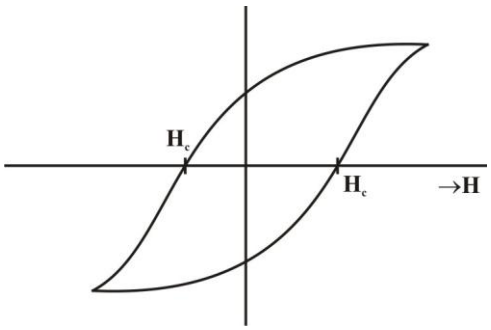
Material Objective Solution

1. (A)



By adding ferromagnetic magnetization will be ($\uparrow$) that will increase saturation magnetization.

2. (C) $S_n \rightarrow 3.72k$

$H_g \rightarrow 4.12\,k$

$O_s \rightarrow .7\,k$

$N_b \rightarrow 9.3k$

O_s is the element has highest density while li has lowest density.

3. (C) $P = N(\alpha_e + \alpha_i)E + \dfrac{Np_p{}^2E}{3kT}$

$$\varepsilon_0(\varepsilon_r - 1)E = N(\alpha_e + \alpha_i)E + \frac{Np_p{}^2}{3kT}.E$$

$$\boxed{\varepsilon_r - 1 = \frac{N}{\varepsilon_0}(\alpha_e + \alpha_i) + \frac{Np_p{}^2}{3kT\varepsilon_0}}$$

Dielectric Constant does not depend on voltage

4. (B) Quartz is not ferroelectric it is only Piezo electric.

5. (D) $P = P_i + P_T$

Lattice scattering

Impurity

In case of metal there is no change in density.

6. (A) By increasing impurity carries will be trapped and Hence. Conductivity $\downarrow$ and resistivity $\uparrow$

7. (B) $\dfrac{k}{\sigma T} = L$

$$\frac{k}{\sigma} = (LT)$$

$$\boxed{\frac{k}{\sigma} \alpha T} \qquad L = 2.48 \times 10^{-8}\, w.\Omega\, k^{-2}$$

8. (C) Lack of centre of symmetry in piezo-electric.

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9. (B) Silsbee's rule
10. (A) Both
11. (B) Type-I superconductor is need not be very good conductor
12. (D) Bakelite $\rightarrow 10^5\Omega$cm

    Window glass - $10^9\Omega$cm

    Pure Silica - $10^{13}\Omega$cm

    Mica - $10^{17}\Omega$cm
13. (A)
14. (B)
15. (A)
16. (B) by use of 4% Si value of resistivity is increased.
17. (C) $3\rightarrow$ is not correct

    So1, 2, 4 are correct.
18. (C)
19. (B)
20. (A) Coordination number of HCP is 12
21. (B) Fe has both form in FCC and BCC
22. (B) GaAs has Zinc Blende structure
23. (D)
24. (A)
25. (D) $Sn \rightarrow 4^oK$ $Nb_3Ge \rightarrow 23^oK$ Ceramic $\rightarrow 34^oK$ Y-Ba-Cu-oxide $\rightarrow 90^oK$
26. (A) Nonpolarized capacitor is half that of polarized capacitor.
27. (D) At optical only electronic $\left(10^{15}\text{Hz}\right)$

    Infrared $\left(10^{13}\text{Hz}\right) \rightarrow \alpha_e + \alpha_i$

    Radio $\left(10^5 - 10^{14}\text{Hz}\right) \rightarrow \alpha_e + \alpha_i + \alpha_o$
28. (C) Diamond has highest resistivity
29. (A)
30. (C)
31. (C) $V_m = 10 \times \text{Form factor} = 10 \times 1.11 = 11.1\text{V}$
32. (B)
33. (B)
34. (D)
35. (A)
36. (C)
37. (D) Q- which is indirect method
38. (A) Sensitivity o/p $= \dfrac{2\text{mV}}{.5\text{mm}} = 4\text{mV/mm}$

    Overall sensitivity $= 250 \times 4 = 1000\,\text{mV/mm}$

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39. (C) $1\times$ Not proportional to deflecting Torque.

40. (C) $\tan\phi = \dfrac{\sqrt{3}(P_1 - P_2)}{(P_1 + P_2)}$

$P_1 = 0$

$\tan\phi = -\sqrt{3}$

$\phi = -60$

$\cos\phi = 1/2$ lagging

41. (D)

42. (C) $m = \dfrac{20V}{50\times10^{-6}} = 400k\Omega$

$400\,k\Omega - .5\,k\Omega = 399.5\,k\Omega$

43. (A)

44. (A) $P = VI\cos\phi = 2070$

$$\frac{400\,Rev}{kwH}\times 2070w = \frac{400\times 2.070}{hr}$$

$$= \frac{400\times 2.070}{60}$$

= 13.8 rpm.

45. (A) Mega ohm sensitivity $= \dfrac{1}{I_{fs}}$

$= 10^6\,\Omega = 1M\Omega$

$V_s = \dfrac{1\mu A}{mm}\times 10^3 = \dfrac{1mV}{mm}$

46. (D) $I_{rms} \rightarrow$ value is very small

47. (A) $\dfrac{30}{15}\times 10^3 = 2000$

$= \dfrac{5}{1999} \cong 2.5\,m\Omega$

48. (C)

49. (D) It can manage up to 1400ºC

50. (B)

51. (A)

52. (A)

53. (C)

54. (A)

55. (C)

56. (B)

57. (D)

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58. (B) Range of error = Avg value – extreme end value $= 110.2 - 110.3 = \pm .1$

59. (A)

60. (A) $$V_{rms}^2 = \frac{1}{12\pi}\left(\int_0^{6\pi}(1+\sin\omega t)^2\, d\omega t + \int_{6\pi}^{12\pi}(-1+\sin\omega t)^2\, d\omega t\right)$$

$$= \frac{9\pi + 9\pi}{12\pi} = 3/2$$

$$V_{rms} = \sqrt{3/2}$$

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