



FIRST TERMINAL EXAM 2022-23

SUBJECT-PHYSICS

CLASS-12

TIME:2:30hrs

MARK:50

General Instruction –The question paper is divided into four section.

(1)**Section A:** Q.1 contain 7 multiple choice type of question carrying one mark each .

Q.2 Contain 7 very short answer type of question carrying one mark each.

(2)**Section B:** Q.3 to Q.13 contains ELEVEN short answer type of question carrying two marks each.

(3)**Section C:** Q.14 to Q.19 Contain SIX short answer type of question carrying three marks each.

(4)**Section D:** Q.20 to Q.23 Contain FOUR long answer type of question carrying four marks each.

(5)Use of log table is allowed, use of calculator is not allowed.

(6)figure to the right indicate full marks.

Section A

Q.1 Select and write the correct sentence.

(7 M)

i) A thin walled hollow cylinder is rolling down an incline without slipping .At any instant, the ratio of

$K_{\text{rotational}}:K_{\text{translational}}:K_{\text{total}}$ -----

a. 1:1:2 b. 1:2:3 c. 1:1:1 d. 2:1:3

ii) In Bernoulli's theorem ,which of the following is conserved? -----

a. linear momentum b. angular momentum c. mass d. energy

iii) The efficiency of Carnot engine is large when-----

- a. T_H is large b. T_C is large c. T_E is large d. $T_H - T_C$ is small

iv) Three capacitors of capacitances 2pf, 3pf and 6 pf are connected in series .The equivalent capacitance of the combination is-----

- a. 0.5 pf b. 1 pf c. 1.1 pf d. 11 pf

v) The fraction of the total current passing through the galvanometer is -----

- a. $S/S+G$ b. $G/S+G$ c. $S+G/G$ d. $S+G/S$

vi) A very long solenoid has 8400 windings on a length of 7m. If the field inside is

$2\pi \times 10^{-3}T$, the current in the windings is about ($\mu_0/4\pi = 10^{-7}T.m/A$)

- a. 0.42 A b. 0.83 A c. 4.2 A d. 8.3 A

vii) The dimensions of magnetic dipole moment are -----

- a. $[L^2I]$ b. $[LI]$ c. $[L^{-1}I]$ d. $[L^{-2}I]$

Q.2) Answer the following

(7M)

i) What is an incompressible fluids ?

ii) Mention the conditions under which a real gas obeys ideal gas equation ?

iii) What is a Quasistatic process ?

iv) Define thermal efficiency of a heat engine.

v) What is a Capacitor?

vi) State the factors on which the resistances of a material dependence ?

vii) Write the relation between relative permeability and magnetic susceptibility.

viii) Define activation energy.

Section-B

Q. Answer the following .Attempt any EIGHT

(6M)

- 3) Define conical pendulum. On which factor does the frequency of conical pendulum depend?
- 4) State the characteristics of an ideal fluids.
- 5) Distinguish between the real gas and the a real gas..
- 6) When a gas is heated, its temperature increases .Explain this phenomenon on three basis of Kinetic theory of gases.
- 7) Distinguish between the volt and the electronvolt?
- 8) Draw a diagram showing the equipotential surfaces and electric field lines in the plane of
 - i) an electric dipole and
 - ii)a system of two equal positive charges.
- 9) A potentiometer wire has a length of 1.5 m and resistance of $10\ \Omega$.It is connected in series with a cell of emf 4 volts and internal resistances $5\ \Omega$. Calculate the potential drop per centimeter of the wire.
- 10) Why does not the Earth's magnetic field affect the working of a moving coil galvanometer?
- 11) State the Bio-Savert's law for the magnetic induction produced by a current element. Express it in vector form.
- 12) State and explain Ampere's circuit law.
- 13) A toroid of central radius of 10 cm has a windings of 1000 turns. For a magnetic field of $5 \times 10^{-2}\ \text{T}$ along its central axis , what current is required to be passed through its windings ?

Section – C

Q. Attempt any FOUR

12M

14) What is banking of road? Why is it necessary ? Do we need a banked road for a two - wheeler? Explain.

15) State and explain the principle of conservation of angular momentum and explain it with a suitable example?

16) Explain the phenomenon of Surface tension on the basis of molecular theory.

17) A spherical shell ,of radius b and carrying a charge Q , is expanded to radius a . Find the work done by the electrical force in the process.

18) Describe Kelvin's method to determine the resistance of a galvanometer by using a Metrebridge .

19) The work done for rotating a magnet with magnetic dipole moment M ,through 90° from its magnetic meridian is n times the work done to rotate it through 60° . Find the value of n .

Section –D

Q. Attempt any TWO.

(8 M)

20) Explain the phenomenon of Capillarity. Explain i) the rise of a liquid and ii) the fall of liquid in a capillary on the basis of pressure difference .

21) Draw P-V diagram and explain the concept of positive and negative work. Give one example each .

22) Describe with the help of a neat circuit diagram how you will determine the internal resistance of a cell by using a potentiometer. Derive the necessary formula.

23) Distinguish between a diamagnetic and a paramagnetic material. The susceptibility of a paramagnetic material is χ at 27°C . At what temperature will its susceptibility be $\chi/3$?