OBJECTIVE - I

1. A perpendicular material is place in a magnetic fields. Consider the following statemetns;
(A) If the magnetic field is increased, the magnetization is increased.
(B) If the temperature is increased, the magnetization is increased
(A) Both A and B are true (B*) A is true but B is false
(C) B is true but A is false (D) Both A and B are false

Sol. **B**

A paramagnetic material is placed in a magnetic field.

Þ If the magnetic field is increased, the magnetization is increased.

$$\therefore \text{Magnetiazation } \vec{I} = \frac{\text{Magnetic Moment}}{\text{volume}} = \frac{\vec{M}}{V}$$

Þ If the temperature is increaed, the magnetization is decreased.

Because susceptibility of a paramagnetic substance is inversely proportional to the absolute temperatue.

$$x = \frac{C}{T}$$

after curie temperature susceptibility varies with temperature as $x = \frac{C^1}{T - T_C}$

2. A paramagnetic material is kept in a magnetic field. The field is increased till the magnetization becomes constant. If the temperature is now decreased, the magnetization
(A) will increase (B) decrease (C*) ramain constant (D) may increase of decrease

Sol. **C**

3. A ferromagnetic material is placed in an external magnetic field. The magnetic domains
(A) increase in size (B) decrease in size
(C*) may increase or decrease is size (D) have no relation with the field

Sol. **C**

A ferromagnetic material is placed in a external magnetic field. The Magnetic domains may increase or decrease in size.

4. A long, straight wire carries a current i. The magnetizing field intensity H is measured at a point P close to the wire. A long, cylindrical iron rod is brought close to the wire so that the point P is at the centre of the rod. The value of H at P will
(A) increase many times (B) decrease many times
(C*) remain almost constant (D) become zero

Sol. **C**

$$\vec{H} = \frac{\vec{B}}{\mu_0} = \frac{1}{4\pi} \frac{id\vec{l} \times \vec{r}}{r^3}$$

The value of H at P will remain almost constant.

5. The magnetic susceptibility is negative for
(A) paramagnetic materials only (B*) diamagnetic material only
(C) ferromagnetic materials only (D) paramagnetic and ferromagnetic materials

Sol. **B**

The magnetic susceptibility is negative for diamagnetic malerials only.

6. The desirable properties for making permanent magnets are
(A*) high retentivity and high coercive force (B) high retentivity and low coercive force
(C) low retentivity and high coercive force (D) low retentivity and low coercive force

Sol. **A**

Permanent magnetis are High retentivity and High coercive force.

7. Electromagnets are made of soft iron because soft iron has
(A) high retentivity and high coercive force (B) high retentivity and low coercive force
(C) low retentivity and high corecive force (D*) low retentivity and low coercive force

Sol. **D**

Electro magnets are made of soft iron because soft iron has Low retentivity and Low coercive force.

OBJECTIVE - II

1. Pick the correct options
(A*) All electrons have magnetic moment (B*) All protons have magnetic moment
(B) All nuclei have magnetic moment (D) All atoms have magnetic moment

Sol. **AB**
All the electrons have magnetic moment & All the protons have magnetic moment.

2. The permaent magnetic moment of the atoms of a material is not zero. The material
(A) must be paramagnetic (B) must be diamagnetic
(C) must be ferromagnetic (D*) may be paramagnetic

Sol. **D**

3. The permanent magnetic of the atoms of a material is not zero. The material
(A) must be paramagnetic (B*) must be diamagnetic
(C) must be ferromagnetic (D) may be paramagnetic

Sol. **B**
The permanent magnetic moment of the atoms of a material is zero. The material muist be diamagnetic.

4. Which of the following pairs has quantities of the same dimension ?
(A) magnetic field B and magnetizing field intensity H
(B) magnetic field B and intensity of magnetization I
(C*) magnetic field intensity H and intensity of magnetization I
(D*) longitudinal strain and magnetic susceptibility

Sol. **CD**

$$\Rightarrow \qquad \vec{H} = \frac{\vec{B}}{\mu_0} - \vec{I}$$

Same dimension substance are added and subtracted and after addup & subtracte up gie the same dimension.
So that dimension of the Magnetic field intensity H and intensity of magnetization 'I' is same.
Þ Longitudinal stramond Magnetic susceptibility are dimansion Less quantity.

5. When a ferromagnetic material goes through a hysteresis loop, the magnetic susceptibility
(A) has a fixed value (B*) may be zero (C*) may be infinity (D*) may be negative

Sol. **BCD**
When a ferromagnetic material goes through a Hysteresis loop, the Magnetic susceptibility may be zero, may be infinity or may be negative.

6. Mark out the correct options.
(A*) Diamagnetism occurs in all materials
(B) Diamagnetism result from the partial alignment of perpmanent magnetic moment.
(C) The magnetizing field intensity H is always zero in free space
(D*) The magnetic field of induced magnetic moment is opposite to the applied field.

Sol. **D**
Þ Diamagnetism occurs in all materials.
Þ The Magnetic field of Induced magnetic moment is opposite to the applied field.