thermodynamics, the quantity which is conserved:	Force	Momentum	Power	Energy
9.	For an ideal gas system, the internal energy is directly proportional to:	Pressure	Volume	Mass	Temperature
10.	10 N centripetal force is revolving along a circular path of radius 1m, the work done by this force is:	10 Joules	20 Joules	40 Joules	Zero Joule
11.	Terminal velocity V_t is related with radius 'r' of a spherical object as:	$V_t \propto r^2$	$V_t \propto r$	$V_t \propto \frac{1}{r}$	$V_t \propto \frac{1}{r^2}$
12.	When a particle is moving in a circular path, its projection along diameter executes?	Linear motion	Simple harmonic motion	Circular motion	Perpetual motion
13.	Phase angle of 180° is equal to a path difference of:	$\frac{\lambda}{2}$	$\frac{\lambda}{4}$	2λ	λ
14.	Motion of a body along y-axis is:	One dimensional	Two dimensional	Three dimensional	Four dimensional
15.	If the mass of the body is doubled, then acceleration will become:	Double	Half	One fourth	Constant
16.	Kilowatt-hour is unit of:	Power	Energy	Impulse	Momentum
17.	Centripetal force is directed along:	Tangent to circle	Radius	Axis of rotation	z-axis

Handwritten mark

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Physics

H.S.S.C (11th)-A-2022

Time : 2:40 Hours

Paper : I

Group : II

Subjective

Handwritten mark

Marks : 68

Note: Section B is compulsory. Attempt any 3 questions from Section C.

SECTION-B

2. Write short answers to any Eight parts. (8 x 2 = 16)
- Give the drawbacks to use the time period of a simple pendulum as a time standard.
 - Is Zero Significant or not? Explain.
 - Check the correctness of relation dimensionally $E = hf$, where $E =$ energy, $f =$ frequency and $h =$ plank, s constant.
 - Does the dimensional analysis give any information on constant of proportionality that may appear in an algebraic expression?
 - Can velocity of an object reverse the direction when acceleration is constant? If so, give an example.
 - Derive the formula for time to reach the maximum height by the projectile.
 - Define an isolated system. Give its example. Is ideal isolated system possible?
 - Show that the range of a projectile is maximum when it is thrown at an angle of 45° with horizontal.
 - State Second Law of Thermodynamics.
 - Derive Boyle's law and Charle's law on the basis of kinetic molecular theory of gasses.
 - Is it possible to convert internal energy into mechanical energy? Explain.
 - Give an example of natural process that involves an increase in the entropy.

3. Write short answers to any Eight parts. (8 x 2 = 16)
- How would you distinguish between unpolarized and plane-polarized lights?
 - Under what conditions two or more sources of light behave as coherent sources?
 - Clearly differentiate between plane and spherical wavefronts.
 - Why does a diver change his body positions before and after diving in the pool?
 - Show that orbital angular momentum $L_o = mvr$.
 - Calculate the moment of inertia of a sphere of radius 0.5m and mass 10kg.
 - What sort of energy is in the given: (i) Compressed spring (ii) A moving car
 - Show that $P = \vec{F} \cdot \vec{V}$
 - What is meant by non-conventional energy sources? Give two examples.
 - Can a body rotate about its centre of gravity under the action of its weight?
 - What is meant by static and dynamic equilibrium?
 - Why the magnitude of a vector can not have negative value? Explain.

4. Write short answers to any Six parts. (6 x 2 = 12)
- Distinguish between Laminar and Turbulent flow of fluid.
 - Find the frequency of Simple Pendulum whose length is 0.25m at $g = 9.8ms^{-2}$
 - Does frequency depend on amplitude for harmonic oscillator?
 - Show that in SHM the acceleration is zero when velocity is greatest.
 - What is time period of 250 cycles per second of sound waves?
 - Explain, why sound travels faster in warm air than in cold air?
 - What features do longitudinal waves have in common with transverse waves?
 - What do you understand by linear magnification and angular magnification? Explain how a convex lens is used as magnifier.
 - 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?

SECTION-C

(Each question carries Eight (8) Marks)

- (a) How would you determine the equations of magnitude and direction of a vector in vector addition by rectangular components? Also give five steps of addition. 5
- (b) Ten bricks, each 6.0 cm thick and mass 1.5 kg, lie flat on a table. How much work is required to stack them one on one the top of another? 3
- (a) What is isolated system? State and explain Law of Conservation of Angular Momentum? 5
- (b) A gramophone record turntable from rest to an angular velocity of 45.0 rev/min in 1.60 s. What is the average angular acceleration? 3
- (a) State and prove Bernoulli's equation for an ideal fluid. 5
- (b) A stationary wave is established in a string which is 120cm 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
- (a) Define simple harmonic motion. Prove that energy is conserved for a body executing simple harmonic motion. 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 the deviation in second order is 15.0° . 3
- (a) State First Law of Thermodynamics and discuss the law for isothermal and adiabatic processes. 5
- (b) A glass light pipe in air will totally internally reflect a light ray if its angle of incidence is at least 39° . What is the minimum angle for total internal reflection if pipe is in water? (Refractive index of water = 1.33) 3