ANSWERS AND EXPLANATIONS

1. ***Ans (b)***

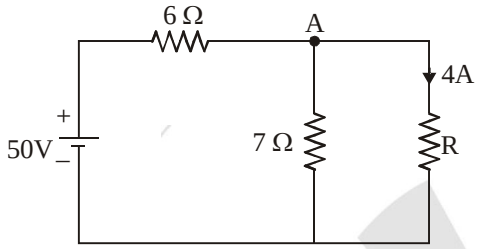
2. ***Ans (b)***

3. ***Ans (d)***

4. ***Ans (b)***

5. ***Ans (d)***

6. ***Ans. (a)***



Apply KCL at node A.

$$\frac{V-50}{6} + \frac{V}{7} + 4 = 0$$

$$7V - 350 + 6V + 168 = 0$$

$$V = \frac{182}{13} = 14 \text{ V}$$

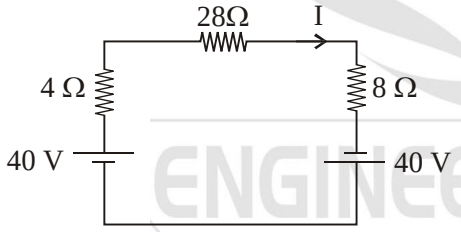
Also

$$4 = \frac{14}{R}$$

$$R = \frac{14}{4} = 3.5\ \Omega$$

7. ***Ans. (a)***

8. ***Ans. (b)***



Convert both current sources into voltage source then circuit will be.

$$I = \frac{40+40}{(4+28+8)} = \frac{80}{40} = 2 \text{ A}$$

9. ***Ans. (c)***

$$e = L\frac{di}{dt}$$

$$\frac{40 \times 0.4}{4} = L$$

$$L = 4 \text{ H}$$

10. ***Ans. (b)***

Using superposition theorem

$$V_1 - V_2 = \left(\frac{176 \times 7 - 110 \times 10}{22}\right) \times 5$$

$$= 30 \text{ Volts.}$$

11. ***Ans. (a)***

Alumina gives plasticity to the Bricks.

12. ***Ans. (d)***

2% $CaCl_2$ wt. by volume is added and its initial setting time is 20 min.

13. ***Ans. (c)***

Clay imparts hydraulicity in hydraulic lime.

14. ***Ans. (b)***

15. ***Ans. (d)***

Radial sawing is less economical because in it cuts in radial direction hence wastage maximum in it.

16. ***Ans. (d)***

17. ***Ans. (c)***

18. ***Ans. (b)***

19. ***Ans. (c)***

20. ***Ans. (c)***

21. ***Ans. (c)***

22. ***Ans. (a)***

ISOPARS : Line joining equal changes in magnetic declination.

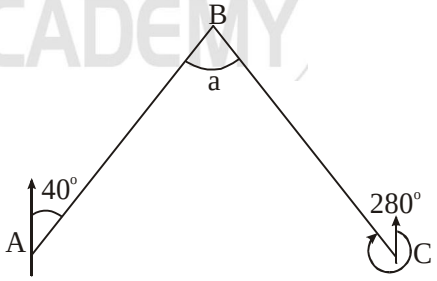
23. ***Ans. (c)***

24. ***Ans. (b)***

BB of BC = FB of BC + 180°

FB of BC = 280° – 180°

FB of BC = 100°



BB of AB = FB of AB + 180°

= 40° + 180°

∴ Included angle, a

= BB of AB – FB of BC

= 220° – 100° = 120°

25. ***Ans. (c)***

26. ***Ans. (a)***

In a bar of different sections, the resultant strain is the algebraic sum of the individual stresses.

27. ***Ans. (b)***

Ductile material has long plastic elongation range.

28. ***Ans. (a)***

No stress will be induced in bar because stress is independent of temperature increment.

29. ***Ans. (a)***

$$N_s = \frac{N\sqrt{P}}{(H)^{5/4}} = \frac{300\times\sqrt{2000}}{(150)^{5/4}}$$
$$= 25.6$$

In metric units 1 hp – 0.756 kW

$$N_s = \frac{300\times\sqrt{2000\times 0.756}}{(150)^{5/4}}$$
$$= 22.2 \text{ in SI units}$$

30. ***Ans. (c)***

31. ***Ans.(d)***

32. ***Ans.(a)***

33. ***Ans. (c)***

34. ***Ans. (a)***

In a throttling process change in enthalpy

$$(\Delta h) = 0$$

It is adiabatic process also & change in kinetic energy is negligible so only first & second statements are correct

35. ***Ans. (a)***

From question

$Q_{Rejected} = 50kW$

$T_1 = 300K$

$T_2 = 250\ K$

$$COP = \frac{T_2}{T_1 - T_2}$$

$$\Rightarrow \quad COP = \frac{250}{300-250}$$
$$= 5$$

$$\Rightarrow \quad COP = \frac{Q_{Re\,jected}}{W_{Input}}$$

$$\Rightarrow \quad W_{Input} = \frac{50}{5}$$
$$= 10\ kW$$

36. ***Ans. (a)***

37. ***Ans. (a)***

$$W = \int_0^6 (-3V+16)\times 10^5 dV$$
$$= \left[-\frac{3V^2}{2}+16V\right]_2^6 \times 10^5$$
$$= 16\times 10^5\ J$$

38. ***Ans. (a)***

Speed regulation of synchronous motor is zero because it always runs at synchronous speed.

39. ***Ans. (a)***

$$\frac{E_1}{N_1} = \frac{E_2}{N_2} = \text{Emf per turn}$$

40. ***Ans. (c)***

$$N_S = \frac{120F}{P} = \frac{120\times 50}{4} = 1500\,\text{rpm}$$

$$S = \frac{N_S - N_r}{N_S} = \frac{1500-1440}{1500} = 0.04 = 4\%$$

41. ***Ans. (a)***

Stepper motors is most suitable for computer printer drive.

42. ***Ans. (a)***

Interpoles are used to neutralize the effect of armature reaction in the interpolar region.

43. ***Ans. (c)***

44. ***Ans. (c)***

45. ***Ans. (d)***

46. ***Ans. (c)***

47. ***Ans. (c)***

48. ***Ans. (a)***

49. ***Ans. (c)***

50. ***Ans. (b)***

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