Serial No. Of the Answer Book 254
Roll No. (in figure)_____
(in Words)_____

Superintendent Seal & Signature FIC. No (For office use only)

111601

FIC. No (For office use only)

PHYSICS (Fresh) - I

Total Time: 3 Hours **Max: Marks: 85**

Note: There are THREE Sections of this Paper i.e. A,B and C, attempt each according to the given instructions.

Time: 20 Minutes **SECTION-A** **Marks: 18**

Note: Attempt all parts of Section – A. Section –A must be return to the superintendent after 20 minutes even if you have not attempted any question. Overwriting/ defacing/Cutting etc is prohibited in Section-A and no credit will be given to such answer.

I. Write the correct option i.e. A/B/C/D in the empty boxes.

i. Which one is a pair of base units _____. [C]
(A) Ampere -Joule (B) Coulomb-second (C) Kilogram-Kelvin (D) Meter-Newton

ii. Which one is the least sub-multiple _____. [C]
(A) Pico (B) Femto (C) Atto (D) Nano

iii. What is the angle between $\vec{A}$ and $\vec{B}$ for which $\left[\vec{A}+\vec{B}\right]=\left[\vec{A}-\vec{B}\right]$ _____. [D]
(A)30^0 (B)45^0 (C)60^0 (D) 90^0

iv. A person walks first 10 km north and then 20 km east. The magnitude of the resultant vector is ____. [A]
(A) 22.36 km (B) 22.46 km (C) 25.36 km (D) 20.36 km

v. A car takes 1 hour to travel 100km along a main road and then 0.5 hour to travel 20 km along a side road. What is the average speed of the car _____. [C]
(A) 60 $km\ h^{-1}$ (B)70 $km\ h^{-1}$ (C)80 $km\ h^{-1}$ (D) 100 kmh^{-1}

vi. The power of TV set is _____. [C]
(A) 100 watts (B) 110 watts (C)120 watts (D) 150 watts

vii. The critical velocity of a satellite is _____. [A]
(A) 7.9 kms^{-1} (B)9.8 kms^{-1} (C)11.2 kms^{-1} (D) 15.2 kms^{-1}

viii. Artificial satellite moves around _____. [D]
(A) Moon (B) Sun (C) Stars (D) Earth

ix. A body moving in a circle with constant speed has _____. [C]
(A) Constant acceleration (B)Constant retardation
(C) Variable acceleration (D)Variable speed and constant velocity

x. According to stoke's law, drag force depends on _____. [C]
(A) Initial velocity (B) Final velocity (C) Instantaneous velocity (D) Terminal velocity

xi. The pressure will be low where the speed of the fluid is ____. [B]
(A) Zero (B) High (C) Low (D) Constant

xii. The time period of simple pendulum is independent of _____. [A]
(A) Mass of the bob (B) Length of the string (C) Both A and B (D) None of these

xiii. To make the frequency double of a Mass-spring system, we have to _____. [A]
(A) Reduce the mass to one forth (B)Quadruple the mass
(C) Double the mass (D) Half the mass

xiv. The portion of a wave above the mean level is called _____. [A]
(A) Crest (B) Trough (C) Compression (D) Rarefaction

xv. The reflection of an original sound from a certain object is received at 0.1 seconds later than the direct sound is called _____. [C]
(A) Beats (B) Diffraction (C) Echo (D) None of these

xvi. The tip of a needle does not give a sharp image. It is due to _____. [C]
(A) Polarization (B)Interference (C)Diffraction (D) Refraction

xvii. Two bodies are said to be in thermal equilibrium if they have the same _____. [A]
(A) Temperature (B) Amount of heat (C) Specific heat (D) Thermal capacities

xviii. A real gas can be approximated to an ideal gas at _____. [A]
(A) Low density (B)High pressure (C)High density (D) Low temperature

PHYSICS (Fresh) - I

Note: Time allowed for section B and C is 2 hours and 40 minutes.

SECTION "B" — Marks: 40

II. Attempt any TEN Parts out of the following. Each Part carries equal marks.

i. Density of air is $1.2\ kgm^{-3}$ change it into gcm^{-3} .

ii. Explain why do buses and heavy trucks have large steering wheels?

iii. Define impulse and state how it is related to linear momentum?

iv. Aero plane while moving horizontally drops a bomb when reaches exactly above the target, but missed it. Explain.

v. Does the tension in the string of a swinging pendulum do any work? Explain

vi. Why energy savers are used instead of normal bulbs?

vii. A ball is just supported by a string without breaking. If it is set swinging, it breaks. Why?

viii. Why a car has oblong shape design?

ix. Give two applications in which resonance plays an important role.

x. Why does a sound wave travel faster in solids than in gases?

xi. A soap bubble looks black when it bursts. Why?

xii. How would you justify that light waves are transverse?

xiii. Can a room be cooled by leaving the door of an electric refrigerator open?

SECTION "C" — Marks: 27

Note: Attempt any THREE questions of the following. Each question carries equal Marks.

III. (a) What is projectile motion? Give examples. Derive mathematical relations for (i) maximum height (ii) range of projectile

(b) Calculate the angle of projection for which Kinetic energy at the highest point of its trajectory is equal one-fourth of its Kinetic energy at the point of projection

IV. (a) State and explain stokes, law. Derive a mathematical relation for terminal velocity by using stokes, law.

(b) Determine the radius of water drop falling through air with a terminal velocity of $0.012 ms^{-1}$
Viscosity of air $= 0.019 \times 10^{-3} NSm^{-2}$
Density of air $= 1.2\ kg\ m^{-3}$
Density of water$= 1000 kgm^{-3}$

V. (a) Show that motion of mass-spring system on a frictionless surface is S.H.M
(b) A mass at the end of a spring describes S.H.M with T = 0.40 seconds. Find its acceleration the displacement is 0.04m.

VI. (a) Define the molar specific heats C_p and C_v for a gas. Show that for an ideal gas, $C_p - C_v = R$
(b) What is the change in internal energy of 200g of nitrogen as it is heated from $10^0 c$ *to* $30^0 c$ at constant volume? For nitrogen gas $C_v = 20.815\ jmole^{-1}K^{-1}$