



Department of Electronics and Communication Engineering

EC 8451- Electromagnetic Fields

UNIT III – MAGNETOSTATICS

MCQ BANK

1. Biot Savart law in magnetic field is analogous to ----- law in electric field.
a) Gauss
b) Faraday
c) Coulomb's
d) Ampere
ANSWER: C. Coulomb's
2. Ampere law states that
a) Divergence of \mathbf{H} is same as the flux
b) Curl of \mathbf{D} is same as the current
c) Divergence of \mathbf{E} is zero
d) Curl of \mathbf{H} is same as the current density
ANSWER: D. Curl of \mathbf{H} is same as the current density
3. The magnetic field intensity will be zero inside a conductor. State true/false.
a) True
b) False
ANSWER: b. False
4. Find the Lorentz force of a charge 2.5C having an electric field of 5 units and magnetic field of 7.25 units with a velocity 1.5m/s.
a) 39.68
b) 68.39
c) 93.68
d) 86.93
ANSWER: a. 39.68
5. The torque of a conductor is defined only in the case when
a) The field is perpendicular to the loop
b) The plane of the loop is parallel to the field

- c) The plane of the loop is perpendicular to the current direction
- d) The field and the current direction are same**

ANSWER: b. The plane of the loop is parallel to the field

6. The line integral of the magnetic field intensity is the
- a) Current density
 - b) Current**
 - c) Magnetic flux density
 - d) Magnetic moment

ANSWER: b. Current

7. Find the magnetization of the material with susceptibility of 6 units and magnetic field intensity of 13 units.
- a) 2.16
 - b) 6.2
 - c) 78**
 - d) 1.3

ANSWER: c. 78

8. A boundary of separation between two magnetic materials is identified by
- a) Change in the permeability**
 - b) Change in permittivity
 - c) Change in magnetization
 - d) Conduction

ANSWER: a. Change in the permeability

9. The tangential component of the magnetic field intensity is continuous at the boundary of separation of two media. State True/False.

- a) True**
- b) False

ANSWER: a. True

10. A conductor of length L has current I passing through it, when it is placed parallel to strong magnetic field. The force experienced by the conductor will be
- a) BIL
 - b) BL^2I
 - c) BI^2L
 - d) Zero**

ANSWER: d. Zero

11. The expression for the inductance in terms of turns, flux and current is given by

a) $L = N \frac{d\phi}{di}$

b) $L = -N \frac{d\phi}{di}$

c) $L = Ni\phi$

d) $L = N\phi/i$

ANSWER: a. $L = N \frac{d\phi}{di}$

12. The equivalent inductance of two coils with series opposing flux having inductances 7H and 2H with a mutual inductance of 1H.

a) 10

b) 7

c) 11

d) 13

ANSWER: b. 7

13. The inductance of a coaxial cable with inner radius a and outer radius b, from a distance d, is given by

a) $L = \mu d \ln(b/a)/2\pi$

b) $L = 2\pi \mu d \ln(b/a)$

c) $L = \pi d/\ln(b/a)$

d) $L = 0$

ANSWER: a. $L = \mu d \ln(b/a)/2\pi$

14. Two coils have inductances $L_1 = 1200$ mH and $L_2 = 800$ mH. They are connected in such a way that flux in the two coils aid each other and inductance is measured to be 2500 mH, then Mutual inductance between the coils is _____ mH.

a) 250

b) 225

c) 150

d) 145

ANSWER: a. 250

15. The magnetic field required to reduce the residual magnetism to zero is called

a) Coercivity

b) Retentivity

c) Hysteresis

d) Saturation magnetism

ANSWER: a. Coercivity

16. The magnetic vector potential due to a single conductor carrying current is

- a) Zero
- b) Infinite**
- c) Unity
- d) Finite

ANSWER: b. Infinite

17. A conductor of length 1 metre moves at right angles to magnetic field of flux density 1 Wb/m² with a velocity of 25 m/s. The induced emf in the conductor will be

- a) 50V
- b) 25V**
- c) 75 V
- d) 100 V

ANSWER: b. 25V

18. A magnetic material has a total flux **B** of 80 micro Wb with an mmf of 160 AT. The reluctance in ampere turn per weber is

- a) 2×10^{-6}
- b) 2×10^6**
- c) 2×10^{-8}
- d) 2×10^8

ANSWER: b. 2×10^6

19. The force required to separate two surfaces with a contact area measuring 5 cm by 6 cm, when flux density normal to the surface is 0.8 tesla, will be

- a) 76400 N
- b) 7640 N
- c) 764 N**
- d) 76.4 N

ANSWER: c. 764 N

20. Mutual inductance between two magnetically coupled coils depends on

- a) permeability of core.
- b) the number of their turns

- c) cross sectional area of their common core
- d) **all of above**

ANSWER: d. all of above

21. The property of the coil by which a counter emf is induced in it when the current through the coil changes is known as

- a) **self-inductance**
- b) mutual inductance
- c) series aiding inductance
- d) capacitance

ANSWER: a. self-inductance

22. 1 Maxwell is the same as

- a) **10^{-8} weber**
- b) 10^8 weber
- c) 10^4 weber
- d) 10^{-4} weber

ANSWER: a. 10^{-8} weber

23. A copper disc is rotated rapidly below a freely suspended magnetic needle. The magnetic needle starts rotating with velocity

- a) equal to that of disc and in the same direction
- b) equal to that of disc and in the opposite direction
- c) **less than that of disc and in the same direction**
- d) less than that of disc but in opposite direction

ANSWER: c. less than that of disc and in the same direction

24. The magnetization is defined by the ratio of

- a) Magnetic moment to area
- b) **Magnetic moment to volume**
- c) Magnetic flux density to area
- d) Magnetic flux density to volume

ANSWER: b. Magnetic moment to volume

25. The flux density of medium 1 has a normal component of 2.4 units, then the normal component of the flux density in the medium 2 will be

- a) 1.2
- b) 4.8

- c) 2.4
- d) 0

ANSWER: c. 2.4

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