Physics

Paper I (Objective Type)

Time : 20 Minutes

Marks : 17

D

L.K.No. 809

(Inter-A-2018)

Inter (Part - I)

Paper Code No. 6477

New Pattern

Group Ist

Session (2015- 2017) to (2017 - 2019)

BWP [redacted]-G1-11-18

Note : Four possible choices A , B , C , D to each question are given. Which choice 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.

Q.No.1 (1)	Number of Steradians in a Solid Sphere is : (A) π (B) 2π (C) 4π (D) $\frac{\pi}{2}$
(2)	If a Vector $\vec{A}$ makes an angle 0^{o} with x - axis then its x - component is : (A) A CosΘ (B) A^2 (C) A (D) A SinΘ
(3)	The Magnitude of $\hat{i} \times \hat{j}$ is equal to : (A) 1 (B) $\hat{K}$ (C) $-\hat{K}$ (D) Zero
(4)	Significant Figures in 0 · 0010 are : (A) 1 (B) 2 (C) 3 (D) 4
(5)	Original Source of Energy for Biomass is : (A) Earth (B) Moon (C) Sun (D) Star
(6)	Change of Momentum is called : (A) Acceleration (B) Impulse (C) Force (D) Pressure
(7)	Angular Momentum has the same unit as : (A) Impulse x Distance (B) Power x time (C) Linear Momentum x time (D) Work x frequency
(8)	The number of Satellite which form the Global Positioning System close to earth are : (A) 22 (B) 24 (C) 30 (D) 34
(9)	A 6 · 0 meter high tank is full of water. A hole appears at its middle. What is speed of efflux : (A) 5 · 66 ms^{-1} (B) 6 · 66 ms^{-1} (C) 7 · 66 ms^{-1} (D) 8 · 66ms^{-1}
(10)	In a Stretched String , if speed of Wave is doubled the tension will be : (A) 2 (B) 4 (C) 8 (D) 6
(11)	In which of following Speed of Sound Wave is greatest : (A) Air (B) Water (C) Vaccum (D) Steel
(12)	The Dimensions of Spring Constant " K " are : (A) $[MT^{-2}]$ (B) $[M^{-2}T]$ (C) $[M^{2}T^{-2}]$ (D) $[MLT^{-2}]$
(13)	The locus of all points in the same Phase of Vibration is called : (A) Wave Front (B) Interference (C) Diffraction (D) Polarization
(14)	The Internal Energy of System does not depend on : (A) Temperature (B) Pressure (C) Path (D) Initial and Final State
(15)	The least distance of Distinct Vision is : (A) 5 cm (B) 10 cm (C) 30 cm (D) 25 cm
(16)	Which is not Optically Active : (A) Sugar (B) Tartaric Acid (C) Water (D) Sodium Chlorate
(17)	The Mean Kinetic Energy of Gas is zero at : (A) $0^{o}C$ (B) $-273^{o}C$ (C) 100 K (D) $100^{o}C$

Roll No.	809 - 23000	New Pattern (Group Ist)
Physics (Subjective)	Inter-A-2018	Inter (Part - I)
Time = 2 : 40 Hours	Total Marks : 68	Session (2015 - 17) to (2017 - 19)

Note : It is compulsory to attempt (8 - 8) parts each from Q.No.2 and Q.No. 3 while attempt any (6) parts from Q. No.4 and attempt any (03) questions from Part II. Write same Question No. and its Part No. as given in the question paper.

BWP Part - I [redacted]-G1-11-18 22 x 2 = 44

Q.No.2 (i) Write the dimensions of : (i) Pressure (ii) Density

(ii) How many Nanoseconds in one year ?

(iii) Define Precision and Accuracy.

(iv) The time period of Simple Pendulum is measured by the stop watch . What type of errors are possible in the time period?

(v) Is it possible to add a Vector Quantity to Scalar Quantity ? Explain.

(vi) Write down the condition for a body to be a complete equilibrium.

(vii) Prove that $\vec{A} \cdot \vec{B} = A_xB_x + A_yB_y + A_zB_z$

(viii) Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true ? Discuss.

(ix) Write any two properties of an Inertial frame of Reference.

(x) Define Impulse. Also give its S.I. Unit.

(xi) Explain what do you understand by the term Viscosity.

(xii) Define Torricelli's Theorem.

Q.No.3 (i) Calculate the work done in Kilo Joules in lifting a mass of 10 Kg through a vertical height of 10 m.

(ii) Define Joule and Watt.

(iii) Derive the relation between Power , Force and Velocity.

(iv) 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?

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

(vi) Why Einstein's Theory of Gravitation is better than Newton's ?

(vii) Why the Motion of Projection of a point revolving in a circle with variable angular velocity is not Simple Harmonic Motion ?

(viii) What do you mean by Phase?

(ix) What is meant by Phase Angle ? Does it define angle between Maximum Displacement and the Deriving Force?

(x) Is it possible for two Identical Waves travelling in the same direction along a string to give rise to a stationary wave?

(xi) How should a sound source move with respect to an observer , so that the frequency of its sound does not change?

(xii) Taking an example of Periodic Wave , prove that $v = f\lambda$

Q.No.4 (i) Why the Polaroid Sunglasses are better than Ordinary Sunglasses?

(ii) An oil film spreading over a wet footpath shows colours. Explain briefly.

(iii) Write two points of Huygen's Principle.

(iv) Focal Length of a Convex Lens is 5 cm. Calculate its magnification.

(v) Define Refractive Index of a Medium. Write its two mathematical forms.

(vi) Derive Boyle's Law from Kinetic Theory of Gases.

(vii) Why the Average Velocity of the Molecules in a Gas is zero , but the average of square of the velocity is not zero? Explain.

(viii) Define Adiabatic Process. Give one example.

(ix) No Spark Plug is used in Diesel Engine. How it gets ignition?

P.T.O.

L.K.No. 809 | Part - II | [redacted]-G1-11-18

Q.No.5 (a) Define Projectile and derive an expression for maximum height and Horizontal Range of the projectile? (5)

(b) The magnitude of Dot and Cross Products of two vectors are $6\sqrt{3}$ and 6. Find the angle between the vectors. (3)

Q.No.6 (a) Define Absolute P.E. Derive an expression for it in Gravitational Field. (5)

(b) A Gramophone Record turn table accelerates from rest to an angular velocity of 45 rev min^{-1} in 1·60 second. What is its Average Angular Acceleration? (3)

Q.No.7 (a) State First Law of Thermodynamics and apply this law in Isothermal Expansion and in Adiabatic Expansion Processes. (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.No.8 (a) What is Simple Pendulum? Show that its time period depends only on the length and acceleration due to Gravity. (5)

(b) Find the temperature at which the velocity of Sound in air is two times its velocity at $10^{o}C$? (3)

Q.No.9 (a) What is Simple Microscope? Derive the relation for its Magnification? (5)

(b) In Double Slit Experiment, the second order maximum occurs at $\Theta = 0 \cdot 25^{o}$. The Wavelength is 650 nm. Calculate the Slit Separation. (3)

Physics | A | L.K.No. 810 | Paper Code No. 6472

Paper I (Objective Type) | (Inter-A-2018) | New Pattern

Time : 20 Minutes | Inter (Part - I) | Group 2nd

Marks : 17 | Session (2015- 2017) to (2017 - 2019)

BWP [redacted] -Gr-11-18

Note : Four possible choices A , B , C , D to each question are given. Which choice 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.

Q.No.1 · (1)	Number of Steradians in a Solid Sphere is : (A) π (B) 2π (C) 4π (D) $\frac{\pi}{2}$
(2)	The Chips are made of : (A) Carbon (B) Germenium (C) Gold (D) Silicon
(3)	Angle between two vectors $3\hat{i} + 4\hat{j}$ and $4\hat{i} - 3\hat{j}$ is : (A) 30^o (B) 90^o (C) 60^o (D) 45^o
(4)	Forces 12 N and 5 N are added , the resultant can not be : (A) 13 N (B) 7 N (C) 6 N (D) 17 N
(5)	Original Source of Energy for Biomass is : (A) Earth (B) Moon (C) Sun (D) Star
(6)	The unit of Solar Constant is : (A) kWm^{-2} (B) kWm^2 (C) kWm (D) kWm^{-1}
(7)	Angular Momentum has the same unit as : (A) Impulse x Distance (B) Power x Time (C) Linear Momentum x time (D) Work x Frequency
(8)	If the Radius of Earth is increased to four times of the present . Critical Velocity V_o becomes : (A) $\frac{V_o}{\sqrt{2}}$ (B) $\sqrt{2}\,V_o$ (C) $2\,V_o$ (D) $\frac{1}{2}V_o$
(9)	The law of conservation of energy is the basis of : (A) Equation of Continuity (B) Bernoulli's Equation (C) Venturi Relation (D) Interference
(10)	Beats can be heard when difference of frequencies is not more than : (A) 8 Hz (B) 10 Hz (C) 2 Hz (D) 4 Hz
(11)	The Wave form of Simple Harmonic Motion is : (A) Sine Wave (B) Cosine Wave (C) Tangent Wave (D) Saw Tooth Wave
(12)	On Reflection of Longitudinal Waves from denser medium, there will be phase change of : (A) π rad (B) 2π rad (C) Zero (D) $\frac{\pi}{2}$ rad
(13)	The angle between the Ray of Light and Surface of the Wave Front is : (A) 60^o (B) 30^o (C) 180^o (D) 90^o
(14)	A glass grating has 5000 lines/ cm then grating element will be : (A) 2×10^{-6} m (B) 2×10^{-4} m (C) 2×10^{-3} m (D) 2×10^{-7} m
(15)	Critical Angle is that angle of incidence for which angle of refraction is : (A) 90^o (B) 45^o (C) 42^o (D) 24^o
(16)	No Spark Plug is needed in : (A) Carnot Engine (B) Petrol Engine (C) Steam Engine (D) Diesel Engine
(17)	Force Acting on the Piston to move outward is : (A) Compressive Stroke (B) Power Stroke (C) All Strokes (D) Exhaust Stroke

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Roll No.	810 - 22000	New Pattern (Group 2nd)
Physics (Subjective)	Inter-A-2018	Inter (Part - I)
Time = 2 : 40 Hours	Total Marks : 68	Session (2015 - 17) to (2017 - 19)

Note : It is compulsory to attempt (8 - 8) parts each from Q.No.2 and Q.No. 3 while attempt any (6) parts from Q. No.4 and attempt any (03) questions from Part II. Write same Question No. and its Part No. as given in the question paper.

Bwp Part - I [illegible] G2-11-18 22 x 2 = 44

Q.No.2 (i) Why do we find it useful to have two units for the amount of substance, the kilogram and the mole?

(ii) How many years in one Second?

(iii) Define Radians and Steradian.

(iv) Show that the Einstein Equation $E = mc^2$ is dimensionally consistant.

(v) What is the Unit Vector in the direction of the vector $\vec{A} = 4\hat{i} + 3\hat{j}$?

(vi) Name the two different conditions that could make $\vec{A} \times \vec{A} = 0$

(vii) Define Resultant Vector and Null Vector.

(viii) Define Impulse and Show that how it is related to Linear Momentum?

(ix) Define Elastic and Inelastic Collisions.

(x) What is meant by Linear Momentum? Also give its S.I. Unit.

(xi) Why Fog Droplets appear to be suspended in air?

(xii) Explain how the Swing is produced in the fast moving cricket ball?

Q.No.3 (i) An object has 1 Joule of Potential Energy. Explain what does it mean?

(ii) When rocket re-enters the atmosphere, its nose cone becomes very hot. Where does this heat energy come from?

(iii) Define Joule and Watt.

(iv) What is meant by Moment of Inertia? Explain its significance.

(v) Show that Orbital Angular Momentum $L_o = mvr$

(vi) Prove that 1 Radian = 57.3^0

(vii) Can we realize an Ideal Simple Pendulum?

(viii) What do you mean by Phase?

(ix) Define Restoring Force and Simple Harmonic Motion.

(x) What features do Longitudinal Waves have in common with Transverse Waves?

(xi) What is the effect of Pressure on the Speed of Sound in Gases?

(xii) State the principle of Superposition.

Q.No.4 (i) Differentiate between Constructive and Destructive Interference.

(ii) Why the Polaroid Sunglasses are better than ordinary Sunglasses?

(iii) Can you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?

(iv) An Astronomical Telescope has an objective and eye piece of Focal Length 100 cm and 5 cm respectively. Calculate its angular magnification.

(v) Define Total Internal Reflection and Critical Angle.

(vi) Specific Heat of a Gas at constant pressure is greater than the specific heat at constant volume, why?

(vii) Can the efficiency of a Carnot Engine 100 %? Explain.

(viii) Is it possible to convert internal energy into mechanical energy? Explain with an example.

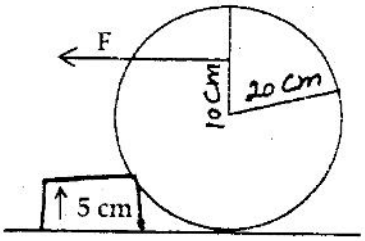
(ix) Does the Entropy of a system increase or decrease due to friction? Explain.

P.T.O.

L.K.No. 810 Bwp Part - II [redacted]-G2-11-18

Q.No.5 (a) Prove that the Total Linear Momentum of an Isolated System remains constant. (5)

(b) A spherical ball of weight 50 N is to be lifted over the step as shown in the given figure. Calculate the minimum force needed just to lift it above the floor. (3)



Q.No.6 (a) What are Geostationary Orbits? Derive an expression for the orbital radius of Geostationary Satellite. (5)

(b) How large a force is required to accelerate an electron of mass $9 \cdot 1 \times 10^{-31}$ Kg from rest to a speed of $2 \cdot 0 \times 10^{7}$ ms^{-1} through a distance of 5 · 0 cm ? (3)

Q.No.7 (a) State and Derive the Equation of Continuity. (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.No.8 (a) What is Simple Pendulum ? Show that its motion is SHM. Derive an expression for its time period. (5)

(b) The frequency of the note emitted by a Stretched String is 300 Hz. What will be the frequency of this note , when the tension is increased by one third without changing the length of the wire ? (3)

Q.No.9 (a) What is Simple Microscope ? Describe its construction , working and derive expression for its magnification. (5)

(b) Sodium light (λ = 589 nm) is incident normally on a grating having 3000 lines per centimetre . What is the highest order of the spectrum obtained with this grating? (3)