

PHYSICS (Group-I) (PART - I) (OBJECTIVE PART) (INTERMEDIATE) (Smart Syllabus)
 21/01 (***)
 Marks : 17
 Time : 20 Minutes

Note:- Write your Roll No. in space provided. Over writing, cutting, using of lead pencil will result in loss of marks. All questions are to be attempted.

1- Each question has four possible answers, Tick (✓) the correct answer. (17)

1	If a car moves with a uniform speed of 2ms^{-1} in a circle of radius 0.4m its angular speed is;							
	A	4 rads^{-1}	B	5 rads^{-1}	C	2 rads^{-1}	D	0.4 rads^{-1}
2	Venturi-meter is a device used to measure;							
	A	density of fluid	B	Viscosity of fluid	C	Pressure of fluid	D	Speed of fluid
3	When the amplitude of a wave becomes double its energy becomes;							
	A	One half	B	Double	C	Four times	D	Six times
4	A uniform string of length l , mass per unit length m is fixed at both ends under tension F . Then its frequency f is given by;							
	A	$f = \frac{1}{2l} \sqrt{\frac{F \times m}{l}}$	B	$f = \frac{1}{2} \sqrt{\frac{F}{m}}$	C	$f = \frac{1}{2l} \sqrt{\frac{F}{m}}$	D	$f = \frac{1}{2l} \sqrt{\frac{l \times m}{F}}$
5	The temperature at which the velocity of sound in air is two times its velocity at 10°C is;							
	A	759°C	B	859°C	C	959°C	D	1132°C
6	The distance between any two consecutive dark fringes is called;							
	A	Wave let	B	Wave length	C	Amplitude	D	Fringe spacing
7	In Michelson experiment the equation used to find the speed of light is;							
	A	$16fc$	B	$\frac{1}{16}fd$	C	$16fd$	D	$\frac{16}{fd}$
8	Carnot cycle consists of;							
	A	Four steps	B	Three steps	C	Two steps	D	Single step
9	A gas performs 10J of work while expanding adiabatically. The change in internal energy is;							
	A	10J	B	-10J	C	100J	D	-100J
10	Time taken by light to reach from moon to earth is;							
	A	1min 10sec	B	1min 20sec	C	1min 40sec	D	1min 45sec
11	Length of an object is recorded as 25.5 cm by using a meter rod having smallest division in millimeter. The fractional uncertainty is;							
	A	0.400	B	2.550	C	0.004	D	0.100
12	The minimum number of vectors of un-equal magnitudes whose vector sum can be zero is;							
	A	3	B	2	C	1	D	4
13	If $\vec{F} = 2\hat{i} + 3\hat{j}$ and $\vec{D} = 4\hat{i} + 4\hat{j}$ then the work done is;							
	A	24J	B	13J	C	8J	D	20J
14	The range of projectile is same for;							
	A	$0^\circ, 45^\circ$	B	$35^\circ, 55^\circ$	C	$15^\circ, 60^\circ$	D	$30^\circ, 75^\circ$
15	The mass of fuel consumed by a typical rocket to overcome earth's gravity is;							
	A	1000 kgs^{-1}	B	100 kgs^{-1}	C	10000 kgs^{-1}	D	10 kgs^{-1}
16	Absolute P.E of an object at an infinite height w.r.t earth is taken as;							
	A	Zero	B	Negative	C	Minimum	D	Maximum
17	The apparent weight of a man in ascending lift moving with acceleration "a"							
	A	Increase	B	Decrease	C	Zero	D	Remain constant

SECTION - I

2- Write short answers of any eight parts. **AJK-41-21** (2 x 8 = 16)

i	Differentiate between the precision and accuracy.	ii	What are the dimensions and units of gravitational; $F = G \frac{m_1 m_2}{r^2}$
iii	What are the rules for assessment of uncertainty in case of multiplication and division?	iv	The wave length λ of a wave depends on the speed v of the wave and its frequency f , knowing that $[\lambda] = [L]$, $[v] = [LT^{-1}]$ and $[f] = [T^{-1}]$ Decide which of the following is correct, $f = v\lambda$ or $f = \frac{v}{\lambda}$
v	If all the components of vectors, A_1 and A_2 were reversed, how would this alter $A_1 \times A_2$?	vi	What is difference between moment arm and moment force?
vii	Suppose the sides of a closed polygon represent vectors arranged head to tail. What is the sum of these vectors?	viii	What is the principle of rocket propulsion?
ix	At what point or points in its path does a projectile have its minimum speed, its maximum speed?	x	Why a safety helmet of motor cycle is padded?
xi	A 20g ball hits the wall of squash court with constant force of 50N. If the time of impact of the force is 0.5 sec, find the impulse.	xii	Explain, how the swing is produced in a fast moving cricket ball?

3- Write short answers of any eight parts. (2 x 8 = 16)

i	Explain the terms; i. Kinetic Energy ii. Absolute potential energy	ii	Calculate the work done in kilo joules in lifting a mass of 10 kg (at a steady velocity) through a vertical height of 10m
iii	Explain what do you understand by the term; (a). Power (b). Escape Velocity	iv	What is orbital velocity? Write its mathematical formula?
v	When mud flies off the tyre of a moving bicycle, in what direction does it fly, Explain.	vi	Show that orbital angular momentum $L_o = mvr$
vii	What should be the frequency of a simple pendulum whose period is 0.5 second at a place where $g=9.8ms^{-2}$?	viii	Describe the free and forced oscillation with example.
ix	Explain the relation between total energy, potential energy and kinetic energy for a body oscillating with SHM.	x	Find the temperature at which the velocity of sound in air is four times its velocity at $10^\circ C$.
xi	How the K.E and P.E alternates in stationary waves?	xii	Explain why sound travels faster in warm air than in cold air.

4- Write short answers of any six parts. (2 x 6 = 12)

i	Stat Huygen's principle.	ii	Define diffraction grating and grating element.
iii	Under what conditions two or more sources of light behave as coherent sources.	iv	What is simple microscope? What is basic principle to use it?
v	Why would it be advantageous to use blue light with a compound microscope?	vi	Define molar specific heat of a gas at constant pressure and at constant volume. Give relation between them.
vii	Define reversible and irreversible processes.	viii	Can mechanical energy be converted into heat energy, if so give an examples.
ix	Is it possible to construct a heat engine that will not expel heat into atmosphere?		

SECTION - II

Note:- Attempt any three questions. (8 x 3 = 24)

5	(a)	Find the magnitude and direction of resultant vector of two given vectors \vec{A} and \vec{B} by the method vector addition by rectangular components.	(05)
	(b)	A foot ball is thrown upward with an angle of 30° with respect to horizontal to throw a 40m pass what must be initial speed of the ball?	(03)
6	(a)	Define stationary waves. Prove that for stationary waves in a stretched string $f_n = nf_1$	(05)
	(b)	Ten bricks, each 6cm thick and mass 1.5kg, lie flat on a table. How much work is required to stack them one on the top of another?	(03)
7	(a)	What is terminal velocity? Show that terminal velocity of fog droplet is directly proportional to the square of its radius.	(05)
	(b)	What is the least speed at which an aeroplane can execute a vertical loop of 1.0 km radius so that there will be tendency for the pilot to fall down at the highest point?	(03)
8	(a)	What is simple pendulum? Derive relation for its time period.	(05)
	(b)	What is the average translational K.E. of molecules in a gas at temperature $27^\circ C$.	(03)
9	(a)	Explain diffraction of X-rays by crystals and derive bragg equation.	(05)
	(b)	A converging lens of focal length 5.0cm is used as magnifying glass. If the near point of the observer is 25cm and the lens is held close to the eye, calculate the distance of the object from the lens.	(03)