



Physics	(D)	L.K.No. 1107	Paper Code No. 6477
Paper I	(Objective Type)	Inter - A - 2021	(Group Ist)
Time :	20 Minutes	Inter (Part I)	20P-91-21
Marks :	17	Session (2017-19) to (2020-22)	

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 No. 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	If the percentage uncertainty in the radius of sphere is 3 %, then total uncertainty in volume is :	(A) 4 % (B) 7 % (C) 9 % (D) 13 %
(1)		
(2)	The magnitudes of Dot and Cross Product of two vectors are $2\sqrt{3}$ and 2 respectively, then the angle between vectors is :	(A) $30^\circ$ (B) $45^\circ$ (C) $60^\circ$ (D) $90^\circ$
(3)	If two unit vectors are perpendicular to each other, then magnitude of their resultant is :	(A) 1 (B) $\sqrt{2}$ (C) $\sqrt{2.5}$ (D) $2\sqrt{2}$
(4)	$\sqrt{\frac{F \times l}{m}}$ is equal to :	(A) Torque (B) Frequency (C) Speed (D) Power
(5)	Acceleration of Rocket is given by the relation :	(A) $a = \frac{M}{mv}$ (B) $a = \frac{mv}{M}$ (C) $a = \frac{m}{Mv}$ (D) $a = \frac{Mv}{m}$
(6)	The speed of hoop on reaching the bottom of an inclined plane is :	(A) $\sqrt{\frac{3}{4}gh}$ (B) $\sqrt{gh}$ (C) $\sqrt{\frac{4}{3}gh}$ (D) $\sqrt{2gh}$
(7)	Kilo Watt - Second is the unit of :	(A) Power (B) Energy (C) Momentum (D) Time
(8)	For which pair of angles, Range is same :	(A) ( $15^\circ$ , $60^\circ$ ) (B) ( $35^\circ$ , $65^\circ$ ) (C) ( $30^\circ$ , $60^\circ$ ) (D) ( $20^\circ$ , $45^\circ$ )
(9)	The ratio of Rotational and Translational K.E. of hoop is :	(A) 1 : 2 (B) 1 : $\sqrt{2}$ (C) 1 : 1 (D) $\sqrt{2}$ : 1
(10)	The value of $r$ for diatomic gas is :	(A) 1.29 (B) 1.4 (C) 1.67 (D) 1.73
(11)	Time Period of Simple Pendulum is directly proportional to :	(A) $l$ (B) $l^2$ (C) $l^{1/2}$ (D) $g$
(12)	If Radius of Droplet is halved, then its Terminal Velocity becomes :	(A) Half (B) Double (C) One Fourth (D) Four Times
(13)	The speed of sound at a given temperature is $v$ , by doubling pressure speed of sound is :	(A) $0.5v$ (B) $v$ (C) $2v$ (D) $3v$
(14)	Pressure of a Gas is equal to :	(A) $\frac{2}{3} p < v^2 >$ (B) $\frac{3}{2} p < v^2 >$ (C) $\frac{1}{3} p < v^2 >$ (D) $p < v^2 >$
(15)	If a Convex Lens of Focal Length 5 cm is used as a Simple Microscope, then its magnifying Power is :	(A) 5 (B) 6 (C) 10 (D) 25
(16)	Angle between Wavefront and Ray of light is :	(A) $0^\circ$ (B) $45^\circ$ (C) $60^\circ$ (D) $90^\circ$
(17)	For a Diatomic Gas $C_v = \frac{5R}{2}$ then $r$ for this gas is equal to :	(A) $\frac{5}{7}$ (B) $\frac{7}{5}$ (C) $\frac{4}{3}$ (D) $\frac{3}{4}$



Roll No.	1107 - 21000	Session (2017-19) to (2020-22)	Inter (Part - I)
Physics (Subjective)	Inter - A - 2021	Time 2 : 40 Hours Marks : 68	Group Ist

Note : It is compulsory to attempt any (8-8) Parts each from Q.No. 2, Q.No.3 and attempt any (6) Parts from Q.No.4. Attempt any (3) Questions from Part - II. Write the Same Question Number and its Part Number as given in the Question Paper

BUP-61-21

Make Diagram where necessary.

Part - I

22 x 2 = 44

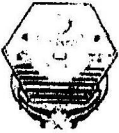
- Q.No.2
- What are the Dimensions and Units of Gravitational Constant  $G$  in the formula  $F = G \frac{m_1 m_2}{r^2}$  ?
  - Show that the famous Einstein Equation  $E = mc^2$  is dimensionally consistent.
  - The time of 30 vibrations of a simple pendulum recorded by a stop watch accurate upto one tenth of a second is 54.6 s. Find its period with uncertainty ?
  - The Wavelength of a Wave depends on the speed  $V$  and its frequency  $f$ , decide which of the given is correct  $f = v\lambda$ ,  $f = v/\lambda$  ?
  - Can you add zero to a Null Vector ?
  - If all the components of the vectors  $\vec{A}_1$  and  $\vec{A}_2$  were reversed, how would this alter  $\vec{A}_1 \times \vec{A}_2$  ?
  - Show that the Vector Addition is Commutative.
  - At what point or points in its path does a projectile have its minimum speed, its maximum speed ?
  - How impulse is related to linear momentum ?
  - Define two types of Collisions.
  - Show that the range of projectile is maximum when projectile is thrown at an angle of  $45^\circ$  with the horizontal ?
  - Why Fog Droplets appear to be suspended in air ?

- Q.No.3
- In which case is more work done : when a 50 Kg bag of books is lifted through 50 cm OR when a 50 Kg crate is pushed through 2 m across the floor with a force of 50 N ?
  - Show that Power is the Dot Product of Force and Velocity.
  - Define Kilowatt Hour.
  - Show that  $a = r\alpha$  where  $\alpha$  is the Angular Acceleration.
  - Write down three equations of Angular Motion.
  - When Mud Flies off the tyre of a moving Bicycle ? In what direction does it fly ? Explain.
  - Find the Time Period of Simple Pendulum if the value of "g" increases by 2-times and mass of the Bob increases 2-times ?
  - Define Resonance giving one example of Resonance.
  - When the Oscillation is given to the Mass Spring System, why this system do not oscillate indefinitely ?
  - What is the difference between Open and Closed Organ Pipe ?
  - How the Velocity of Waves generated in a String change, if the tension in the String is made 4-times ?
  - What is the effect of pressure and Density of the Medium on the Velocity of Sound ?

- Q.No.4
- Define Diffraction Grating and Grating Element.
  - Can Visible light produce interference fringes ? Explain.
  - Under what conditions two or more sources of light behave as Coherent Sources of light ?
  - What do you mean by Normal Adjustment of Astronomical Telescope ?
  - What is Spectrometer ? Give names of its main parts.
  - What are Source and Sink for Carnot Engine ?
  - Write down two Postulates for Kinetic Theory of Gases.
  - Specific Heat of a gas at constant pressure is greater than the specific heat at constant volume. Why ?
  - Is it possible to construct a heat engine that will not expel heat into atmosphere ?

Part - II

- Q.No.5
- Explain the addition of Vectors by Rectangular Components. (5)
  - A 1500 Kg car has its velocity reduced from 20 m/sec to 15 m/sec in 3.0 sec. How large was the average retarding force ? (5)
- Q.No.6
- Derive Newton's formula for the speed of sound in air and describe the correction by Laplace in it. (3)
  - How large a 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<sup>-1</sup> through a distance of 5.0 cm ? (5)
- Q.No.7
- Define Centripetal Force and derive the relation of Centripetal Force. (3)
  - What Gauge Pressure is required in the city mains for a stream from a fire hose connected to the mains to reach a vertical height of 15.0 m ? (5)
- Q.No.8
- Consider a Horizontal Spring Mass System. Discuss Law of Conservation of Energy for this System. (3)
  - 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 ? (5)
- Q.No.9
- Describe the construction and working of Michelson's Interferometer. (3)
  - An Astronomical Telescope having magnifying power of 5 consists of two thin lenses 24 cm apart. Find the Focal Lengths of these lenses. (5)



<b>Physics</b>	(A)	<b>L.K.No. 1108</b>	Paper Code No. 6472
Paper I	( Objective Type )	<b>Inter - A - 2021</b>	( Group 2nd )
Time :	20 Minutes	<b>Inter ( Part I )</b>	<b>BUP-42-21</b>
Marks :	17	Session (2017 -19) to (2020 - 22)	

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 No. 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	In earth's Gravitational Field , work done in a closed path is :	(A) Maximum (B) Positive (C) Negative (D) Zero
(1)		
(2)	A two meter high tank is full of water. A hole appears at its middle , what is speed of Efflux :	(A) 3.75 m/s (B) 4.91 m/s (C) 4.42 m/s (D) 5.11 m/s
(3)	A particle execute SHM of amplitude A . Potential Energy is maximum when the displacement is :	(A) $\pm A$ (B) Zero (C) $\pm \frac{A}{2}$ (D) $\pm \frac{A}{\sqrt{2}}$
(4)	In Young's Double Slit Experiment the Fringe Spacing is equal to :	(A) $\frac{d}{\lambda L}$ (B) $\frac{L}{\lambda d}$ (C) $\frac{\lambda L}{d}$ (D) $\frac{Ld}{\lambda}$
(5)	Expression for Resolving Power of Lens is :	(A) $\alpha_{min} = \frac{\lambda}{D}$ (B) $R = \frac{1}{\alpha_{min}}$ (C) $R = \frac{D}{1.22 \lambda}$ (D) $R = \frac{\lambda}{\lambda_2 - \lambda_1}$
(6)	Which of the following measurement is more precise :	(A) 3127 s (B) 312.7 s (C) 31.27 s (D) 3.127 s
(7)	A system takes 88 seconds to complete 25 oscillations. Time period of the system is :	(A) 3.52 s (B) 35.2 s (C) 3.82 s (D) 0.032 s
(8)	If $r = 5$ m and $F = 4$ N are along same direction then Torque is :	(A) 5 N-m (B) 20 N-m (C) 10 N-m (D) Zero
(9)	If Vector makes angle $\theta$ with the x-axis , its x-component is :	(A) $A \sin \theta$ (B) $A \tan \theta$ (C) $A \cos \theta$ (D) $A \sec \theta$
(10)	Which of the given variable is present in all three equations of Motion :	(A) Acceleration (B) Distance (C) Time (D) Torque
(11)	Motion along y-axis is :	(A) One Dimensional (B) Two Dimensional (C) Three Dimensional (D) Angular
(12)	One Radian is equal to :	(A) $2\pi$ rev (B) $\frac{\pi}{4}$ rev (C) $\frac{\pi}{2}$ rev (D) $\frac{1}{2\pi}$ rev
(13)	S.I. Unit of Angular Acceleration is :	(A) $\text{rad/s}^2$ (B) $\text{rev/s}^2$ (C) $\text{degree/s}^2$ (D) $\text{m/s}^2$
(14)	If 20 Waves passes through medium in 1 second with speed of $20 \text{ ms}^{-1}$ , then Wavelength is :	(A) 20 m (B) 200 m (C) 400 m (D) 1 m
(15)	Velocity of Sound is maximum in :	(A) Air (B) Nitrogen (C) Metal (D) Glass
(16)	The Efficiency of Heat Engine is 100% , when temperature of Sink is :	(A) $0^\circ\text{C}$ (B) $0^\circ\text{F}$ (C) 0 K (D) 273 K
(17)	Area under p-v Diagram of Carnot Engine represents :	(A) Heat Input (B) Heat Output (C) Efficiency (D) Work done



Roll No.	1108 - 2000	Session (2017-19) to (2020-22)	Inter (Part - I)
Physics (Subjective)	Inter - A - 2021	Time 2 : 40 Hours Marks : 68	Group 2nd

Note : It is compulsory to attempt any (8 - 8) Parts each from Q.No. 2, Q.No.3 and attempt any (6) Parts from Q.No.4. Attempt any (3) Questions from Part - II. Write the Same Question Number and its Part Number as given in the Question Paper

BWP-92-21

Make Diagram where necessary.

Part - I

22 x 2 = 44

Q.No.2	(i)	What are the Dimensions and Units of Gravitational Constant G in the formula $F = G \frac{m_1 m_2}{r^2}$ ?		
	(ii)	Is a Precise Measurement also an Accurate Measurement ? Explain your answer.		
	(iii)	Show that the equation $V_f = V_i + at$ is dimensionally correct.		
	(iv)	Is it possible to add a Vector Quantity to a Scalar Quantity ? Explain.		
	(v)	How would the two vectors of the same magnitude have to be oriented if they were to be combined to give a resultant equal to a vector of the same magnitude ?		
	(vi)	If all the components of the vectors $\vec{A}_1$ and $\vec{A}_2$ were reversed, how would this alter $\vec{A}_1 \times \vec{A}_2$ ?		
	(vii)	State the Law of Conservation of Linear Momentum, pointing out the importance of Isolated System.		
	(viii)	Prove that for angles of Projection, which exceed or fall short of $45^\circ$ by equal amounts the ranges are equal.		
	(ix)	What is Force due to Water Flow ?		
	(x)	Explain the difference between Laminar Flow and Turbulent Flow.		
Q.No.3	(xi)	Write the Dimensions of : (a) Density (b) Power	(xii) Does a Moving Object have impulse ?	
	(i)	Define Power and Absolute P.E.	(ii) Define Stationary Waves and Organ Pipe.	
	(iii)	Why does sound travel faster in Solids than in Gases?	(iv) Prove the relation $v = f\lambda$ for Waves.	
	(v)	Define Work Energy Principle and write its formula.	(vi) Define Simple Pendulum and Second Pendulum.	
	(vii)	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.		
	(viii)	Define Angular Velocity and Angular Displacement.		
	(ix)	Find the speed of Hoop on reaching at the bottom of the inclined plane when rolled down from an inclined plane of height h.		
	(x)	Explain the difference between Tangential Velocity and the Angular Velocity. If one of these is given for a wheel of known radius, how will you find the other ?		
	(xi)	Under what conditions does the addition of two simple Harmonic Motions produce a resultant, which is also Simple Harmonic ?		
	(xii)	Explain the relation between Total Energy, Potential Energy and Kinetic Energy for a body oscillating with S.H.M.		
	Q.No.4	(i)	Can Visible light produce interference fringes ? Explain.	
		(ii)	Explain whether the Young's Experiment is an Experiment for studying Interference or Diffraction Effects of light?	
(iii)		What are Newton's Rings ? Why the centre of the Newton's Rings is dark for reflected light ?		
(iv)		Explain the difference between Magnifying Power and Resolving Power of Optical Instrument ?		
(v)		What is the function of Collimator in Spectrometer ?		
(vi)		Can the mechanical energy be converted completely into Heat Energy, if so give an example.		
(vii)		What is the difference between Isothermal and Adiabatic Process ?		
(viii)		State 1st Law of Thermodynamics. How it is applicable on human body ?		
(ix)		Derive Boyle's Law from Kinetic Theory of Gases.		
Part - II				
Q.No.5	(a)	Define Vector Product. Write down the four characteristics of Scalar Product.	(5)	
	(b)	A ball is thrown horizontally from a height of 10 m with velocity of 21 m/s. How far off it hit the ground and with what velocity ?	(3)	
Q.No.6	(a)	Define Absolute Potential Energy. Derive relation for Absolute P.E. of body of mass m on the surface of earth.	(5)	
	(b)	A stationary wave is established in a string which is 120 cm long and fixed at both ends. The string vibrates in four segments at a frequency of 120 Hz. Determine its Wavelength and the fundamental frequency.	(3)	
Q.No.7	(a)	What are Real and Apparent Weight ? Find the apparent weight in different cases for an object suspended by a string and spring balance in an elevator moving vertically.	(5)	
	(b)	What Gauge Pressure is required in the city mains for a stream from a fire hose connected to the mains to reach a vertical height of 15.0 m ?	(3)	
Q.No.8	(a)	What is Carnot Engine ? Discuss Carnot Cycle, also derive relation for its efficiency.	(5)	
	(b)	A block of Mass 4 Kg is dropped from height of 0.6 m on to a spring of Spring Constant $K = 1960 \text{ Nm}^{-1}$ . Find the maximum distance through which spring will be compressed ?	(3)	
Q.No.9	(a)	Write down the construction of Compound Microscope and derive a relation for its Angular Magnification.	(5)	
	(b)	In a Double Slit Experiment, the second order maximum occurs at $\theta = 25^\circ$ . The Wavelength is 650 nm. Determine the Slit Separation.	(3)	