

Model Question Paper
Effects of Electric Current - Part II

12th Standard

Physics

Reg.No. :

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I. Answer all the Questions.

II. Use blue pen only.

Time : 01:15:00 Hrs

Total Marks : 53

5 x 1 = 5

Section-A

- 1) Magnetic induction due to an infinitely long straight conductor placed in a medium of permeability μ is
(a) $\frac{\mu_0 I}{4\pi a}$ (b) $\frac{\mu_0 I}{2\pi a}$ (c) $\frac{\mu I}{4\pi a}$ (d) $\frac{\mu I}{2\pi a}$
- 2) In a tangent galvanometer, for a constant current, the deflection is 30° . The plane of the coil is rotated through 90° . Now, for the same current, the deflection will be
(a) 30° (b) 60° (c) 90° (d) 0°
- 3) The period of revolution of a charged particle inside a cyclotron does not depend on
(a) the magnetic induction (b) the charge of the particle (c) the velocity of the particle (d) the mass of the particle
- 4) The torque on a rectangular coil placed in a uniform magnetic field is large, when
(a) the number of turns is large (b) the number of turns is less (c) the plane of the coil is perpendicular to the field (d) the area of the coil is small
- 5) Phosphor - bronze wire is used for suspension in a moving coil galvanometer, because it has
(a) high conductivity (b) high resistivity (c) large couple per unit twist (d) small couple per unit twist

Section-B

6 x 3 = 18

- 6) Define ampere
- 7) What is Peltier effect?
- 8) State Fleming's left hand rule.
- 9) Why is nichrome used as a heating element?
- 10) Define Seebeck effect.
- 11) What is a thermocouple?

Section-C

2 x 5 = 10

- 12) A, B and C are the parallel conductors each of length 10 m, carrying currents as shown in the figure. Find the magnitude and direction of the resultant force on the conductor B.
- 13) In a thermocouple, the temperature of the cold junction is -20°C and the temperature of inversion is 600°C . If the temperature of the cold junction 20°C , find the temperature inversion.

Section-D

3 x 10 = 20

- 14) Explain in detail the principle, construction and theory of a tangent galvanometer.
- 15) Deduce an expression for the force on a current carrying conductor placed in a magnetic field. Give the magnitude and direction of the force.
- 16) a) A current of 4A flows through 5 turn coil of tangent galvanometer having a diameter of 30 cm. If the horizontal component of earth's magnetic induction is $4 \times 10^{-5}\text{T}$, find the deflection produced in the coil.
b) A rectangular coil of 500 turns and area $6 \times 10^{-4}\text{ m}^2$ is suspended inside a radial magnetic field of induction 10^4T by a suspension wire of torsional constant $5 \times 10^{-10}\text{ Nm/}^\circ$. Calculate the current required to produce a deflection of 10° .
