Model Question Paper

Effects of Electric Current - Part III

12th Standard

Physics

Reg.No. : | | | | | | |

I.Answer all the Questions.

II.Use blue pen only.

Time : 01:15:00 Hrs

Total Marks : 65

Section-A

5 x 1 = 5

1) The resistance of the filament of a 110 W, 220 V electric bulb is

(a) 440Ω (b) 220Ω (c) 484Ω (d) 848Ω

2) An electron is moving with a velocity $3\times10^{6}ms^{-1}$ perpendicular to a uniform magnetic field of induction 0.5 T. The force experienced by the electron

(a) $2.4\times10^{-13}N$ (b) $13.6\times10^{-27}N$ (c) $13.6\times10^{-11}N$ (d) zero

3) When the number of turns (n) in a galvanometer is doubled, current sensitivity

(a) remains constant (b) decreases twice (c) increases twice (d) increases four times

4) The value of gyro magnetic ratio is

(a) $8.8\times10^{8}Ckg^{-1}$ (b) $8.8\times10^{10}Ckg^{-1}$ (c) $8.8\times10^{-8}Ckg^{-1}$ (d) $8.8\times10^{-10}Ckg^{-1}$

5) Bohr magneton is given by the formula

(a) $\frac{neh}{4\pi m}$ (b) $\frac{meh}{4\pi}$ (c) $\frac{4\pi m}{en}$ (d) $\frac{4\pi e}{mh}$

Section-B

5 x 3 = 15

6) What is a thermocouple?

7) Define neutral temperature of thermocouple.

8) Define temperature inversion of thermocouple.

9) What is Thomson effect?

10) Mention any two differences between Peltier effect and Joule's heating effect.

Section-C

5 x 5 = 25

11) 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.

12) 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.

13) 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$4\times10^{-5}T$, find the deflection produced in the coil.

14) A rectangular coil of 500 turns and area 6×10^{-4} m^{2} is suspended inside a radial magnetic field of induction $10^{4}T$ by a suspension wire of torsional constant $5\times10^{-10}Nm/^{\circ}$ .Calculate the current required to produce a deflection of 10° .

15) A galvanometer with 50 divisions on a scale has a current sensitivity of 0.1 mA/division.The resistance of the galvanometer is 40 ohm.If a shunt resistance 0.1 ohm is connected across it, find the maximum value of the current that can be measured?

Section-D

2 x 10 = 20

16) Deduce an expression for the force on a current carrying conductor placed in a magnetic field. Give the magnitude and direction of the force.

17) a) Explain how you will convert a galvanometer in (i) an ammeter nd (ii) a voltmeter Conversion of galvanometer into an ammeter

(OR)

b) Deduce an expression for the force on a current carrying conductor placed in a magnetic field.Find the magnitude of the force.

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