

ANSWERS AND EXPLANATIONS

1. *Ans. (d)*2. *Ans. (a)*3. *Ans. (b)*4. *Ans. (c)*

$$\text{Effective rainfall} = \frac{\text{Run-off}}{\text{Catchment Area}}$$

$$\begin{aligned} \text{Run-off} &= 2 \text{ m}^3/\text{sec annually} \\ &= 2 \times 3600 \times 24 \times 365 \\ &= 63072000 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \text{Effective Rain} &= \frac{63072000}{10 \times 10^6} = 6.30 \text{ m} \\ &= 630 \text{ cm} \end{aligned}$$

5. *Ans. (b)*6. *Ans. (d)*

$$\begin{aligned} D &= \frac{864B}{\Delta} = \frac{864 \times 10}{8.64} \\ &= 1000 \text{ ha/cum/sec} \end{aligned}$$

7. *Ans. (c)*

$$\begin{aligned} \text{Available moisture} &= \phi - F \\ &= 60 - 30 = 30\% \end{aligned}$$

8. *Ans. (b)*9. *Ans. (c)*

$$\text{Flow velocity} \propto (Qf^2)^{1/6}$$

$$\text{Flow velocity} \propto \frac{1}{(Qf^2)^{-1/6}}$$

So, flow velocity is impropotional to $(Qf^2)^{-1/6}$

10. *Ans. (d)*11. *Ans. (d)*

$$Q = \frac{2}{3} C_d \sqrt{2g} L_e H^{3/2} = 1.84 L_e H^{3/2}$$

(Long rectangular weir)

$$\begin{aligned} L_e &= (L - 0.1 nH) \\ &= 4 - 0.1 \times 2 \times 0.36 = 3.928 \text{ m} \end{aligned}$$

$$\begin{aligned} \therefore Q &= 1.84 \times 3.928 \times (0.36)^{3/2} \\ &= 1.56 \text{ m}^3/\text{s} \end{aligned}$$

12. *Ans. (b)*13. *Ans. (c)*

$$\text{Manning's equation } Q = \frac{1}{n} B y^{5/3} S^{1/2}$$

$$Q \propto y^{5/3}$$

$$\Rightarrow \left(\frac{Q}{Q_2} \right) = \left(\frac{100}{120} \right)^{5/3}$$

$$\Rightarrow Q_2 = 136 \text{ Q}$$

$$\% \text{ increase} = 36\%$$

14. *Ans. (b)*15. *Ans. (c)*16. *Ans. (c)*17. *Ans. (c)*18. *Ans. (c)*19. *Ans. (a)*20. *Ans. (c)*21. *Ans. (b)*22. *Ans. (c)*23. *Ans. (a)*24. *Ans. (c)*25. *Ans. (c)*26. *Ans. (d)*27. *Ans. (b)*28. *Ans. (a)*29. *Ans. (b)*30. *Ans. (a)*31. *Ans. (a)*32. *Ans. (b)*33. *Ans. (a)*34. *Ans. (d)*35. *Ans. (a)*36. *Ans. (c)*37. *Ans. (b)*38. *Ans. (b)*39. *Ans. (a)*40. *Ans. (d)*41. *Ans. (a)*42. *Ans. (a)*43. *Ans. (a)*44. *Ans. (d)*45. *Ans. (a)*46. *Ans. (d)*47. *Ans. (a)*

Discharge through cipolletti weir is

$$Q = \frac{2}{3} C_d \sqrt{2g} L(H)^{3/2}$$

10. *Ans. (d)*11. *Ans. (d)*48. *Ans. (d)*

It is directly proportional to H.

49. *Ans. (b)*

In triangular section, most economical channel should be inclined at 45°.

50. *Ans. (b)*

$$y_c^3 = \frac{q_c^2}{g}$$

$$\text{Here, } q_c = \frac{Q}{B} = \frac{100}{4.5} = 22.22$$

$$y_c^3 = \frac{(22.22)^2}{9.81} = 3.69 \text{ m}$$