DPP – 08

Q.1 The soft-iron is a suitable material for making an electromagnet. This is because soft-iron has

(A) low coercivity and high retentivity.

(B) low coercivity and low permeability.

(C) high permeability and low retentivity.

(D) high permeability and high retentivity.

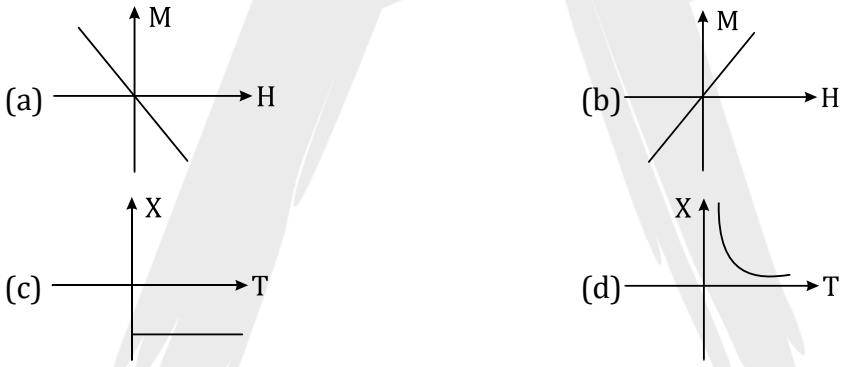
Q.2 The susceptibility of a paramagnetic material is 99. The permeability of the material in Wb/A −m, is [Permeability of free space $\mu_0 = 4\pi \times 10^{-7}$ Wb/A − m]

(A) $4\pi \times 10^{-7}$ (B) $4\pi \times 10^{-4}$ (C) $4\pi \times 10^{-5}$ (D) $4\pi \times 10^{-6}$

Q.3 The space inside a straight current carrying solenoid is filled with a magnetic material having magnetic susceptibility equal to 1.2×10^{-5}. What is fractional increase in the magnetic field inside solenoid with respect to air as medium inside the solenoid?

(A) 1.2×10^{-5} (B) 1.2×10^{-3} (C) 1.8×10^{-3} (D) 2.4×10^{-5}

Q.4 Following plots show Magnetization (M) vs Magnetising field (H) and magnetic susceptibility (χ) vs Temperature (T) graph.



Which of the following combination will be represented by a diamagnetic material?

(A) (b), (c) (B) (b), (d) (C) (a), (d) (D) (a), (c)

Q.5 The magnetic susceptibility of a material of a rod is 499. Permeability in vacuum is $4\pi \times 10^{-7}$H/m. Absolute permeability of the material of the rod is

(A) $\pi \times 10^{-4}$H/m (B) $2\pi \times 10^{-4}$H/m

(C) $3\pi \times 10^{-4}$H/m (D) $4\pi \times 10^{-4}$H/m

Q.6 Which of the following statements are correct?

(a) Electric monopoles do not exist whereas magnetic monopoles exist.

(b) Magnetic field lines due to a solenoid at its ends and outside cannot be completely straight and confined.

(c) Magnetic field lines are completely confined within a toroid.

(d) Magnetic field lines inside a bar magnet are not parallel.

(e) $\chi = -1$ is the condition for a perfect diamagnetic material, where χ is its magnetic susceptibility.

Choose the correct answer from the options given below

(A) (a) and (b) only

(B) (b) and (d) only

(C) (b) and (c) only

(D) (c) and (e) only

Q.7 In a ferromagnetic material, below the curie temperature, a domain is defined as

(A) a macroscopic region with consecutive magnetic dipoles oriented in opposite direction.

(B) a macroscopic region with randomly oriented magnetic dipoles.

(C) a macroscopic region with saturation magnetization.

(D) a macroscopic region with zero magnetization.

Q.8 Magnetic materials used for making permanent magnets - (P) and magnets in a transformer (T) have different properties of the following, which property best matches for the type of magnet required?

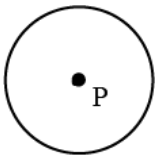
(A) T : Large retentivity, small coercivity.

(B) P : Small retentivity, large coercivity.

(C) T : Large retentivity, large coercivity.

(D) P: Large retentivity, large coercivity.

Q.9 A perfectly diamagnetic sphere has a small spherical cavity at its centre, which is filled with a paramagnetic substance. The whole system is placed in a uniform magnetic field $\vec{B}$. Then the field inside the paramagnetic substance is



(A) $\vec{B}$

(B) Zero

(C) much large than $|\vec{B}|$ and parallel to $\vec{B}$

(D) much large than $|\vec{B}|$ but opposite to $\vec{B}$.

Q.10 An iron rod of volume 10^{-3} m^3 and relative permeability 1000 is placed as core in a solenoid with 10 turns /cm. If a current of 0.5 A is passed through the solenoid, then the magnetic moment of the rod will be

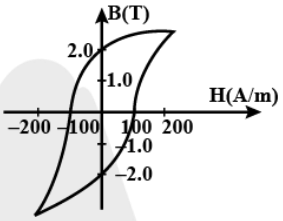
(A) 50×10^2 A m^2 (B) 5×10^2 A m^2

(C) 500×10^2 A m^2 (D) 0.5×10^2 A m^2

Q.11 A bar magnet is demagnetized by inserting it inside a solenoid of length 0.2 m, 100 turns, and carrying a current of 5.2 A. The coercivity of the bar magnet is

(A) 520 A/m (B) 1200 A/m (C) 2600 A/m (D) 285 A/m

Q.12 The B − H curve for a ferromagnet is shown in the figure. The ferromagnet is placed inside a long solenoid with 1000 turns /cm. The current that should be passed in the solenoid to demagnetise the ferromagnet completely is



(A) 1 mA (B) 20μA (C) 2 mA (D) 40μA

ANSWER KEY

1.	(C)	**2.**	(C)	**3.**	(A)	**4.**	(D)	**5.**	(B)	**6.**	(D)	**7.**	(C)
8.	(D)	**9.**	(B)	**10.**	(B)	**11.**	(C)	**12.**	(A)				