

Roll No.....

Total No. of Questions—14]

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KH2RO9

8335

PHYSICS

PAPER—A

Maximum Marks—60

Time Allowed—3 Hours

(Long Answer Type Questions)

1. State and explain Coulomb's law in vector form. Hence define unit of charge.

Or

Derive an expression for potential energy of an electric dipole in a uniform electric field. 5

2. Deduce an expression for the capacitance of a parallel plate capacitor with a dielectric slab.

Or

State and prove Gauss's theorem in electrostatics. Deduce Coulomb's law from it. 5

3. Explain the principle of a Potentiometer. How can it be used to determine internal resistance of a cell ?

Or

What are Secondary Cells ? Describe lead accumulator. 5

4. Derive an expression for magnetic field due to current flowing in a long straight conductor.

P. T. O.

(2)

Or

Discuss the principle, construction and working of a Cyclotron. Obtain the expression for the maximum energy acquired by the accelerated charged particle. 5

5. Derive an expression for the average power in LCR circuit connected to a.c. supply. Define Power factor.

Or

Give the principle, construction and working of an a.c. generator. 5

(Short Answer Type Questions)

6. Derive a relation for work done in moving a charge in an electric field. 3
7. There are 8.4×10^{22} free electrons per cubic cm in copper. Calculate drift velocity of electrons in a copper wire of 1 mm^2 cross-section. The current in the wire is 0.21 A. 3
8. Explain Thomson's effect and Thomson's coefficient. 3
9. A resistance of 1980Ω is connected in series with a voltmeter, after which the scale division becomes 100 times larger. Find the resistance of Voltmeter. 3
10. What are Eddy Currents ? How can they be minimised ? 3
11. A current of 10A in primary coil of a circuit is reduced to zero at a uniform rate in 10^{-3} s. If coefficient of mutual inductance is 3H, What is the induced e.m.f. in the secondary ? 3
12. What is Electromagnetic spectrum ? Give its important uses. 3

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(Very Short Answer Type Questions)

13. The following very short answer type questions of two marks, each may be answered in a few sentences or as required.

- (a) Define Conductance and Conductivity and give their units. 2
- (b) Define Angle of dip and Earth's horizontal component. 2
- (c) What is current sensitivity and voltage sensitivity of a Galvanometer ? 2
- (d) Why sky waves are not used in the transmission of T.V. Signals ? 2

(Objective Type Questions)

14. Choose the correct/most appropriate answer and write it in your Answer-book :

(i) How many electrons must be removed from a piece of metal to give it a positive charge of 1.0×10^{-7} C ?

A. 6.25×10^{11}

B. 6.25×10^{-11}

C. 62.5×10^{11}

D. 0.625×10^{11} . 1

(ii) Ampere hour is the unit of

A. Charge

B. Current

C. Power

D. Energy. 1

(iii) The vertical component of earth's magnetic field is zero at a place where angle of dip is

A. 0°

B. 45°

C. 60°

D. 90° .

1

(iv) Which of the following is most suitable for the core of electromagnets ?

A. Air

B. Soft Iron

C. Steel

D. Cu-Ni alloy.

1

(v) For high frequency, capacity offers

A. less resistance

B. more resistance

C. zero resistance

D. None of these.

1

(vi) Which of the following are not electromagnetic waves ?

A. X-rays

B. Gamma rays

C. β -rays

D. Cosmic rays.

1