Sig. of Supdt.....

KT-XI-1901
Physics (Part – I)
Fresh/Reappear

Roll No.....

Fic. No.....

Fic. No.....

Time allowed: 3 Hrs **Physics (Part – I)** **Code-A** **Marks: 85**

Fresh / Reappear

Note: There are three sections of the paper, A, B & C. Attempt Section – A on the same paper and return it to the Superintendent within the given time. Mobile phone etc. are not allowed in the examination hall.

Time: 20 Mins **Section "A"** **Marks: 18**

Q.1 Write the correct option i.e. A, B, C or D in the empty box provided opposite to each part. No marks will be awarded for cutting, erasing or over writing.

i. If heat of 110 J is added to a gaseous system, the increase in internal energy is 40 J. Then the amount of external work done is: [C]
A. 150 J B. 110 J C. 70 J D. 40 J

ii. $[ML^{+2}T^{-2}]$ is dimensions of ..... [C]
A. Impulse B. Strain C. Heat D. Torque

iii. $\frac{IKm}{1Gm}$ = ...? [A]
A. 10^{-6} m B. μ C. 10^{0} D. 10μ

iv. If $|\vec{A}.\vec{B}| = |\vec{A} \times \vec{B}|$, then the angle between $\vec{A}$ and $\vec{B}$ is ..... [C]
A. 0 B. $\pi/2$ C. $\pi/4$ D. π

v. When a torque acting upon a system is zero, which of the following will be constant. [D]
A. Force B. Linear momentum C. impulse D. Angular momentum

vi. A body of mass 2 kg is moving with a velocity of $8ms^{-1}$ on a smooth surface. If it is to be brought to rest in 4 seconds. Then force to be applied is ..... [B]
A. 8N B. 4N C. 2N D. IN

vii. The horizontal range is four times the maximum height attained by a projectable. The angle of projection is: [C]
A. 90^0 B. 60^0 C. 45^0 D. 30^0

viii. A force of 10N acts on a body of mass 2 kg for 1m distance. The kinetic energy obtained by the body is ..... work-energy principle ⇒ W = K.E [B]
A. 20 J B. 10 J C. 5 J D. 2.5 J

ix. The escape velocity of a projectile from the earth is ..... [A]
A. 11.2 km/s B. 7 km/s C. 11.2 m/s D. 112 km/s

x. When sand is poured on a rotating disc, its angular velocity will ..... [B]
A. Increase B. Decrease C. Remain Constant D. None of these

xi. A ring and a disc have the same mass and radius. The ratio of their moment of inertia about their axis is: [B]
A. 1 : 1 B. 2 :1 C. 4 : 1 D. 1 : 2

xii. In Bernoulli's Theorem, which of the following is conserved? [C]
A. Linear momentum B. Angular momentum C. Energy D. Velocity

xiii. After terminal velocity is reached the acceleration of a body falling through a fluid is: [B]
A. Equal to g B. Zero C. Less than g D. More than g

xiv. A particle excutes simple harmonic motion of amplitude A. At what distance from the mean position its kinetic energy is equal to its potential energy. [A]
A. 0.51A B. 0.61A C. 0.71A D. 0.81A

xv. If the period of oscillation of mass (M) suspended from a spring is 2s. Then the period of mass 4M will be: [B] F
A. 1s B. 2s C. 3s D. 4s

xvi. When a transverse wave is reflected from the boundary of a denser to a rare medium, it under goes a phase change of ..... [C]
A. 0 B. $\frac{\pi}{2}$ C. π D. 2π

xvii. Which one of the following factors has no effect on the speed of sound in a gas. [B]
A. Humidity B. Pressure C. Temperature D. Density

xviii. Two sources of light are said to be coherent if the waves produced by them have the same frequency, same ..... [C]
A. Amplitude B. Wavelength C. Wavelength & a constant phase difference D. Amplitude & constant phase difference

Time: 2:40 Hours

KT-XI-1901

Physics (Part – I)

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Section "B"

Marks: 40

Q.2 Attempt any TEN parts. All parts carry equal marks.

i. Find the Dimensions of Plank's constant h.

ii. What is the minimum number of unequal vectors to result into a null vector? Explain with the help of diagram.

iii. Aeroplane while horizontally drops a bomb when reaches exactly above the target, but missed it. Explain.

iv. A bucket is taken to the bottom of a well, does the bucket posses any P.E. Explain?

v. A body of moment of inertia 0.80 kg m^2 about a fix axis, rotates with constant angular velocity of 100 rad s^{-1}. Calculate

i. It's angular momentum=L ii. Torque to sustain this position= $\vec{\tau}$

vi. Why is it more difficult to revolve a stone by tieing it to a longer string than by tieing it to a shorter string?

vii. Is there a transfer of energy through a medium when a stationary wave is produced in it? Explain.

viii. What happens to the frequency of a simple pendulum as its oscillations die down from large amplitude to small?

ix. Why it is not possible to obtained the diffraction of x-rays by Young's double slits experiment?

x. On removing the valve, the air escaping from a cycle tube cool. Why?

xi. What is impulse? Show that impulse is equal to the change in momentum.

xii. If two ships are moving parallel and close to each other. They experience an attractive force. Why?

xiii. A heat engine with 100% efficiency is only a theoretical possibility. Explain.

Section "C"

Marks: 27

Note: Attempt any THREE questions. All questions carry equal marks.

Q.3 a. What does rectangular components mean? Explain addition of vectors by rectangular components.

b. A load of 10 N is suspended from a clothes line. This distorts the line so that it makes an angle of 15° with the horizontal at each end. Find the tension in the clothes line.

Q.4 a. What is artificial gravity? To provide artificial gravity to the inhabitants of spaceship, derive the particular frequency of the spaceship.

b. Eight equal drops of oil are falling through air with a steady velocity of 0.1ms^{-1}. If the drops recombine to from a single drop, what should be the new terminal velocity.

Q.5 a. Define simple Harmonic motion. Derive equations for Kinetic and potential energy of a body of mass m executing S.H.M.

b. The speed of sound in air at O°C is 332m s^{-1}. What will be the speed of sound at 22°C?

Q.6 a. What is diffraction grating? How can the wavelength of a beam of light be measured with it?

b. Calculate the change in entropy when 10 kg of water is heated from 90°C to 100°C? (Specific heat of water is 4180J mole^{-1} K^{-1})