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 DGR-G2-22

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) ½ mv^2 (B) ¼ IW^2 (C) ¼ 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 λ/4 (B) 3 λ/4 (C) 3 λ/2 (D) 7 λ/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) λ/4 (B) λ/2 (C) λ/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

DGK-G2-22

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