PHYSICS	PAPER CODE – 6475	TIME : 20 MINUTES
GROUP : FIRST	11th CLASS – 1st Annual 2024	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 marks in that question.

QUESTION NO. 1

1 The minimum velocity necessary to put a satellite into orbit is :
(A) 7.1 Kms^{-1} (B) 7.9 Kms^{-1} (C) 7.4 Kms^{-1} (D) 8.7 Kms^{-1}

2 Stoke's law holds for bodies having :
(A) Oblong shape (B) Rectangular shape (C) Spherical shape (D) All shapes

3 Product of time period and frequency is :
(A) Zero (B) π (C) 1 (D) 2

4 The value of 'r' for monoatomic gas is :
(A) 1.67 (B) 1.40 (C) 1.29 (D) 1.45

5 Laplace 's formula for speed of sound is :
(A) $\sqrt{\gamma P/p}$ (B) $\sqrt{E/p}$ (C) $\sqrt{P/p}$ (D) $\gamma P/p$

6 The blue colour of sky is due to :
(A) Reflection (B) Diffraction (C) Scattering (D) Polarization

7 Magnifying power of astronomical Telescope is :
(A) f_e/f_o (B) f_o/f_e (C) $f_e f_o$ (D) $\frac{1}{f_e f_o}$

8 Heat is form of :
(A) Power (B) Momentum (C) Torque (D) Energy

9 Pascal is the unit of :
(A) Force (B) Pressure (C) Tension (D) Weight

10 SI unit of intensity of light is :
(A) Watt (B) Joule (C) Mole (D) Candela

11 1 giga is equal to :
(A) 10^3 (B) 10^{12} (C) 10^9 (D) 10^{18}

12 The magnitude of $\hat{i} . (\hat{j} \times \hat{k})$ is :
(A) -1 (B) 0 (C) 1 (D) $\hat{j}$

13 If A_x and A_y are both negative, the resultant vector will lie in --------- quadrant.
(A) First (B) Second (C) Third (D) Fourth

14 A body having uniform acceleration of 10 ms^{-2} has a velocity of 100 ms^{-1}. In what time its velocity will be doubled ?
(A) 7 S (B) 14 S (C) 10 S (D) 16 S

15 The mass of an object is quantitative measure of its :
(A) Momentum (B) Inertia (C) Energy (D) Velocity

16 Work is negative when angle between $\bar{F}$ and $\bar{d}$ is :
(A) 0^o (B) 90^o (C) 180^o (D) 45^o

17 One revolution is equal to :
(A) $\frac{\pi}{2}$ rad (B) π rad (C) 2π rad (D) $\frac{\pi}{4}$ rad

11th CLASS -- 1st Annual 2024

PHYSICS	SUBJECTIVE PART	TIME: 2 HRS 40 MINUTES
GROUP : FIRST		MARKS: 68

SECTION–I

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

i	Does a dimensional analysis give any information on constant of proportionality that may apear in an algebraic expression ? Explain.
ii	Give the drawbacks to use the period of a pendulum as a time standard.
iii	Find the uncertainty in the average value of these measurements 1.20 , 1.22 , 1.23 , 1.19
iv	Find the distance between Moon and Earth where the travel time of light from Moon to Earth is 1 min 20 sec.
v	If one of the rectangular components of a vector is not zero. Can its magnitude be zero ? Explain.
vi	Can a body rotate about its center of gravity under the action of its weight ?
vii	If $F_1 = 3$ cm and $F_2 = 6$ cm. Let $\vec{F_1}$ is at angle 30° while $\vec{F_2}$ is lying at an angle of 120° w.r to X-axis respectively, then find their dot Product.
viii	What is the difference between uniform and variable velocity. Give S.I unit of acceleration.
ix	Why does a cricket player retrace his hands backward while catching ?
x	At what point or points in its path does a projectile have its minimum speed, its maximum speed ?
xi	When a rocket re – enters the atmosphere, its nose cone becomes very hot. Where does this heat energy come from ?
xii	Calculate the work done in Kilo joules in lifting a mass of 10 Kg through a vertical height of 10 m.

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

i	What are natural satellites and artificial satellites ?
ii	Define angular displacement and write its unit.
iii	A disc and a hoop start moving down from the top of an inclined plane at the same time. Which one will be moving faster on reaching the bottom ?
iv	Show that $S = r\theta$
v	Explain the difference between laminar flow and turbulent flow.
vi	Explain what do you understand by the term viscosity ?
vii	Can we realize an ideal simple pendulum ?
viii	What is meant by phase angle ? Does it define angle between maximum displacement and the driving force ?
ix	What is the total distance travelled by an object moving SHM in a time equal to its period, if its amplitude is A ?
x	Explain the terms node and anti-node.
xi	Why does sound travel faster in solid than in gases ?
xii	What are stationary waves ? Explain.

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

i	How would you distinguish between un-polarized and plane-polarized lights ?
ii	Can visible light produce interference fringes ? Explain.
iii	Explain for which colour of light, the fringe spacing in double slit experiment will be maximum.
iv	Why would it be advantageous to use blue light with a compound microscope ?
v	How the power is lost in optical fibre through dispersion ? Explain.
vi	In a compound microscope magnification of objective and eyepiece are 5 and 50 respectively. What is the total magnification of microscope ?
vii	Why does the pressure of a gas in a car tyre increase when it is driven through some distance ?
viii	What happens to the temperature of the room, when an air conditioner is left running on a table in the middle of the room ?
ix	How process of Human metabolism can be explained, by the first law of thermodynamics.

SECTION-II

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

Q.5.(A)	What is vector product of two vectors ? Why it is called cross product ? Give its examples and write down its characteristics.	5
(B)	A truck weighing 2500 Kg and moving with velocity of 21 ms^{-1} collides with a stationary car weighing 1000 Kg. The truck and the car move together after the impact. Calculate their common velocity.	3
Q.6.(A)	What is gravitational field ? Show that gravitational field is a conservative field.	5
(B)	An organ Pipe has a length of 50 cm. Find the frequency of its fundamental note and the next harmonic when it is open at both ends. (Speed of sound = 350 ms^{-1})	3
Q.7.(A)	What is moment of inertia. Discuss the moment of inertia of a rigid body.	5
(B)	A car of mass 1300 Kg is constructed using a frame supported by four springs. Each spring has a spring constant 20,000 Nm^{-1}. If two people riding in the car have a combined mass of 160 Kg. Find the frequency of vibration of the car, when it is driven over a pot hole in the road. Assume the weight is evenly distributed.	3
Q.8.(A)	State and explain Bernoulli's equation.	5
(B)	A mechanical engineer develops an engine. Working between 327 °C and 27 °C and claims to have an efficiency of 52 %. Does he claim correctly ? Explain.	3
Q.9.(A)	How does the magnification of an object is determined by using compound microscope ?	5
(B)	Sodium light λ = 589 nm is incident normally on grating having 3000 lines per centimeter. What is the highest order of the spectrum obtained with this grating ?	3

PHYSICS	PAPER CODE – 6472	TIME : 20 MINUTES
GROUP : SECOND	11th CLASS – 1st Annual 2024	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 marks in that question.

QUESTION NO. 1

1 Unit used for the factor $\sqrt{\frac{l}{g}}$ may be :

(A) Meter (B) Second (C) Kilogram (D) Radian

2 Solid angle is :

(A) One dimensional (B) Two dimensional (C) Three dimensional (D) Four dimensional

3 If the magnitude of $\overline{A} \cdot \overline{B} = \frac{1}{2} AB$ then an angle between $\overline{A}$ and $\overline{B}$ is

(A) 30^o (B) 45^o (C) 60^o (D) 90^o

4 $\hat{i} \cdot (\hat{k} \times \hat{i})$ is equal to :

(A) 0 (B) 1 (C) $\hat{i}$ (D) $\hat{j}$

5 Impulse has the same unit as that of :

(A) Force (B) Energy (C) Mass (D) Momentum

6 When an object moves with constant acceleration, the velocity – time graph is

(A) Parabola (B) Hyperbola (C) Straight line (D) Semi circle

7 1 Kilowatt is the unit of :

(A) Power (B) Work (C) Energy (D) Weight

8 The value of ' g ' at the center of earth is :

(A) infinite (B) 2 g (C) 3 g (D) Zero

9 The expression for the angular momentum is :

(A) $\bar{L} = \bar{p} \cdot \bar{r}$ (B) $\bar{L} = -\bar{p} \cdot \bar{r}$ (C) $\bar{L} = \bar{r} \times \bar{p}$ (D) $\bar{L} = \bar{p} \times \bar{r}$.

10 The diastolic pressure of a normal healthy person in torr is :

(A) 70 - 75 (B) 75 - 80 (C) 90 - 95 (D) 95 - 100

11 If time period of a simple pendulum is double, its length will be

(A) Eight times (B) Four times (C) Three times (D) Two times

12 The value of ' r ' for diatomic gas is :

(A) 1.4 (B) 1.67 (C) 1.29 (D) 1.73

13 Open end of an organ pipe act as :

(A) Node (B) Antinode (C) Crest (D) Trough

14 The wavelength of X – rays is of the order of :

(A) 10^{-10} mm (B) 10^{-10} cm (C) 10^{-10} m (D) 10^{-10} dm

15 Optical fibre is covered for the protection with :

(A) Glass (B) Plastic jacket (C) Copper (D) Aluminum

16 The value of triple point of water is :

(A) 273.16 ^oC (B) 273.16 F (C) 273.16 K (D) 273.16 K^{-1}

17 When hot and cold water are mixed, the entropy :

(A) Decreases (B) Increases (C) Remains constant (D) Zero

PHYSICS	SUBJECTIVE PART	TIME: 2 HRS 40 MINUTES
GROUP : SECOND		MARKS: 68

SECTION–I

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

i	The length of a floor tile is 0.233 m while its breadth is 0.178 m. Find its area in significant figures.
ii	What is the difference between random error and systematic error ?
iii	Why do we find it useful to have two units for the amount of substance, the Kilogram and the mole ?
iv	Write the dimensions of (i) Pressure (ii) Density
v	If force $\vec{F}$ of magnitude 10 N makes an angle of 30° with y – axis then find its x – component.
vi	What does $\frac{\vec{A} \times \vec{B}}{AB \sin \theta}$ represent ?
vii	Can a vector have a component greater than the vector 's magnitude
viii	If a squash ball comes back to its starting point after bouncing several times, then what would be its average velocity ?
ix	What is velocity time graph ?
x	Define impulse and show how it is related to linear momentum.
xi	A 60 kg man runs up a long flight of stairs in 40 sec. The vertical height of the stairs is 4.5 m. Calculate his power output in watts .
xii	What sort of energy is in the following (a) Compressed spring (b) A moving car

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

i	Describe what should be the minimum velocity, for a satellite to orbit close to the Earth around it.
ii	Show that orbital angular momentum $L_o = mvr$
iii	Show that how many minimum number of geostationary satellites are required for global coverage of T.V transmission.
iv	Orbital speed of a satellite is 7.9 Kms^{-1}. Calculate its period.
v	What are dimensions of AV , where ' A ' is area and ' V ' is velocity.
vi	A person is standing near a fast moving train. Is there any danger that he will fall towards it ?
vii	Why can we not realize an ideal simple pendulum ?
viii	Explain a relation between total energy, potential energy and kinetic energy of a body oscillating with SHM.
ix	Does frequency depend on amplitude for harmonic oscillator ?
x	Why does sound travel faster in solids than in gases ?
xi	How stationary waves are produced ?
xii	How do bats navigate food ?

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

i	An oil film spreading over a wet footpath shows colours.. Explain how does it happen ?
ii	What is the difference between " Spherical wave front " and " plane wavefront " ?
iii	What are the conditions to observe the interference of light waves ?
iv	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.
v	What will be the speed of light in water ? (refractive index of water is 1.33)
vi	One can buy a cheap microscope for use of children. The images seen in such a microscope have coloured edges. Why is this so ?
vii	Why the entropy of the system increases due to friction ?
viii	Why does the pressure of a gas in a car tyre increase when it is driven through some distance ?
ix	The oceans and our atmosphere contain large amount of heat energy but we cannot convert this energy into useful work. Why ?

SECTION-II

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

Q.5.(A)	Explain the addition of vector by rectangular components. Also write the main steps for addition.	5
(B)	A truck weighing 2500 Kg and moving with a velocity of 21 ms^{-1} collides with a stationary car weighing 1000 Kg. The truck and the car move together after the impact. Calculate their common velocity.	3
Q.6.(A)	What are stationary waves ? How they generate in an air column ?	5
(B)	A car of mass 800 kg at 54 km h^{-1} is brought to rest in 60 m. Find the average retarding force on the car. What has happened to its original kinetic energy ?	3
Q.7.(A)	How would you Differentiate real weight with apparent weight on the basis of frame of reference, also elaborate the reading of the scale as apparent weight in case of movement of lift.	2+1+1+1
(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 N/m, find the maximum distance through which the spring will be compressed ?	3
Q.8.(A)	What is terminal velocity ? Show that terminal velocity of fog droplet is directly proportional to the square of its radius.	5
(B)	A heat engine performs 100 J of work and at the same time rejects 400 J of heat energy to the cold reservoirs. What is the efficiency of the engine ?	3
Q.9.(A)	Explain the diffraction of X – rays by crystal and derive Bragg's law. What are the uses of diffraction of X – rays ?	5
(B)	An astronomical telescope having magnifying power of 5 consists of two thin lenses 24 cm apart. Find the focal lengths of these lenses.	3

PAPER CODE – 6471

11th CLASS - 1st Annual 2023

PHYSICS **TIME: 20 MINTUES**

GROUP : FIRST **OBJECTIVE** **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 If the radius of a sphere r = 2.25 ± 0.01 cm then percentage uncertainty in r is
(A) 0.2 % (B) 0.4 % (C) 0.1 % (D) 0.3 %

2 If we add the numbers 2.7543 , 4.10, 1.273, the rounded off answer will be
(A) 8.1273 (B) 8.127 (C) 8.2 (D) 8.13

3 The minimum number of unequal vectors whose sum can be zero is
(A) 1 (B) 2 (C) 3 (D) 4

4 The magnitude of resultant of two forces 6N and 8N acting at right angle to each other is
(A) 10 N (B) 2 N (C) 14 N (D) 8 N

5 The horizontal range and maximum range of projectile are related as
(A) $R = R_{max} \sin\theta$ (B) $R = R_{max} \sin 2\theta$
(C) $R = R_{max} \sin^2\theta$ (D) $R = R_{max} \sin\theta \cos\theta$

6 A body is moving with uniform velocity. Its _____ changes
(A) Speed (B) Acceleration (C) Direction of motion (D) Displacement

7 Escape velocity from the earth surface is
(A) 4.2 kms^{-1} (B) 7.5 kms^{-1} (C) 9.5 kms^{-1} (D) 11.2 kms^{-1}

8 Which of the following is correct
(A) $\vec{v} = \vec{r} \times \vec{w}$ (B) $\vec{v} = \vec{w} \times \vec{r}$ (C) $\vec{v} = \vec{r} \cdot \vec{w}$ (D) $\vec{v} = \vec{w} \cdot \vec{r}$

9 The internal energy of 1 mole of an ideal gas depends on
(A) Volume (B) Pressure (C) Temperature (D) Potential energy

10 The number of geo-stationary satellites to cover the whole earth is
(A) 5 (B) 24 (C) 3 (D) 7

11 Cloud formation in the atmosphere is _____ process
(A) Adiabatic (B) Isobaric (C) Isothermal (D) Isochoric

12 Terminal velocity is a _____ velocity
(A) Constant maximum (B) Constant minimum (C) Variable (D) Instantaneous

13 Time period of simple pendulum at the centre of the earth will be
(A) Zero (B) Infinite (C) Same as on the surface of the earth (D) Doubled

14 Maximum number of beats frequency that can be heard by a human is
(A) 15 Hz (B) 20 Hz (C) 10 Hz (D) 8 Hz

15 Stationary waves are set up in an open organ pipe of length 2m. The wavelength of waves in first mode of vibration is
(A) 4 m (B) 1 m (C) 8 m (D) 3 m

16 Light waves cannot be polarized by
(A) Selective absorption (B) Reflection at large incidence angle
(C) Interference of light (D) Scattering by air molecules.

17 Which of the following phenomena does not occur in sound waves ?
(A) Diffraction (B) Polarization (C) Interference (D) Reflection

11th CLASS - 1st Annual 2023

PHYSICS | **SUBJECTIVE** | **TIME: 2.40 HOURS**

GROUP : FIRST | **SECTION – I** | **MARKS : 68**

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

i	Differentiate between random and systematic error.
ii	What are two principal characteristics of an ideal standard ?
iii	Why do we find it useful to have two units for the amount of substance Kilogram and the mole?
iv	Show that the famous " Einstein equation " $E = mc^2$ is dimensionally consistent.
v	Prove that scalar product is commutative.
vi	Find the projection of $\vec{A} = 2\,\hat{\imath} - 8\,\hat{\jmath} + \hat{k}$ in the direction of $\vec{B} = 3\,\hat{c} - \hat{\jmath} - 12\,\hat{k}$
vii	Show that the sum and difference of two perpendicular vectors of equal lengths are also perpendicular and of the same length.
viii	Calculate the distance covered by a free falling body during first second of its motion.
ix	What are inertial and non inertial frame of references.
x	Explain the circumstances in which the velocity V and acceleration a of a car are (a) V is zero but a is not zero. (b) a is zero but V is not zero
xi	At what point or points in its path does a projectile have its minimum speed its maximum speed ?
xii	Explain how swing is produced in a fast moving cricket ball.

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

i	Calculate the work done in Kilo joules in lifting a mass of 10 kg (at a steady velocity) through a vertical height of 10 m.
ii	When a rocket re-enters the atmosphere, its nose cone becomes very hot. Where does this heat energy come from ?
iii	Define term " Aquifer " .
iv	Show that orbital angular momentum $L_o = mv_o r$
v	Explain how many minimum numbers of geo-stationary satellites are required for global coverage of T.V transmission.
vi	Prove that 2 radian = 114.6^o
vii	Name two characteristics of simple harmonic motion.
viii	What is the total distance travelled by an object moving with S.H.M in a time equal to its period, if its amplitude is A ?
ix	Define resonance and give its example.
x	Is it possible for two identical waves travelling in the same direction along a string to give rise a stationary wave.
xi	Why does sound travel faster in solids than in gasses ?
xii	What is condition for path difference in constructive interference and write its general equation ?

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

i	State the Huygen's principle.
ii	How would you distinguish between un-polarized and plane-polarized lights ?
iii	An oil film spreading over a wet path shows colours. Explain how does it happen ?
iv	What is the function of a collimator in spectrometer ?
v	How would it be advantageous to use blue light with a compound microscope ?
vi	How can the efficiency of a practical heat engine be increased ?
vii	Why spark plug is not needed in a diesel engine ?
viii	Specific heat of a gas at constant pressure is greater than specific heat at constant volume why ?
ix	Does the entropy of a system increase or decrease due to friction ?

SECTION – II

NOTE : Attempt any three questions from this section (8 x 3 = 24) (Part A = 5 marks & Part B = 3 marks)

Q. No.5 (A)	Explain the scalar product with its characteristics and examples.
(B)	How large force is required to accelerate an electron ($m = 9.1 \times 10^{-31} kg$) from rest to a speed of $2.0 \times 10^7\ ms^{-1}$ through a distance of 5.0 cm.
Q. No.6 (A)	Define centripetal force and derive its formula $Fc = \frac{mv^2}{r}$
(B)	A football is thrown an angle of 30^o with respect to horizontal to throw a 40m pass, What must be the initial speed of the ball.
Q. No.7 (A)	State and explain equation of continuity.
(B)	What is the average translational kinetic energy of molecules in a gas at temperature $27C^o$?
Q. No.8 (A)	Discuss the effects of variations of pressure, density and temperature on the speed of sound in a gas. Also, derive the relation $V_t = V_o + 0.61\ t$
(B)	A simple pendulum is 50.0 cm long. What will be its frequency of vibration at a place where $g = 9.8 ms^{-2}$
Q. No.9 (A)	What is a spectrometer ? Explain its main parts.
(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^o

PAPER CODE – 6476

11th CLASS - 1st Annual 2023

PHYSICS **TIME: 20 MINTUES**

GROUP : SECOND **OBJECTIVE** **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 The expression for the time period of low flying satellite put into the orbit is
(A) $T = \frac{2\pi R}{g}$ (B) $T = \frac{2\pi R}{g^2}$ (C) $T = \frac{2\pi g}{R}$ (D) $T = \frac{2\pi R}{V}$

2 The incompressible and non viscous fluid is called
(A) Viscous fluid (B) Non ideal fluid (C) Real Fluid (D) Ideal fluid

3 The product of frequency and time period is equal to
(A) 1 (B) 2 (C) 3 (D) 4

4 The portion of a wave below the mean level is called
(A) Crest (B) Trough (C) Node (D) Anti - node

5 When an aero plane move towards air port, then its frequency received by radar
(A) Decreases (B) Increases (C) Remain same (D) Become zero

6 Which of the following waves cannot be polarized
(A) X - rays (B) radio waves (C) Ultra – violet waves (D) Sound waves

7 The magnifying power of a simple microscope is
(A) $M = 1 + \frac{f}{d}$ (B) $M = 1 + \frac{d}{f}$ (C) $M = 1 + \frac{1}{f}$ (D) $M = 1 + df$

8 Charle's law can be written as mathematically
(A) $V \propto T$ (B) $V \propto {}^{1}/_{T}$ (C) $P \propto T$ (D) $P \propto {}^{1}/_{T}$

9 The carnot cycle can be shown by
(A) V – T graph (B) P – V graph (C) P – T graph (D) P – V – T graph

10 The unit of power in terms of base unit is
(A) $Kg\, ms^{-2}$ (B) $Kg\, m^{-1}s^{-1}$ (C) $Kg\, m^{-2}s^{-2}$ (D) $Kg\, m^{2}s^{-3}$

11 Time taken by light to reach from sun to earth is
(A) 1 min, 20 sec (B) 4 min, 20 sec (C) 8 min, 20 sec (D) 10 min, 20 sec

12 $\vec{r} = a\hat{i} + b\hat{j} + C\hat{k}$
(A) Equal vector (B) Position vector (C) Unit vector (D) Negative vector

13 Torque has maximum value if angle between $\vec{r}$ and $\vec{F}$ is
(A) 30° (B) 90° (C) 45° (D) 60°

14 The time rate of change of displacement is called
(A) Acceleration (B) Velocity (C) Speed (D) Average force

15 The relation $I = \vec{F} \times \Delta t$ shows
(A) Momentum (B) Power (C) Impulse (D) Work

16 The original source of energy of tides is
(A) Earth (B) Sun (C) Moon (D) Star

17 Angular momentum of a body under a centripetal force is
(A) Zero (B) Maximum (C) Minimum (D) Constant

11th CLASS - 1st Annual 2023

PHYSICS | **SUBJECTIVE** | **TIME: 2.40 HOURS**
GROUP : SECOND | **SECTION – I** | **MARKS : 68**

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

i	Add the given masses, in kg up to appropriate precision 2.189, 0.089, 11.8 and 5.32
ii	How many nano-seconds in one year ?
iii	Why do we find it useful to have two units for the amount of substance, the Kilogram and the mole ?
iv	Write the dimensions of (i) Pressure (ii) Density
v	Can the magnitude of a vector have a negative value ?
vi	Is it possible to add $2\vec{A}$ into 6 ? Explain
vii	Name the three conditions that could make $A_1 \times A_2 = 0$
viii	At the highest point in the path of a projectile its speed is minimum, why? Explain it.
ix	Derive the relation for the height of a projectile.
x	Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true ? Discuss.
xi	Explain the circumstances in which the velocity ' $\vec{v}$ ' and acceleration ' $\vec{a}$ ' of a car are (i) Parallel (ii) Perpendicular to one another
xii	Two row boats moving parallel in the same direction are pulled towards each other. Explain.

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

i	A person holds a bag of groceries while standing still, talking to a friend. A car is still while its engine is running. From the stand point of work , How are these two situations similar ?
ii	Calculator the work done in Kilojoules in lifting a mass of 10 kg (at a steady velocity) through a vertical height of 10 m.
iii	Define escape velocity. Does the escape velocity of a body depend upon its mass ?
iv	Calculate the rotational K.E of a disc and a hoop
v	Differentiate between tangential and angular velocity. If one of these is given for a wheel of known radius, how will you find the other ?
vi	What is meant by moment of inertia ? Explain its significance.
vii	Name the two characteristics of simple harmonic motion.
viii	Does frequency depend on amplitude for harmonic oscillators ? Explain.
ix	Explain briefly the example of an electrical resonance.
x	Find the temperature at which the velocity of sound in air is two times its velocity at 10 °C
xi	What features do longitudinal waves have in common with transverse waves ?
xii	Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave ? Explain.

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

i	Draw the experimental arrangement for observing Newton's ring.
ii	How would you manage to get more orders of spectra using a diffraction grating ?
iii	Why the Polaroid sunglasses are better than ordinary sunglasses ?
iv	Define near point and resolving power.
v	Why would it be advantageous to use blue light with a compound microscope ?
vi	What is heat engine ? Define efficiency.
vii	Explain bicycle pump as an example of Ist law of thermodynamics.
viii	Is it possible to convert internal energy into mechanical energy ? Explain with examples.
ix	A thermos flask containing milk as a system is shaken rapidly. Does the temperature of milk rise ?

SECTION – II

NOTE : Attempt any three questions from this part (8 x3 =24) (Part A = 5 marks and Part B = 3 marks)

Q. No.5 (A)	Define absolute potential energy. Derive relation for absolute potential energy of body of mass 'm' at distance ' r ' from the centre of earth.
(B)	Find the angle between the two Vectors $\vec{A} = 5\hat{i} + \hat{j}$ and $\vec{B} = 2\hat{i} + 4\hat{j}$
Q. No.6 (A)	What is projectile motion? Work out expressions for (i) Height (ii) Time of light
(B)	A gramophone record turntable accelerates from rest to an angular velocity of 45.0 rev min^{-1} in 1.60 s. What is its average angular acceleration ?
Q. No.7 (A)	Derive a relation which shows that flow rate is a constant quantity in an ideal fluid.
(B)	A thermodynamic system undergoes a process in which its internal energy decreases by 300 J. If at the same time 120 J of work is done on the system, find the heat lost by the system.
Q. No.8 (A)	Define and explain the phenomenon of beats. How beats are graphically represented. Also mention the uses of beats.
(B)	A simple pendulum is 50.0 cm long. What will be its frequency of vibration at a place where g = 9.8 ms^{-2}
Q. No.9 (A)	What is compound microscope ? Explain its working and derive the formula for its angular magnification
(B)	In a double slit experiment the second order maximum occurs at $\theta = 0.25°$. The wavelength is 650 nm Determine the slit separation.

DG Khan Board-2022

PAPER CODE - 6471

11th CLASS – 12022

PHYSICS **TIME: 20 MINUTES**

GROUP : FIRST **OBJECTIVE** **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	Number of colours used in process of colour printing to produce the entire range of colours are (A) 4 (B) 5 (C) 6 (D) 7
2	One femto is equal to (A) 10^{-9} (B) 10^{-18} (C) 10^{-6} (D) 10^{-15}
3	Resultant of two perpendicular vectors of equal magnitude A is (A) A^2 (B) A (C) $\sqrt{2}$ A (D) 2A
4	If $\vec{A} = 2\hat{\imath} + 3\hat{\jmath} - \hat{k}$ and $\vec{B} = 4\hat{\imath} + 6\hat{\jmath} - 2\hat{k}$ the angle between them will be (A) 0° (B) 45° (C) 60° (D) 90°
5	A bullet shot straight up , returns to its starting point in 10 sec , the initial speed was (A) 10 m/sec (B) 49 m/sec (C) 24 m/sec (D) 98 m/sec
6	Horizontal range is equal to 4 times of its maximum height only if angle of projection is (A) 90° (B) 45° (C) 60° (D) 30°
7	When two protons are brought closer together , then (A) K.E increases (B) P.E decreases (C) P.E increases (D) P.E remains same
8	The time period of artificial satellite close to earth is given by (A) $\frac{2\pi R}{V}$ (B) $2\pi RV$ (C) $\frac{2\pi V}{R}$ (D) $\frac{\pi R}{V}$
9	If a body of mass 10 kg is allowed to fall freely , its weight becomes (A) 10 N (B) 0 N (C) 100 N (D) 9.8 N
10	A two (2) meter high tank is full of water. A hole appears at its middle. The speed of efflux will be (A) 3.75 ms^{-1} (B) 5.11 ms^{-1} (C) 4 10 ms^{-1} (D) 4.42 ms^{-1}
11	The distance covered by a body in one complete vibration is 20 cm. What is the amplitude of the body (A) 10 cm (B) 20 cm (C) 1 cm (D) 5 cm
12	If the speed of sound in air at given pressure is 'V' then doubling the pressure, the new speed becomes (A) 2 V (B) V (C) 3 V (D) 4 V
13	A stretched string vibrates in ***n*** loops , its length in terms of wavelength is (A) $\frac{n\lambda n}{2}$ (B) $(n+1)\frac{\lambda n}{2}$ (C) $\left(n+\frac{1}{2}\right)\frac{\lambda n}{2}$ (D) $\left(n+\frac{1}{2}\right)\lambda n$
14	Which of the following phenomenon cannot produce colours with white light ? (A) Diffraction (B) Interference (C) Polarization (D) Dispersion
15	An astronomical telescope has objective of focal length 100 cm and eyepiece of focal length 10 cm. Its magnifying power is (A) 100 (B) 1000 (C) 10 (D) 1
16	Change in entropy of reversible process is (A) Positive (B) Maximum (C) Negative (D) Zero
17	Isobaric process is one in which ..... remains constant (A) Volume (B) Pressure (C) Temperature (D) Energy

PHYSICS | **11th CLASS - 12022** | **TIME : 2.40 HOURS**
GROUP : FIRST | **SUBJECTIVE** | **MARKS : 68**

SECTION-I

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

i	Define the terms , precision and accuracy
ii	Write the dimensions of (a) Pressure (b) Density
iii	How many seconds are in one year ? Calculate
iv	Differentiate in physical and non-physical quantities with examples
v	At what point or points in its path does a projectile have its minimum speed , its maximum speed ?
vi	Define impulse and show how it is related to linear momentum ?
vii	Why ballistic missiles are not useful for long range ?
viii	State second law of motion in terms of momentum
ix	A thermos flask containing milk as a system is shaken. Does the temperature of milk rise ?
x	Specific heat of gas at constant pressure is greater than specific heat at constant volume. Why ?
xi	Why entropy is called time arrow ?
xii	Can we say that first law of thermodynamics is law of conservation of energy ? Explain

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

i	What changes take place in a vector when it is multiplied by " -2 " ?
ii	How the direction of the vector product of two vectors can be determined ? Explain
iii	Can a vector have rectangular component greater than the vector's magnitude ? Explain
iv	Define escape velocity. Does the escape velocity of a body depend upon its mass ?
v	In which case more work is done ? When a 50 kg bag of books lifted through 50 cm ; or when 50 kg crate is pushed through 2 m across the floor with force of 50 N ?
vi	Differentiate between renewable and non-renewable energy sources with examples
vii	Why does the coasting rotating system slow down as water drops into the beaker ?
viii	Why does a diver change his body positions before and after diving into the pool ?
ix	Calculate rotational K.E of solid circular disc and hoop
x	Can visible light produce interference fringes ? Explain
xi	What is meant by optically active crystals ? Give at least two examples
xii	Find the grating element of the diffraction grating containing 2000 lines/cm

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

i	Write down the properties of an ideal fluid
ii	Does frequency depend on amplitude of harmonic oscillator ? Explain briefly
iii	Can we realize an ideal simple pendulum ? Explain
iv	What will be the time period and frequency of a simple pendulum at the centre of earth ?
v	What is the effect of pressure and density on speed of sound ?
vi	Discuss briefly the phase changes when the transverse wave is reflected by a rarer and denser medium
vii	Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave ?
viii	Write down the importance of collimator in spectrometer
ix	One can buy a cheap microscope for use of children. The image seen in such a microscope have coloured edges. Why is this so ?

SECTION-II

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

Q.5 (A) Define and formulate absolute gravitational potential energy 5

(B) Find the angle between two vectors $\vec{A} = 5\hat{i} + \hat{j}$ and $\vec{B} = 2\hat{i} + 4\hat{j}$ 3

Q.6 (A) State and prove law of conservation of linear momentum 5

(B) A body of moment of inertia $I = 0.80$ kg m^2 about a fixed axis , rotates with a constant angular velocity of 100 rad s^{-1} . Calculate its angular momentum L and the torque to sustain this motion 3

Q.7 (A) State and prove Bernoulli's equation for ideal fluid 5

(B) A pipe has length 1 m. Determine the frequency of fundamental and first two harmonics (a) if pipe is open at both ends (b) if pipe is closed at one end . (Speed of sound in air = 340 ms^{-1}) 3

Q.8 (A) Why simple pendulum is called simple. Also , derive a relation for its time period 5

(B) Sodium light ($\lambda = 589$ nm) is incident normally on a grating having 3000 lines per centimeter. What is the highest order of the spectrum obtained with this grating ? 3

Q.9 (A) What is Astronomical telescope ? Describe its construction and working. Also find its magnifying power 5

(B) Calculate the entropy change when 1.0 kg ice at 0 °C melts into water at 0 °C. Latent heat of fusion of ice = $L_f = 3.36 \times 10^5$ J kg^{-1} 3

PAPER CODE - 6472

11th CLASS – 12022

PHYSICS
GROUP : SECOND

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 Which pair of physical quantity has the same dimension
(A) Work and Power (B) Force and Torque (C) Momentum and Impulse (D) Torque and Power

2 The significant zero's in 0.04060 are
(A) 4 (B) 3 (C) 6 (D) 2

3 $\hat{i} . (\hat{j} \times \hat{k}) + \hat{j} . (\hat{k} \times \hat{i}) =$
(A) 1 (B) 2 (C) 0 (D) - 1

4 If a force of 5 N is acting along x-axis , its component along x-axis is
(A) 5 N (B) 0 N (C) 3 N (D) 4 N

5 The angle of projection for which max. height is equal to the horizontal range is
(A) 45° (B) 67° (C) 76° (D) 56°

6 Rate of change of momentum of freely falling object is equal to
(A) K.E (B) Momentum (C) Acceleration (D) Weight

7 When two protons are brought closer their ?
(A) P.E increases (B) K.E increases (C) P.E Decreases (D) K.E Decreases

8 A body of mass 10 kg is falling freely , its weight appears
(A) 98 N (B) 0 N (C) 10 N (D) 9.8 N

9 Rotational K.E of disc is
(A) $\frac{1}{2} mv^2$ (B) $\frac{1}{4} Iw^2$ (C) $\frac{1}{4} mv^2$ (D) $1/8\ mv^2$

10 Maximum drag force on a 1 kg falling sphere is
(A) 9.8 N (B) 1 N (C) 98 N (D) 4.9 N

11 The distance covered by a body in one complete vibration is 20cm. What is the amplitude of vibration ?
(A) 10 cm (B) 5 cm (C) 15 cm (D) 20 cm

12 The distance between 1st node and 4th anti node is
(A) $5\lambda/4$ (B) $3\lambda/4$ (C) $3\lambda/2$ (D) $7\lambda/4$

13 Which quantity changes due to interference of sound waves of same frequency ?
(A) Time period (B) Wave length (C) Amplitude (D) Frequency

14 In Michelson Interferometer , to shift bright to dark fringe , the mirror should be displaced by
(A) $\lambda/4$ (B) $\lambda/2$ (C) $\lambda/3$ (D) λ

15 Light emitted from LED has wavelength
(A) 1.3 μm (B) 1.2 μm (C) 1.4 μm (D) 1.5 μm

16 For isothermal process
(A) $\Delta U = 0$ (B) $Q = W$ (C) PV = constant (D) All of these

17 For diatomic gas $C_v = 5/2\ R$ then C_p will be
(A) 3/2 R (B) 2/7 R (C) 7/2 R (D) 9/2 R

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

i	Why do we find it useful to have two units for the amount of a substance , the kilogram and the mole ?
ii	The period of a simple pendulum is measured by a stop watch. What type of errors are possible in the time period ?
iii	How can the uncertainty be calculated in timing experiments ?
iv	Calculate how many seconds are there in one year ?
v	Differentiate between variable velocity and instantaneous velocity
vi	A 1500 kg car has its velocity reduced from 20 ms^{-1} to 15 ms^{-1}. How large was the average retarding force ?
vii	Explain the circumstances in which velocity $\vec{v}$ and acceleration $\vec{a}$ of a car are **(a)** antiparallel **(b)** perpendicular to each other
viii	Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true ? Discuss
ix	Prove that absolute temperature of an ideal gas is directly proportional to average translational kinetic energy of gas molecules
x	Give at least two examples of an adiabatic process
xi	Why does the pressure of a gas in a car tyre increase when it is driven through some distance ?
xii	Is it possible to convert internal energy into mechanical energy ? Explain with an example

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

i	Write the rules to find direction θ of the resultant in different quadrants
ii	If one of the rectangular components of a vector is not zero , can its magnitude be zero ? Explain
iii	If all the components of the vectors $\overrightarrow{A_1}$ and $\overrightarrow{A_2}$ were reversed. How would this alter $\overrightarrow{A_1} \times \overrightarrow{A_2}$
iv	A disc without sliping rolls down a hill of height 10 m. If the disc starts from rest at the top of the hill. What is its speed at the bottom ?
v	Why microwaves are preffered in communication satellites ?
vi	An object has 1 j of potential energy. What does it mean ? Explain
vii	What is orbital velocity ? Explain how it is related to orbital radius ?
viii	A force F acts through a distance L . The force is then increased to 3 F , and then acts through a further distance 2 L. Draw the work diagram to scale
ix	When a rocket re-enters the atmosphere, its nose cone becomes very hot. Where does this energy come from ?
x	Why Polaroid sunglasses are better than ordinary sunglasses ?
xi	In Young's slits experiment , one of the slits is covered with blue filter and other with a red filter. What would be the pattern of light intensity on the screen ?
xii	Define fringe spacing and write its formula

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

i	Define the term viscosity. Give its units
ii	Show that for horizontal mass spring system , elastic potential energy is given by P.E = ½ kx^2 . where x is displacement
iii	Describe some common phenomena in which resonance plays an important role
iv	Given $x = 0.5 \sin \frac{\pi}{8} t$, Find the amplitude and frequency of the mass performing simple harmonic motion
v	As a result of distant explosion , an observer senses a ground tremor and then hears the explosion. Explain the time difference.
vi	What features do longitudinal waves have common with transverse waves ?
vii	What are the conditions on the path difference for constructive and destructive interference of two waves?
viii	What is the refractive index of the medium in which speed of light is 2.75×10^8 m/s ?
ix	Explain the difference between angular magnification and resolving power of an optical instrument

SECTION-II

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

Q.5 (A) Define work and give its's SI unit. How does it change with angle θ between force and displacement. Discuss work done by variable force 5

(B) Find the angle between the two vectors $\vec{A} = 5\hat{i} + \hat{j}$ and $\vec{B} = 2\hat{i} + 4\hat{j}$ 3

Q.6 (A) What procedure you suggest to produce artificial gravity. Derive a relation for the frequency of space station to produce artificial gravity. 5

(B) A proton moving with speed of 1.0×10^7 m/s passes through a 0.020 cm thick sheet of paper and emerges with a speed of 2.0×10^6 m/s. Assuming uniform deceleration , find retardation and time taken to pass through the paper. 3

Q.7 (A) State and explain Bernoulli's Equation 5

(B) The wavelength of the signals from a radio transmitter is 1500 m and the frequency is 200 KHz. What is the wavelength for a transmitter operating at 1000 KHz and with what speed the radio waves travel ? 3

Q.8 (A) Prove that total energy remains conserved in man spring system , Oscillating with SHM. 5

(B) In a double slit experiment the second order maximum occur at $\theta = 0.25°$. The wavelength is 650 nm. Determine the slit separation 3

Q.9 (A) Define molar specific heat of a gas at constant pressure (C_p) and at constant volume (C_v). Also prove That $C_p - C_v = R$ 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

PAPER CODE - 6477

11th CLASS – 12021

PHYSICS **TIME: 20 MINUTES**

GROUP : FIRST **OBJECTIVE** **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 Acceleration of a pendulum of length ℓ = 1 m and displacement of 5 cm having S.H.M is
(A) 0.29 m/s^2 (B) 0.19 m/s^2 (C) 0.69 m/s^2 (D) 0.49 m/s^2

2 If radius of droplet becomes half then its terminal velocity will be
(A) One fourth (B) Four times (C) Half (D) Double

3 When both ends of organ pipe are open then the frequency of stationary waves of nth harmonic is given by
(A) $fn = \frac{nv}{4\ell}$ (B) $fn = \frac{v}{2n\ell}$ (C) $fn = \frac{nv}{2\ell}$ (D) $fn = \frac{2v}{n\ell}$

4 The value of constant γ for the mono-atomic gas is
(A) 1.67 (B) 1.40 (C) 1.29 (D) 2.45

5 In youngs double slit experiment the position of bright fringe is given by
(A) $y = \frac{m\lambda d}{L}$ (B) $y = \frac{mLd}{\lambda}$ (C) $y = \frac{m\lambda}{Ld}$ (D) $y = \frac{m\lambda L}{d}$

6 In Michelson method time taken by the rotational mirror to rotate through an angle $\frac{2\pi}{8}$ (If f is the frequency of rotation) is
(A) $\frac{1}{4f}$ (B) $\frac{1}{2f}$ (C) $\frac{1}{8f}$ (D) $\frac{1}{6f}$

7 Sadi Carnot described an ideal engine in
(A) 1640 (B) 1740 (C) 1940 (D) 1840

8 A system does 600 J of work and at the same time internal energy increases by 320 J , The heat supplied is
(A) 200 J (B) 600 J (C) 280 J (D) 920 J

9 The dimensions of volume flow rate of a fluid are
(A) $[LT^{-1}]$ (B) $[L^2T^{-2}]$ (C) $[L^3T^{-1}]$ (D) $[L^3T^{-2}]$

10 Time taken by light to travel from sun to earth is
(A) 8 min 20 s (B) 1 min 20 s (C) 5 h 20 s (D) 4 h 20 s

11 At what angle Dot product and Cross product have the same magnitude
(A) 0° (B) 45° (C) 30° (D) 60°

12 Magnitude of cross product of two perpendicular vectors is
(A) $\vec{A}\,\vec{B}$ (B) AB $\hat{n}$ (C) 0 (D) AB

13 A 1500 kg has its velocity reduced from 20 ms^{-1} to 15 ms^{-1} in 3.0 sec. How large was the retarding force ?
(A) 500 N (B) 2500 N (C) 1500 N (D) 1000 N

14 When a massive body of mass m_1 collides with lighter stationary body of mass m_2 , the velocity of massive body after collision will be
(A) $V_1' = 2V_1$ (B) $V_2' = V_1$ (C) $V_1' = V_1$ (D) $V_2' = 2V_2$

15 Which one of the following is conservative force
(A) Electric force (B) Air resistance (C) Frictional force (D) Tension in string

16 A hoop is rolled down on an inclined plane having height of 10 m. Its velocity at the bottom will be
(A) 4.91 m/sec (B) 9.89 m/sec (C) 28.31 m/sec (D) 31.31 m/sec

17 Apparent weight of an object in a lift moving down with acceleration a = g is
(A) T = w + ma (B) T = 0 (C) T = w (D) T = Infinity

PHYSICS | **11th CLASS - 12021** | **TIME : 2.40 HOURS**
GROUP : FIRST | **SUBJECTIVE** | **MARKS : 68**

SECTION-I

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

(1) Show that the expression $Vf = Vi + at$ is dimensionally correct. Where Vi is the velocity at $t = 0$, a is acceleration and Vf is the velocity at time t
(2) What are the rules for assessment of uncertainty in case of a power factor ?
(3) Three students measured the length of a needle with a scale on which minimum divisions is 1 mm and recorded as (i) 0.2145 (ii) 0.21 m (iii) 0.214 m. which record is correct and why ?
(4) Write the dimensions of (i) Force (ii) Velocity
(5) The vector sum of three vectors give a zero resultant. What can be the orientation of the vectors ?
(6) Define torque. Write its unit (7) What is the unit vector in the direction of the vector $\vec{A} = 4\hat{i} + 3\hat{j}$
(8) Does a moving object have impulse ? (9) Explain the difference between elastic and inelastic collision.
(10) What is the effect on the speed of a fighter plane chasing another when it open fire ? What happen to the speed of pursued plane when it returns the fire ?
(11) Define an Isolated system. Give example
(12) Two row boats moving parallel in the same direction are pulled towards each other. Explain

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

(1) Explain what do you understand the work done by Gravitational field ?
(2) An object has one joule of potential energy. Explain what does its mean ?
(3) When a rocket re-enters the atmosphere, itsnose cone become very hot. Where does heat energy come from ?
(4) Define the terms (a) Rotational Kinetic Energy (b) Orbital velocity
(5) State the direction of the following vectors in simple situation ; angular velocity and angular momentum
(6) Why does a diver change his body positions before and after diving in the pool ?
(7) What should be the length of a simple pendulum whose period is 1.0 second at a place where $g = 9.8\ ms^{-2}$?
(8) Under what conditions does the addition of two simple harmonic motions produce a result , which is also simple harmonic ?
(9) Describe two common phenomena in which resonance plays important role
(10) What features do transverse periodic waves have common with longitudinal periodic waves ?
(11) What is the effect of density on the speed of sound ? Explain
(12) What happen when a jet plane like Concorde flies faster than the speed of sound ?

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

(1) Can visible light produce interference fringes ? Explain
(2) Explain whether the Young's experiment is an experiment for studying interference or diffraction effect of light
(3) Why the centre of the Newton's ring is dark ?
(4) How convex lens is used as a magnifier ? What limits the magnification of an optical instrument ?
(5) 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 ?
(6) Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why ?
(7) What is meant by irreversible process ? Give its example
(8) Calculate the work done during isothermal process ?
(9) Draw PV-diagram which show four steps of Carnot engine

SECTION-II

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

Q.5 (A) What is projectile motion ? Derive expressions for its height and range ? 5
(B) Find the projection of $\vec{A} = 2\hat{i} - 8\hat{j} + \hat{k}$ in the direction of the vector $\vec{B} = 3\hat{i} - 4\hat{j} - 12\hat{k}$ 3
Q.6 (A) What is the effect of temperature on speed of sound ? Show that $v_t = v_o + 0.61\ t$ 5
(B) How large a force is required to accelerate an electron ($m = 9.1 \times 10^{-31}$ kg) from rest to a speed of $2 \times 10^7\ ms^{-1}$ through a distance of 10 cm. 3
Q.7 (A) Derive Bernoulli's equation for a non-viscous , incompressible fluid which flows in a steady state manner 5
(B) A 1000 kg car traveling with a speed of 144 km h^{-1} rounds a curve of radius 100 m. Find the necessary centripetal force 3
Q.8 (A) Prove Law of Conservation of energy in SHM in mass spring system 5
(B) Estimate the average speed of Nitrogen molecules in air under standard conditions of pressure and temperature. 3
Q.9 (A) Define diffraction of light. Describe it through a diffraction grating to derive diffraction equation to determine wavelength of light. 5
(B) An astronomical telescope having magnifying power 5.0 consists of two thin lenses 24 cm apart. Find focal lengths of the lenses 3

PAPER CODE - 6478

11th CLASS – 12021

PHYSICS
GROUP : SECOND

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) $Qp = Cv\,\Delta T$ (B) $W = Cv\,\Delta T$ (C) $Qv = Cp\,\Delta T$ (D) $\Delta U = Cv\,\Delta T$
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) $[ML^2T^{-2}]$ (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) $\frac{1}{2}m^2r$

PHYSICS | **11th CLASS - 12021** | **TIME : 2.40 HOURS**
GROUP : SECOND | **SUBJECTIVE** | **MARKS : 68**

SECTION-I

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

11th CLASS – 12019

PHYSICS (NEW COURSE) **TIME: 20 MINUTES**
GROUP FIRST **MARKS: 17**
ACADEMIC SESSION : 2015 – 2017 TO 2018 - 2020

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	The prefix femto is equal to (A) 10^{-9} (B) 10^{-12} (C) 10^{-14} (D) 10^{-15}
2	The time taken by light from moon to earth is (A) 1 min 10 sec. (B) 1 min 20 sec. (C) 1 min 30 sec. (D) 1 min 40 sec.
3	If the magnitudes of scalar and vector product of two vectors are $2\sqrt{3}$ and 2 respectively. The angle between vectors is (A) 30° (B) 60° (C) 120° (D) 180°
4	The resultant of two perpendicular vectors each of magnitude A is (A) A (B) 2A (C) $\sqrt{2}$ A (D) A^2
5	Ballistic missiles are used for (A) short ranges (B) long ranges (C) very long ranges (D) any range
6	Power of an electric heater is (approximate power) (A) 1 KW (B) 2 KW (C) 3 KW (D) 4 KW
7	A man in a lift moving upward with constant velocity will conclude that his weight has (A) Increased (B) Decreased (C) Reduced to zero (D) Not changed
8	The number of satellites in global positioning system is (A) 3 (B) 12 (C) 24 (D) 36
9	If the radius of droplet becomes half, then terminal velocity will become (A) Half (B) Four times (C) One third (D) One fourth
10	The systolic pressure for a normal healthy person is (A) 75 – 80 torr (B) 100 torr (C) 120 torr (D) 140 torr
11	If the length of simple pendulum is doubled then its time period becomes (A) Half (B) 2 times (C) $\sqrt{2}$ times (D) 4 times
12	The speed of sound in vacuum is (A) 330 ms^{-1} (B) 332 ms^{-1} (C) 3×10^8 ms^{-1} (D) Zero
13	It becomes difficult to recognize the beats when the difference between the frequencies of two sounds is more than (A) 10 Hz (B) 20 Hz (C) 30 Hz (D) 40 Hz
14	Bending of light around the edges of an obstacle is called (A) Refraction (B) Interference (C) Polarization (D) Diffraction
15	In multimode step index fiber, the value of refractive index of core is (A) 1.33 (B) 1.52 (C) 1.67 (D) 1.48
16	The approximate efficiency of dry cell battery is (A) 70 % (B) 80 % (C) 90% (D) 93 %
17	For an ideal gas, the P.E. associated with its molecules is equal to (A) $\frac{1}{2}$ KX (B) $\frac{1}{2}$ KX_0^2 (C) 2 KX_0 (D) Zero

SECTION-I

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

(1) Give the drawbacks to use the period of pendulum as a time standard.
(2) Is zero significant or not ? Explain?
(3) Define the null vector and give two examples
(4) Is it possible to add a vector quantity to scalar quantity ? Explain
(5) Can a body rotate about its centre of gravity under the action of its weight ? Explain briefly.
(6) A girl drops a cup from a certain height, which breaks into pieces. What energy changes are involved?
(7) Define kilowatt hours and show that 1 KWh = 3.6 MJ.
(8) Why fog droplets appear to be suspended in air? Explain briefly.
(9) Write the three characteristics of an ideal fluid.
(10) Name two characteristics of simple harmonic motion.
(11) State Hook's law. Give SI unit of spring constant.
(12) What is driven harmonic oscillator ? Give example.

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

(1) At what point or points in its path does a projectile have its minimum speed, its maximum speed.
(2) Explain the difference between (i) Elastic collision and (ii) In-elastic collision.
(3) State and derive second law of motion in terms of momentum.
(4) What is (i) Ballistic missile (ii) Ballistic Trajectory.
(5) Define angular velocity and give its formula.
(6) Prove that $a = r \propto$
(7) State the direction of the following vectors in simple situation
(i) Angular momentum (ii) Angular velocity.
(8) What is meant by moment of inertia? Explain its significance.
(9) Explain the effect of variation of density on the speed of sound in gas.
(10) Give the rules for the reflection of waves from the boundary of a (i) denser medium (ii) rarer medium
(11) Explain why sound travels faster in warm air than in cold air?
(12) Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave ? Explain

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

(1) Can visible light produce the interference fringes ? Explain
(2) An oil film spreading over wet foot path show colours. Explain
(3) What are Newton's rings ? Explain briefly.
(4) Define resolving power and the magnification.
(5) If a person was looking through telescope at the full moon, how would the appearance of moon be changed by covering half of the objective lens?
(6) Internal energy is a state function. Explain
(7) Give two examples of the adiabatic process.
(8) Is it possible to construct a heat engine without sink ? Explain.
(9) Does entropy of a system increase or decrease due to friction ? Explain.

SECTION-II

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

5 (a) Define Molar specific heat at constant pressure and at constant volume and also derive relation between them. 5
(b) Calculate, how many seconds are there in one year and many years in one second? 3
6 (a) What is scalar product of two vectors ? Discuss its four characteristics. 5
(b) A truck weighing 2500 kg and moving with a velocity of 21 ms^{-1} collides with a stationary car weighing 1000 kg.The truck and the car move together after the impact. Calculate their common velocity? 3
7 (a) Show that frequencies of stationary waves in a stretched string are quantized. 5
(b) A car of mass 800 kg travelling at 54 km/h is brought to rest in 60 meters. Find the average retarding force on the car. What has happened to original kinetic energy? 3
8 (a) Define centripetal force and derive its relation. 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
9 (a) Describe the construction of a simple microscope and derive an expression for its magnifying power. 5
(b) In a double slit experiment the second order maximum occurs at $\theta = 0.25°$. The wavelength is 650 nm. Determine the slit separation. 3

PHYSICS (NEW COURSE) **TIME: 20 MINUTES**

GROUP SECOND **MARKS: 17**

ACADEMIC SESSION : 2015 – 2017 TO 2018 - 2020

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	Dimension of coefficient of viscosity " η " is (A) $[ML^2T^{-1}]$ (B) $[ML^{-1}T^{-2}]$ (C) $[ML^{-1}T^{-1}]$ (D) $[ML^{-2}T^{-2}]$
2	One year has seconds (A) 3.1536×10^7 (B) 3.1536×10^6 (C) 3.1536×10^8 (D) 3.1536×10^9
3	Self dot product of a vector $\vec{A}$ is (A) A (B) A^2 (C) Zero (D) 1
4	If Rx is negative and Ry is positive the resultant lies in quadrant (A) 1st (B) 2nd (C) 3rd (D) 4th
5	A typical rocket consumes fuel at a rate of (ejecting gas at speed of 4000 $m\ s^{-1}$) (A) 10000 Kg /s (B) 1000 Kg /s (C) 100 Kg /s (D) 100000 Kg /s
6	Power is the dot product of force and (A) Acceleration (B) Mass (C) Velocity (D) Displacement
7	In rotational motion analogous of force is (A) Torque (B) Rotational inertia (C) Mass (D) Momentum
8	If orbital velocity of a satellite is 7.9 Km/s and ' R ' is the radius of Earth , time required to complete one rotation will be (A) 84 min (B) 84 sec (C) 6050 sec (D) 24 hours
9	Drag force is given by (A) Stoke's law (B) Bernoulli's equation (C) Continuity equation (D) Newton's law
10	If $V_1 = 0.20$ m/s and $V_2 = 2$ m/s and density $S = 1000$ Kg /m^3 , then $P_1 - P_2$ will be (A) 1980 N / m^2 (B) 1970 N / m^2 (C) 1960 N / m^2 (D) 1990 N / m^2
11	Potential energy of oscillating mass spring system at any instant is (A) mgh (B) KX^2 (C) $\frac{1}{2} K X_0^2$ (D) $\frac{1}{2} KX^2$
12	If organ pipe is open at both ends, frequency of fundamental harmonic is given by (A) $V / 2\ell$ (B) $V / 4\ell$ (C) $4\ell / V$ (D) $2\ell / V$
13	Increase in velocity of sound in air per degree Celsius is (A) 0.61 m/s (B) 0.61 cm/s (C) 0.61 dm/s (D) 0.61 km/s
14	Phase difference of 180 ° between two waves is equal to a path difference of (A) λ (B) $\lambda/2$ (C) $\lambda/4$ (D) $3\lambda/4$
15	In single mode step index fiber core diameter is (A) 5 μm (B) 5 nm (C) 5 pm (D) 5 cm
16	If internal energy decreases by 300 J and 120 J of work is done on the system then heat will be (A) 420 J (B) 320 J (C) 400 J (D) 300 J
17	If $T_H = T_1 = 327°$ and $T_L = T_2 = 27\ C°$, then efficiency will be (A) 50 % (B) 52 % (C) 100 % (D) Zero

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

What is the cause of systematic error? How can it be reduced?
How can the total uncertainty be found in the final results for multiplication and division?
What is the orientation of three vectors to get their vector sum equal to zero magnitude?
For what orientation of a vector its components have opposite signs , if vector lies in xy plane ?
Is it possible to add $2\vec{A}$ into 6 ? Explain
Name the four non conservative forces.
How can air pollution be reduced?
State Stok's law and what are the limitation of this law?
A person standing near a fast moving train , Is there any danger that he will fall towards train?
) Why the amplitude of the lead ball is greater than of pith ball of same size and length? Explain.
) Explain restoring force and what is its direction?
) If mass of a spring-mass vibrating system is increased by four times. What is the effect on its frequency?

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

What is instantaneous velocity ? Explain. ?
What is difference between open and closed system?
What is trajectory ? Explain briefly.
Show that : Range of projectile is maximum when thrown at an angle of 45° with horizontal.
What are two differences between mechanical and electro-magnetic waves ?
On what factors does the speed of sound in medium depends ?
What features do the longitudinal waves have in common with transverse waves ?
How should a sound source move with respect to an observer so that frequency of sound does not change ?
As a result of distant explosion, an observer senses a ground tremor than hear the explosion.
Explain the time difference?
) On what factors does the fundamental frequency in a stretched string depends ?
) Write down two differences between constructive and destructive interferences ?
) What is the principle of superposition of waves ?

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

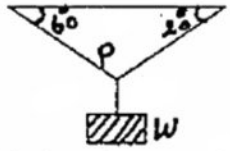
If a wavelength of light 600 nm illuminates two slits 0.5 mm apart. The distance between the slits and screen is 200 cm. Calculate its fringe spacing.
Why centre spot of Newton Rings appear dark?
Hold two fingers close together to form a slit. Look at the light bulb through the slit pattern of light being seen. What phenomenon is used in this case? Define this phenomenon.
Why would it be advantageous of use of blue light with a compound microscope? ·
What is the use of light emitting diode and Microphone in signal transmission in optical fiber.
A system absorbs 200 Joule heat at an absolute temperature 200 K. Calculate the change in Entropy.
Why is the average velocity of the molecules in a gas is zero but the average of the square of velocities is not zero
A thermos flask containing milk as a system is shaken rapidly , does the temperature of milk rise ? Explain
Is it possible to construct a heat engine that will not expel heat into atmosphere? Explain it.

SECTION-II

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

5.(a) Derive the relation for Efficiency of Carnot Engine by explaining its working . 5
(b) Show that expression $V_f = V_i + at$ is dimensionally correct, where V_i is the velocity at t = o , 'a' is acceleration and V_f is the velocity at time t. 3

6.(a) What is difference between elastic and inelastic collision and discuss elastic collision in one dimension to prove that magnitude of relative velocity of approach is equal to the magnitude of the relative velocity of separation. 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 stress of the cord used is 50 N 3



7. (a) Describe Newton's formula for the speed of sound in air and explain how it was corrected by Laplace? 5
(b) Ten bricks each 6cm thick and mass 1.5 Kg lie flat on a table. How much work is required to stack them one on the top of another ? 3

8. (a) What is simple pendulum? Show that its motion is SHM. Derive expression for its time period. 5
(b) A body of moment of inertia I = 0.80 Kg m^2 about a fixed axis, rotates with a constant angular Velocity of 100 rad s^{-1} . Calculate its angular momentum L and the torque to sustain this motion. 3

9. (a) What is compound microscope? Explain its working and derive formula for its magnifying power. 5
(b) The distance between the slits in young's double slit experiment is 0.25 cm .Interference fringes are formed on a screen placed at a distance of 100 cm from the slits .The distance of third dark fringe from the central bright fringe is 0.059 cm. Find the wavelength of the incident light. 3

(11th CLASS – 12018)

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

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	Which of the following is a derived quantity? (A) Mass (B) Velocity (C) Length (D) Time
2	Error in the measurement of radius of sphere is 1 %. The error in the calculated value of its volume is (A) 7 % (B) 5 % (C) 3 % (D) 1 %
3	Magnitude of resultant vector of 6N and 8N which are perpendicular to each other is (A) 14 N (B) 10 N (C) 20 N (D) 2N
4	If magnitudes of scalar product and vector products are same then the angle between the two vectors is (A) 30° (B) 45° (C) 60° (D) 180°
5	Distance covered by a freely falling body in 2 seconds will be (A) 9.8 m (B) 19.2 m (C) 19.4 m (D) 19.6 m
6	Kilowatt hour is the unit of (A) Work (B) Force (C) Power (D) Momentum
7	The weight of an object in an elevator moving down with an acceleration of 9.8 m/s^2 will become (A) Half (B) Double (C) Unchanged (D) Zero
8	Artificial gravity can be created in the spaceship by (A) Revolving around the earth (B) Spinning around its own axis (C)Increasing its velocity (D) Decreasing its velocity
9	The systolic pressure of normal healthy person is (A) 110 torr (B) 115 torr (C) 120 torr (D) 130 torr
10	When the amplitude of oscillation is doubled then its energy becomes (A) Double (B) Four times (C) One half (D) Six times
11	The distance between two consecutive troughs is called (A) Displacement (B) Amplitude (C) Wavelength (D) Wave-front
12	In the stretched string, if speed of the wave is doubled, the tension will be. (A) 2 (B) 4 (C) 8 (D) 6
13	When light enters glass , it suffers a change in (A) Frequency (B) Wavelength (C) Velocity (D) Both velocity and wavelength
14	In a Michelson interferometer by moving the mirror through a distance of $\lambda/4$. The path difference changes by (A) $\lambda/2$ (B) λ (C) $\lambda/4$ (D) 2λ
15	For normal adjustment, what is the length of astronomical telescope if focal lengths of objective and eye piece are 100 cm and 20 cm respectively (A) 100 cm (B) 20 cm (C) 5 cm (D) 120 cm
16	If the temperature of sink is absolute zero then the efficiency of heat engine should be (A) 100 % (B) 50 % (C) Zero (D) Infinite
17	The difference between two molar heat capacities is equal to (A) Temperature (B) Pressure (C) Volume (D) Universal gas constant

PHYSICS (NEW COURSE) (11th CLASS - 12018)
GROUP FIRST **SUBJECTIVE** TIME : 2.40 HOURS
ACADEMIC SESSION : 2015 – 17 TO 2017–19 MARKS : 68

SECTION-I

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

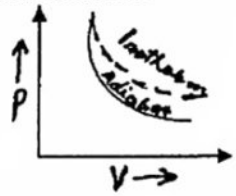
(1) How many seconds are there in one year?
(2) Time period is measured by a stopwatch. What types of errors are possible in time period?
(3) Give drawbacks to use period of pendulum as a time standard ?
(4) Define the units of angle; the radian and the steradian.
(5) Can the magnitude of a vector have negative value? Explain.
(6) Under what condition would a vector have components that are equal in magnitude?
(7) Define null vector and component of a vector.
(8) Show that range of a projectile is maximum at angle of 45°.
(9) Discuss the condition when acceleration $\vec{a}$ of a car is zero but velocity $\vec{V}$ is not zero.
(10) Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true? Discuss
(11) Why fog droplet appears to be suspended in air?
(12) Give two applications of the Bernoulli's equation?

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

(1) A boy uses a catapult to throw a stone, which accidently smashes a green house window. List the possible energy changes.
(2) What are renewable and non-renewable energy sources .Give one example of each
(3) What is solar constant? Give its value.
(4) Why does a diver change his body position before and after the diving in the pool? Briefly explain with figure.
(5) State right hand rule how would you apply it to find the direction of angular velocity.
(6) What are banked tracks? Explain briefly
(7) Does the frequency of simple pendulum depends on amplitude or length of simple pendulum? Explain briefly
(8) If a mass spring, system is hung vertically and set into oscillations. Why does the motion eventually stops.
(9) Differentiate between damped and un-damped oscillations.
(10) Write down two applications of Doppler's effect.
(11) What is the difference between transverse and longitudinal waves ? Draw their diagrams also.
(12) Why does sound travel faster in solids than in gasses?

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

(1) The centre of Newton's rings is dark although the thickness of air film is effectively zero at the centre .Explain
(2) Why x-rays cannot be diffracted by ordinary glass grating?
(3) An oil film spreading over a wet footpath shows colours. Explain, how does it happen?
(4) An astronomical telescope of long focal length and large aperture is considered to be a good telescope. Why ?
(5) How the light signal is transmitted through the optical fiber?
(6) Is it possible to convert internal energy into mechanical energy? Explain with an example .
(7) Why does the pressure of a gas in a car tyre increases when it is driven through some distance?
(8) How can the efficiency of real heat engine be increased?
(9) Solid line represents adiabatic and dotted line isothermal process. In which process more work is done?



SECTION-II

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

5.(a) Define cross product of two vectors. Also, write down four characteristics of cross product. 5
(b) A 100 g golf ball is moving to the right with a velocity of 20 ms^{-1} , it makes a head on collision with 8kg steel ball initial at rest. Compute velocities of balls after collision. 3

6.(a) Define the absolute potential energy. Derive its mathematical expression 5
(b) What should be the orbiting speed to launch a satellite in circular orbit 900 Km above the surface of earth? (Take mass of the earth as 6×10^{24} Kg and its radius as 6400 Km) 3

7.(a) Define terminal velocity. Show that the terminal velocity is directly proportional to the square of the radius. 5
(b) Find the average speed of oxygen molecule in the air at STP. 3

8.(a) Prove that the total energy of the vibrating mass-spring system remains constant. 5
(b) A pipe has length of one meter. Determine the frequencies of the fundamental and the first two harmonics If the pipe is open at both ends. (Speed of sound in air = 340 ms^{-1}) 3

9.(a) What is telescope? Discuss its construction and magnification with ray diagram. 5
(b) A second order spectrum is formed at an angle of 38.0° .When light falls normally on a diffraction grating having 5400 lines per centimeter. Determine wavelength of the light used. 3

PAPER CODE - 6472

(11th CLASS – 12018)

PHYSICS (NEW COURSE) **TIME: 20 MINUTES**

GROUP SECOND **MARKS: 17**

ACADEMIC SESSION : 2015 – 17 TO 2017 - 19

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

PHYSICS (NEW COURSE) (11th CLASS - 12018)
GROUP SECOND **SUBJECTIVE** TIME : 2.40 HOURS
ACADEMIC SESSION : 2015 - 17 TO 2017 – 19 MARKS : 68

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 $\vec{A_1} . \vec{A_2} = 0$
(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 ?

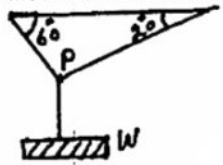
QUESTION NO. 4 Write short answers any Six (6) questions of the following 12

(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 x 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 (η + 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