Karnataka Board

Question Paper

Quaterly Exam 2024
Question Paper

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FIRST QUARTERLY TEST AUGUST 2024

CLASS : II PUC **SUBJECT : PHYSICS (33)** **Max. Marks : 35**

TIME : 1 Hr. 30 Mins.

General Instructions :

1) **All parts are compulsory.**
2) **For Part A questions, only the first written answer will be considered for evaluation.**
3) **Answers without relevant diagram/figure/circuit wherever necessary will not carry any marks.**
4) **Direct answers to the Numerical problems solved without detailed solutions will not carry any marks.**

PART-A

I Pick the correct option among the four given options for all the following questions: **7x1=7**

1) The charge on a body to which 6.25×10^{18} electrons are added is

a) +1 C b) −1 C c) +10 C d) −10 C

2) The S.I unit of electric dipole moment is

a) C b) Cm^{-1} c) Cm d) NC^{-1}

3) The potential at any point inside a hollow charged spherical conductor of radius 0.2 m is 1 V. The potential on the surface of the conductor is

a) 0.5 V b) 1 V c) 2 V d) 2.5 V

4) The capacitance of a parallel plate capacitor is increased by

a) increasing the area of the plates b) increasing the distance between the plates
c) decreasing the dielectric constant d) None of these

5) S.I unit of mobility of free electrons is

a) ms^{-1} b) Vm^{-1} c) $m^2V^{-1}s^{-1}$ d) ms^{-2}

6) On increasing the temperature of a conductor, its resistance increases because

a) relaxation time decreases b) mass of the electrons increases
c) electron density decreases d) None of the above

7) The radius of the circular path described by a charged particle entering a magnetic field normally is

a) $r = \frac{mvq}{B}$ b) $r = \frac{mq}{Bv}$ c) $r = \frac{mB}{qv}$ d) $r = \frac{mv}{qB}$

II Fill in the blanks by choosing appropriate answers given in the brackets for all the following questions: **3x1=3**

(straight line, Cm, charge, Nm^2C^{-1})

8) The S.I unit of electric flux is _____.

9) The significance of Kirchhoff's junction rule is the law of conservation of _____.

10) A charged particle enters an electric field in the direction of the field, then the nature of the path traced by it is _____.

PART-B

III Answer any TWO of the following questions: **2x2=4**

11) State and Explain Coulomb's law of Electrostatics.

12) If 200 J of work is done in moving 2μC of charge from a point A to another point B, find the potential difference between A and B.

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13) Give any two limitations of Ohm's law.

14) Mention the expression for Lorentz force and explain the terms.

PART-C

IV Answer any TWO of the following questions: 2x3=6

15) Write any three properties of Electric field lines.

16) Obtain the relation between Electric field and Electric potential.

17) Derive the expression for drift velocity of free electrons in a conductor when an electric field is applied across it.

18) Obtain the relation between Current density, Electrical conductivity and Electric field.

PART-D

V Answer any TWO of the following questions: 2x5=10

19) Derive an expression for electric field due to an electric dipole at point on the axial line.

20) Define electric potential at a point in an electric field. Derive an expression for electric potential at a point to due to an isolated positive charge.

21) Obtain the condition for balance of Wheatstone's network using Kirchhoff's rules.

22) Derive the expression for magnetic field at a point on the axis of a circular current loop.

VI Answer any ONE of the following questions: 1x5=5

23) In a parallel plate capacitor with air between the plates, each plate has an area of $6\times10^{-3}\,m^2$ and the distance between the plates in 3 mm. Calculate the capacitance of the capacitor. If the capacitor is connected to 100 V supply, what is the charge on each plate of the capacitor? Given the absolute permitivity of free space is $8.854\times10^{-12}\ Fm^{-1}$.

24) Two cells of emf 2V and 4V and internal resistance 1Ω and 2Ω respectively are connected in parallel so as to send the current in the same direction through an external resistance of 20Ω. Find the potential difference across 20Ω resistor.

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