SEM-II UG1 PHYSICS HONS. MCQ

ELECTRICITY AND MAGNETISM TM: 20X2=40

1.A moving chrge produces

- $\vec{E}$- field only
- $\vec{B}$- field only
- both $\vec{E}$ and $\vec{B}$ fields
- none of these

2.The attraction of parallel currents and the repulsion of antiparallel ones occur due to

- electrostatic force
- charging of the wire
- magnetic force
- none of these

3.Magnetic force on a charge Q moving with velocity v in a magnetic field B is

- Q $[\overrightarrow{E} + (\vec{V} \times \vec{B})]$
- Q $(\vec{V} \times \vec{B})$
- Q $\overrightarrow{E}$
- none of these

4.Magnetic force acting on a charge moving in a magnetic field alone cannot do any work on the charged particle because

- magnetic force is perpendicular to its velocity.
- direction of magnetic force is opposite for negatively charged particle.
- magnetic force is perpendicular to magnetic induction.
- none of these.

5. The SI unit of magnetic induction is

- Weber
- Gauss
- Tesla
- Newton

6. For an infinitely long wire, the magnetic field at a point distant R normally from the wire is $\frac{\mu i}{2\pi R}$.

This relation indicates

- the lines of magnetic induction are parabolic in nature and lying in planes perpendicular to it.
- the lines of magnetic induction are straight and perpendicular to its length.
- the lines of magnetic induction are circles concentric with wire lying in planes perpendicular to it
- none of these.

7. An electron of charge 'e' rotates n times per second around the nucleus in a circular orbit of radius 'a'.

The magnetic field at the position of the nucleus will be

- $\frac{\mu_0}{2}\frac{en}{a}$
- $\frac{\mu_0}{2}\frac{e}{n}$
- neπa^2
- none of these

8. $\vec{V}.\vec{B} = 0$ implies

- there are point sources for magnetic field .
- magnetic field lines either form closed loops or extend out to infinity.
- the magnetic field diverges away from pole.
- none of these

9. In the Bohr model of the hydrogen atom, an electron of charge 'e' moves with velocity 'v' in a circular orbit of radius' r' about a stationary proton. Magnetic moment associated with the orbital motion will be

- $\frac{2\pi re}{v}$
- $\frac{evr}{2}$
- $\frac{e}{2}\frac{\pi r^2}{v}$
- none of these

10. The unit of magnetic flux in SI system is

- Tesla
- Newton/metre
- Weber(Wb)
- Gauss

11.Ampere's circuital law states that

- $\oint \vec{B}\,.\,\vec{dl}$ = ⍰$_0$I
- $\iint \vec{B}.\hat{n}$ds =0
- $\vec{\nabla}.\vec{J}$ =0
- $\vec{\nabla}.\vec{B}$ =0

12.Two parallel wires carry a current I in the same direction. The wires will

- be attracted
- be repelled
- experience no force
- experience a torque.

13.The variation of magnetic field with the distance from the axis of a long cylindrical wire :

- The magnetic field is maximum at centre and zero outside the wire.
- The magnetic field is zero at the centre, maximum at the surface and zero at infinity.
- The magnetic field is zero at the centre and attains constant value outside the wire.
- None of these.

14.A small current loop behaves as a magnetic dipole whose dipole moment is

- the product of the circumference of the loop and the circulating current.
- the product of the loop area and the circulating current.
- the product of the half of the loop area and the circulating current.
- None of these.

15.The differential form of Ampere's law is

- $\vec{\nabla}.\vec{B}$ =0
- $\vec{\nabla}.\vec{J}$ =0
- $\vec{\nabla}$x$\vec{B}$ =⍰$_0\vec{J}$
- None

16.The magnetic induction $\vec{B}$ and the magnetic vector potential $\vec{A}$ are related by the relation

- $\vec{B} = \vec{\nabla}$ X $\vec{A}$
- $\vec{A} = \vec{\nabla}$ X $\vec{B}$
- $\vec{\nabla}$ X ($\vec{A}$ X $\vec{B}$) = 0
- None

17.The SI unit of magnetic vector potential is

- Coulomb
- Weber(Wb)
- Tesla
- Weber per metre(Wb/m)

18.The magnetization of a material medium occurs due to

- bound current
- free current
- both bound and free current
- none of these

19.Magnetisation current (I_m) can

- produce joule heating
- produce magnetic field
- transport charge over macrodistances
- none of these

20. The magnetization ($\vec{M}$) and the magnetization current density ($\overrightarrow{J_m}$) is related by the equation

- $\vec{\nabla}$ X $\overrightarrow{J_m} = \vec{M}$
- $\vec{\nabla}$. $\vec{M}$ = $\overrightarrow{J_m}$
- $\vec{\nabla}$ X ($\overrightarrow{J_m}$ X $\vec{M}$) = 0
- $\vec{\nabla}$ X $\vec{M}$ = $\overrightarrow{J_m}$
