BPSC TEST

Date: 17 March, 2019

TEST 13 (OBJECTIVE SOLUTION)...

ANSWERS

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

BPSC TEST-13 Solutions

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1. (c)

2. (a)

3. (b)

Radius (r) = 1m

N = 240 rpm

$$w = \frac{2\pi N}{60} = \frac{2\times\pi\times 240}{60}$$

= 25.1 rad/s

$\therefore$ linear velocity at the periphery

= w × r = 25.1 × 1

= 25.1 m/s

4. (c)

MV = mV

or, 25 × V = 0.03 × 250

$$\text{or, } V = \frac{0.03\times 250}{25}$$

= 0.3 m/sec

5. (b)

6. (a)

$$y = \mu\sin\alpha t - \frac{1}{2}gt^2$$

For time of flight calculation

y = 0

$$\therefore \quad \mu\sin\alpha t = \frac{1}{2}gt^2$$

$$\text{or, } t = \frac{2\mu\sin\alpha}{g}$$

7. (d)

The main principle of surveying is to work from whole to part because by working from whole to part, errors are minimised or localized.

8. (a)

$\because$ 1 cm = 1 km

and, 1 km = 100000 cm

$$\therefore \text{ R.F} = \frac{1}{100000}$$

9. (c)

10. (a)

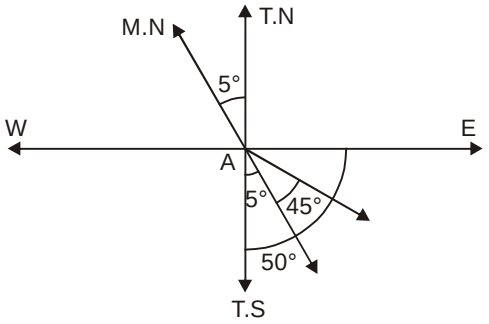
11. (b)

$$\text{Correct length} = \frac{\text{A.L}}{\text{N.L}}\times \text{M.L}$$

$$100 = \frac{l}{20}\times 100.25$$

$$\therefore l = 19.95\text{m}$$

12. (c)



$\therefore$ T.B = S 50° E

13. (c)

Error is half the difference between face left and face right observations

$$\therefore \text{ Error} = \frac{4'}{2}$$

= 2'

14. (c)

15. (a)

Boyle's law states that at a constant temperature pressure is inversely proportional to volume

Boyles law $\rightarrow$ PV = constant

16. (b)

V = IR

= 12 mA × 1.2 kΩ

= 12 × 10^{-3} × 1.2 × 10^3

= 14.4 V

17. (b)

σ_1 = 20 MPa, σ_3 = – 10 MPa

Maximum shear stress = $\frac{\sigma_1 - \sigma_3}{2}$

= $\frac{20-(-10)}{2}$

= 15 MPa

18. (a)

Creep occurs due to permanent load

19. (d)

There is no twisting if the load passes through shear centre.

20. (d)

σ_1 = 150 MPa

σ_3 = 0

Shear stress = $\frac{\sigma_1 - \sigma_3}{2}$

= $\frac{150}{2}$

= 75 MPa

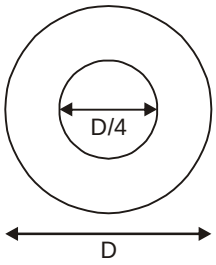
21. (d)

ε_v = Volumetric strain = $\frac{\sigma_1+\sigma_2+\sigma_3}{3}\times(1-2\mu)$

In uniform pressure case, $\sigma_1 = \sigma_2 = \sigma_2 = \sigma$

$\boxed{\varepsilon_v = 0}$

22. (d)



23. (c)

24. (d)

As per IS code, slenderness ratio should less than 27

25. (b)

26. (b)

27. (a)

28. (b)

29. (b)

30. (c)

31. (d)

32. (b)

$t_E = \frac{t_p + t_m \times 4 + t_0}{6}$

= $\frac{8+4\times5+4}{6}$

= $\frac{32}{6}$

= 5.33 days

33. (c)

Slcak = $T_s - T_E$

= 18 – 20

= – 2 weeks

34. (b)

35. (b)

36. (c)

S.I unit is m^2/sec

as, $\nu = \frac{\mu}{\rho}$ ($\mu \rightarrow$ dynamic viscosity, $\nu \rightarrow$ kinematic, viscosity $\rho \rightarrow$ density)

37. (d)

Discharge through orifice is

$Q = C_d \times a \times \sqrt{2gh}$

Where, a = area of orifice

h = depth at which orifice is placed

$\therefore\ Q \propto a\sqrt{h}$

$\Rightarrow\ a_1 \times \sqrt{h_1} = a_2\sqrt{h_2}$

$\frac{\pi}{4} \times d_1^2 \times \sqrt{400} = \frac{\pi}{4} \times d_2^2 \times \sqrt{900}$

$\frac{d_1}{d_2} = \frac{\sqrt{1.5}}{1}$

38. (a)

Bernoulli's equation is

$\frac{P}{\rho g} + \frac{V^2}{2g} + Z$ = constant

All terms represent energy per unit weight

39. (c)

40. (d)

41. (a)

Separation occurs for adverse pressure gradient

(i.e. $\frac{dP}{dx} > 0$) i.e. positive

42. (b)

$N_s = \frac{N\sqrt{Q}}{H^{3/4}}$

$= \frac{1000 \times \sqrt{36}}{16^{3/4}}$

$= \frac{1000 \times 6}{8} = 750$

43. (c)

- Jackson's turbidimeter measures turbidity > 25 ppm
- Baylis turbidimeter is used to measure turbidity less than 1 ppm.

44. (d)

45. (a)

46. (c)

A trickling filter is a fixed bed biological filter that operates under aerobic conditions. It removes dissolved organic matter.

47. (b)

i.e. alum is used.

48. (d)

$[OH^-] = 10^{-5.6}$ mmol/L

$= 10^{-5.6} \times 10^{-3}$ mol/L

$\therefore$ POH = – log $[OH^-]$

= – log $[OH^-]$

= – log $[10^{-8.6}]$

= 8.6

$\therefore$ PH = 14 – 8.6

= 5.4

49. (a)

50. (a)