BPSC TEST

Date: 10 March, 2019

TEST 08 (OBJECTIVE SOLUTION)...

ANSWERS

1. (c)	11. (a)	21. (b)	31. (a)	41. (d)
2. (d)	12. (d)	22. (c)	32. (b)	42. (c)
3. (c)	13. (a)	23. (d)	33. (b)	43. (b)
4. (a)	14. (c)	24. (b)	34. (b)	44. (d)
5. (c)	15. (a)	25. (d)	35. (a)	45. (b)
6. (d)	16. (b)	26. (d)	36. (c)	46. (d)
7. (c)	17. (c)	27. (c)	37. (b)	47. (b)
8. (b)	18. (b)	28. (d)	38. (c)	48. (d)
9. (c)	19. (b)	29. (d)	39. (a)	49. (c)
10. (d)	20. (d)	30. (a)	40. (a)	50. (a)

BPSC TEST-08 Solutions

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1. (c)

The theory of unit hydrograph was proposed by shermen in the year of 1932

2. (d)

3. (c)

Isohyetal method is best because it considers topographical variations and distribution pattern of rainfall.

4. (a)

5. (c)

The standard recording type raingauge used in India is natural syphon type.

6. (d)

Average depth

$$= \frac{(45\times1500+55\times2500+65\times3000 \\ +75\times2000+85\times1000)}{(1500+2500+3000+2000+1000)}$$

= 63.5 cms

7. (c)

8. (b)

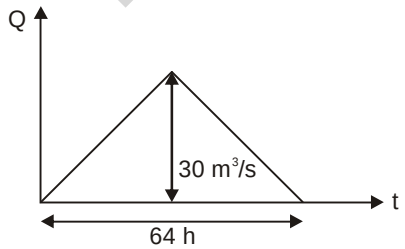
Direct runoff volume = $\frac{1}{2}\times30\times64\times60\times60$

= 3.456 × 106 m^3/s.

Runoff depth = $\frac{3.456\times10^6}{120\times10^6}$

= 0.0288 m

= 2.88 cm



Rainfall = 0.5 × 12 = 6 cm

Loss = 6 – 2.88 = 3.12 cm

ϕ-index = $\frac{3.12}{12}$ = 0.26 cm/h

9. (c)

$$Q_s = 2.778\times\frac{A}{D}$$

$$= 2.778\times\frac{720}{4}$$

= 500 m^3/sec.

10. (d)

Return period = 100 years

Design period = 2 years

Risk = $1 - q^n$

= $1 - (1 - p)^n$

$$= 1-\left(1-\frac{1}{T}\right)^n$$

$$= 1-\left(1-\frac{1}{100}\right)^2$$

= $1 - 0.99^2$

= 0.0199 = 1.99%

11. (a)

Dicken's formula,

$$\underset{m^3/sec}{Q_p} = C_D\times\underset{km^2}{A^{3/4}}$$

It is used in central and northern parts of the country.

12. (d)

13. (a)

14. (c)

15. (a)

16. (b)

$$F = \frac{1}{2}\times r\times\frac{(y_1-y_2)^3}{(y_1+y_2)}$$

$= \frac{1}{2} \times 9.81 \times \frac{(2-0.4)^3}{2+0.4}$

= 8.37 kN/m

17. (c)

For a hydraulic efficient rectangular section,

$y = \frac{B}{2}$

$\therefore \frac{B}{y} = 2$

18. (b)

$\tau = \rho g R S$

1 = 9810 × R × S

$RS = \frac{1}{9810}$

$V = C\sqrt{RS}$

$C = 0.605 \times \sqrt{9810}$

C = 59.92

19. (b)

20. (d)

$E_C = \frac{3}{2} \times y_c$

$= \frac{3}{2} \times 1.5$

= 2.25 m

21. (b)

Hydraulic jump occurs when flow changes from super-critical to sub-critical.

22. (c)

$E_L = \frac{(y_2 - y_1)^3}{4 y_2 \times y_1}$

$= \frac{(2-0.5)^3}{4 \times 2 \times 0.5}$

= 0.84375 m

23. (d)

Maximum area that can be irrigated, $A_{max} = \frac{Q}{f}$

$= \frac{0.02 \times 60 \times 60 \left(m^3/hr\right)}{\left(\frac{5}{100}\right)(m/hr)}$

= 1440 m^2

= 0.144 hA

24. (b)

25. (d)

Duty (hA/cumecs) = $\frac{8.64 \times B(\text{days})}{\Delta(\text{m})}$

$\therefore$ Duty $= \frac{8.64 \times 10 \times 100}{8.64}$

= 1000 hectares per cumecs

26. (d)

Duty (hectares/cumecs) = $\frac{8.64 \times B(\text{days})}{\Delta(\text{m})}$

Ditu \ $\frac{8.64 \times 30}{0.17}$

= 1524.706 hA/cumecs

$\therefore Q = \frac{\text{Area}}{\text{Duty}} = \frac{2600}{1524.706}$

= 1.705 cumecs

27. (c)

28. (d)

29. (d)

30. (a)

31. (a)

32. (b)

33. (b)

When L > S.S.D,

N = 3 – (–5) = 8%

Length of summit curve = $\frac{NS^2}{4.4} = \frac{8 \times 128^2}{100 \times 4.4}$

= 297.89 m

$\approx$ 298 m

34. (b)

$L = \frac{U^2}{2gf}$

$V = U - at$

$0 = U - g \times f \times t \quad (\because a = fg)$

$U = g \times f \times t$

$L = \frac{g^2 f^2 \times t^2}{2gf}$

$f = \frac{2L}{gt^2} = \frac{2 \times 9.8}{9.8 \times 4} = 0.4$

35. (a)

36. (c)

37. (b)

Maximum flow = $\frac{80 \times 70}{4}$

= 1400 vehicles/hr.

38. (c)

39. (a)

40. (a)

41. (d)

42. (c)

43. (b)

44. (d)

45. (b)

46. (d)

47. (b)

Blue baby disease or, methemoglobinemia is caused by presence of nitrates in water.

48. (d)

BOD = COD – non biodegradable organic matter

49. (c)

50. (a)

Length = 0.25 (m/sec) × 60 = 15 m