ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

SOLUTION TO WORK SHEET 23

Subject : PHYSICS

CLASS : XII

25.6.20

Chapter : Electromagnetism

Topic : Moving coil galvanometer, galvanometer as voltmeter and ammeter.

Multiple Choice Question : **1 x 15 = 15**

1. For 1 A current, a galvanometer shows its full-scale deflection. If a resistance of 800 Ω is connected in series, it is converted into a voltmeter of range 0 - 1000 V. What is the resistance of the galvanometer ?

   (a) 50 Ω (b) 100 Ω (c) 200 Ω (d) 800 Ω

   Ans. (c) 200 Ω

2. In an ammeter 0.5% of main current passes through galvanometer. If resistance of galvanometer is G the resistance of ammeter will be

   (a) $\frac{G}{200}$ (b) $\frac{G}{199}$ (c) 200G (d) 199G

   Ans (a) $\frac{G}{200}$

3. What type of galvanometer is used to prepare an ammeter or a voltmeter in the laboratory ?

   (a) galvanometer (b) moving oil galvanometer

   (c) neither @ nor (b) (d) ballastic galvanometer

   Ans. (b) moving oil galvanometer

4. In case of a moving coil galvanometer, what is the relation between the current I and the angle of deflection θ ?

   (a) $I \propto \theta$ (b) $I \propto \frac{I}{\theta^2}$ (c) $I \propto \theta^2$ (d) $I \propto \frac{I}{\theta^2}$

   Ans. (a) $I \propto \theta$

5. How is a galvanometer converted into an ammeter ?

   (a) by connecting a rightly chosen low resistance shunt in parallel to it.

   (b) by connecting a high resistance shunt in parallel to it.

   (c) by connecting low resistance in series with the galvanometer.

   (d) by connecting high resistance in series with the galvanometer.

   Ans. (a) by connecting a rightly chosen low resistance shunt in parallel to it.

6. How should a resistance be connected with a galvanometer to convert it into a voltmeter ?

   (a) in series (b) in parallel (c) neither in series nor in parallel

   (d) both in series and parallel

   Ans. (a) in series

7. What is the nature of magnetic field in a moving coil galvanometer ?

(a) varying (b) radial (c) circular (d) straight

Ans. (b) radial

8. A galvanometer is an electromagnetic device which is used to detect the presence of

(a) voltage in a circuit (b) e. m. f in a circuit (c) current in a circuit

(d) none of the above

Ans. (c) current in a circuit

9. When a voltmeter is connected in a circuit, the effective resistance of the circuit does not change due to

(a) high resistance of voltmeter (b) low resistance of voltmeter

(c) voltmeter connected in series (d) voltmeter connected in parallel

Ans. (d) voltmeter connected in parallel

10. In a moving coil galvanometer of coil of N - turns of area A have a spring of stiffness k.
If coil is deflected by some angle Φ due to flow of I current in uniform redial magnetic field B, then

(a) $\Phi = \left[\frac{NAB}{\mathrm{k}} \right] I$ (b) $\Phi = \left[\frac{k}{\mathrm{BNA}} \right] I$

(c) $\Phi = \left[\frac{kA}{\mathrm{BN}} \right] I$ (d) $\Phi = \left[\frac{BN}{\mathrm{kA}} \right] I$

Ans. (a) $\Phi = \left[\frac{NAB}{\mathrm{k}} \right] I$

11. To make the field radial in a moving coil galvanometer

(a) number of turns of coil is kept small (b) magnet is taken in the form of horse-shoe

(c) poles are of very strong magnets (d) poles are cylindrically cut

Ans. (d) poles are cylindrically cut

12. In a moving coil galvanometer having a coil of N - turns of area A and carrying current I is placed in a radial field of strength B.
The torque acting on the coil is

(a) NA^2B^2I (b) $NABI^2$ (c) N^2ABI (d) $NABI$

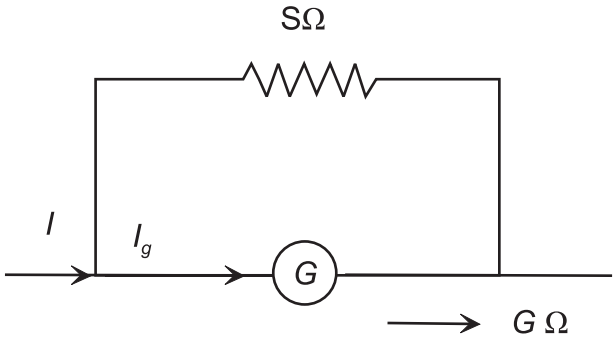
Ans. (d) $NABI$

13. Current sensitivity of a galvanometer is

(a) $\frac{NBA}{\mathrm{k}}$ (b) $\frac{k}{NBA}$ (c) $\frac{NBA}{kR}$ (d) $\frac{kR}{NBA}$

Ans. (a) $\frac{NBA}{\mathrm{k}}$

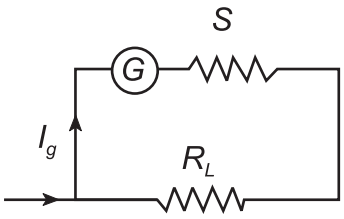
14. For the given ammeter circuit,



(a) $I_g S = IG$ (b) $(I - I_g)S = I_g G$ (c) $I_g G = (I + I_g)S$ (d) $\frac{I}{I_g} = \frac{G}{S}$

Ans. (b) $(I - I_g)S = I_g G$

15. For the voltmeter circuit given,



(a) $\frac{I_g}{I} = \frac{G}{S}$ (b) $\frac{I}{I_g} = \frac{R_L + G}{S}$

(c) $(I - I_g)R_L = I_g (G + S)$ (d) $IR_L = I_g G$

Ans. (c) $(I - I_g)R_L = I_g (G + S)$