www.vineetloomba.com

Powered by IITians

Sankalp IIT

A Must Do Test Series for Sure Shot Success in JEE Main And Advanced

Solutions All India Test Series

Test-8

PHYSICS		CHEMISTRY		MATHEMATICS	
1.	(3)	31.	(2)	61.	(2)
2.	(3)	32.	(4)	62.	(1)
3.	(2)	33.	(1)	63.	(2)
4.	(1)	34.	(2)	64.	(3)
5.	(3)	35.	(3)	65.	(4)
6.	(1)	36.	(4)	66.	(3)
7.	(3)	37.	(1)	67.	(2)
8.	(1)	38.	(4)	68.	(1)
9.	(2)	39.	(4)	69.	(4)
10.	(1)	40.	(2)	70.	(3)
11.	(2)	41.	(4)	71.	(1)
12.	(1)	42.	(1)	72.	(3)
13.	(3)	43.	(1)	73.	(4)
14.	(4)	44.	(2)	74.	(2)
15.	(4)	45.	(4)	75.	(4)
16.	(3)	46.	(2)	76.	(1)
17.	(1)	47.	(2)	77.	(2)
18.	(4)	48.	(4)	78.	(3)
19.	(1)	49.	(2)	79.	(3)
20.	(1)	50.	(3)	80.	(2)
21.	(1)	51.	(1)	81.	(1)
22.	(1)	52.	(1)	82.	(1)
23.	(3)	53.	(1)	83.	(4)
24.	(2)	54.	(1)	84.	(4)
25.	(2)	55.	(3)	85.	(3)
26.	(4)	56.	(2)	86.	(2)
27.	(1)	57.	(1)	87.	(3)
28.	(2)	58.	(2)	88.	(1)
29.	(4)	59.	(3)	89.	(2)
30.	(3)	60.	(4)	90.	(4)

Prepared By:
Er. Vineet Loomba (IIT Roorkee)

1. Answer (3)

   Motion is uniformly accelerated so path cannot be circle

2. Answer (3)

3. Answer (2)

   Current $I = qf = \frac{qv}{2\pi r}$

   $$B = \frac{\mu_0 I}{2r} = \frac{\mu_0 qv}{4\pi r^2}$$

4. Answer (1)

5. Answer (3)

   $p_{av} = I_v^2 R = 2^2 \times 10 = 40\,\text{W}$

6. Answer (1)

   $MP = m_0 \times m_e$

7. Answer (3)

8. Answer (1)

9. Answer (2)

   $$\lambda = \frac{\lambda_1 \lambda_2}{\lambda_1 + \lambda_2}$$

10. Answer (1)

11. Answer (2)

12. Answer (1)

13. Answer (3)

    $$Av = \beta \frac{R_L}{R_i}$$

14. Answer (4)

15. Answer (4)

    $$\frac{P_2}{P_1} = \left(\frac{V_2}{V_1}\right)^2$$

16. Answer (3)

    $$E = \frac{1}{2}CV^2 = \frac{1}{2} \times 50 \times 10^{-6} \times 10^2 = 25 \times 10^{-4}\,\text{J}$$

17. Answer (1)

18. Answer (4)

19. Answer (1)

20. Answer (1)

21. Answer (1)

22. Answer (1)

23. Answer (3)

24. Answer (2)

    $$y_n = \frac{n\lambda D}{d}$$

    $$\frac{(4 \times 2 - 1)}{2} \frac{\lambda D}{d} = \frac{7\lambda D'}{d}$$

    $$D' = \frac{D}{2}$$

    $$vt = \frac{D}{2}$$

    $$t = \frac{D}{2v}$$

25. Answer (2)

    $$i = -\frac{dq}{dt} = 5$$

    From conservation of energy

    $$\frac{q_{\max}^2}{2C} = \frac{q^2}{2C} + \frac{1}{2}Li^2$$

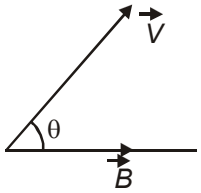
    $$g_{\max} = \sqrt{g^2 + LCi^2}$$

    $$= \sqrt{(10)^2 + 5 \times 1 \times (5)^2}$$

    $$= \sqrt{225}$$

    = 15 C

26. Answer (4)

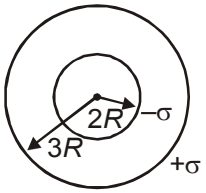
    

    Here $\theta = 45°$

    $$P = \frac{2\pi mv \cos\theta}{qB_0}$$

    $$= \frac{\sqrt{2}\,\pi mv}{qB_0}$$

27. Answer (1)

    $q_1 = -\sigma 4\pi (2R)^2$

    $q_2 = +\sigma\, 4\pi (3R)^2$

    $Q = q_1 + q_2$

$= 36\pi\sigma R^2 - 16\pi\sigma R^2$

$= 20\pi\sigma R^3$

$$v = \frac{1}{4\pi\varepsilon_0} = \frac{20\pi\sigma R^2}{3R} = \frac{5\sigma R}{3\varepsilon_0}$$

28. Answer (2)

29. Answer (4)

$$\frac{1}{f_1} = \left(\frac{\mu_2}{\mu_1} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

$$= \left(\frac{1.5}{\mu} - 1\right)\left(-\frac{1}{R} - \frac{1}{R}\right)$$

$$= \left(\frac{1.5}{\mu} - 1\right)\left(-\frac{2}{R}\right)$$

$$\frac{1}{f_2} = \left(\frac{\mu_2}{\mu_1} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

$$= \left(\frac{1.5}{1} - 1\right)\left(-\frac{1}{R} - \frac{1}{\infty}\right)$$

$$\frac{1}{f_2} = 0.5\left(-\frac{1}{R}\right)$$

$$\frac{1}{f_1} = \frac{1}{f_2}$$

$$\left(\frac{1.5}{\mu} - 1\right)\left(+\frac{2}{R}\right) = (0.5)\left(+\frac{1}{R}\right)$$

$$\frac{1.5}{\mu} = 1 + \frac{1}{4}$$

$$\frac{1.5}{\mu} = \frac{5}{4}$$

$$\mu = \frac{1.5 \times 4}{5}$$

30. Answer (3)

31. Answer (2)

Distance = $\sqrt{\frac{a^2}{4} + \frac{a^2}{4}} = \frac{a}{\sqrt{2}}$

32. Answer (4)

33. Answer (1)

H^+ & OH^- have exceptionally high ionic mobility.

34. Answer (2)

35. Answer (3)

36. Answer (4)

37. Answer (1)

Fact.

38. Answer (4)

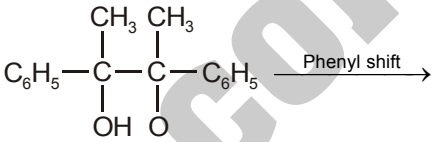
39. Answer (4)

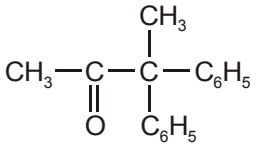
Stability of oxidation state depend on reduction potential.

40. Answer (2)

41. Answer (4)

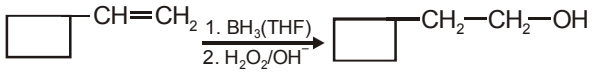
42. Answer (1)





43. Answer (1)

44. Answer (2)



45. Answer (4)

46. Answer (2)

47. Answer (2)

48. Answer (4)

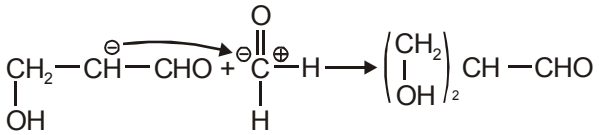
49. Answer (2)

50. Answer (3)

51. Answer (1)

52. Answer (1)

53. Answer (1)



54. Answer (1)

55. Answer (3)

56. Answer (2)

$$\log\frac{k_2}{k_1}=\frac{E_a}{2.303\times 2}\left[\frac{400-300}{120000}\right]$$

$$\frac{7\times 2.303\times 2\times 120000}{100\times 10}=E_a$$

$E_a = 14 \times 120 \times 2.303$

$= 1680 \times 2.303 = 3.86$ kcal

57. Answer (1)

58. Answer (2)

59. Answer (3)

Fact

60. Answer (4)

61. Answer (2)

62. Answer (1)

$$\lim_{x\to 0}\left(\frac{7}{2+\sqrt{25+x}}\right)^{\frac{1}{\sin x}}$$

$$=e^{\lim_{x\to 0}\frac{1}{\sin x}\left(\frac{7}{2+\sqrt{25+x}}-1\right)}$$

$$=e^{\lim_{x\to 0}\frac{1}{\sin x}\left(\frac{5-\sqrt{25+x}}{2+\sqrt{25+x}}\right)}$$

$$=e^{\lim_{x\to 0}\frac{25-25-x}{\sin x\left(2+\sqrt{25+x}\right)\left(5+\sqrt{25+x}\right)}}$$

$$=e^{\frac{-1}{70}}$$

63. Answer (2)

64. Answer (3)

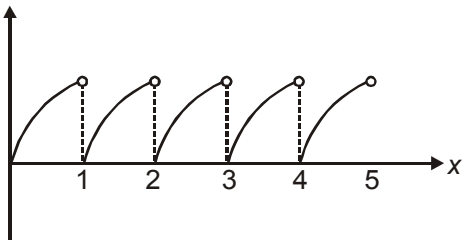
We have,

$$x^2dx - xdx + \left(\frac{1+y^2}{y}\right)dy = 0$$

$$\Rightarrow \frac{x^3}{3}-\frac{x^2}{2}+\ln y+\frac{y^2}{2}+C=0$$

65. Answer (4)

$y = \{\sin\{x\}\}$



66. Answer (3)

$g(x) = f(x) + f(1 - x)$

$g'(x) = f'(x) - f'(1 - x)$

for $g(x)$ to be increasing,

$x > 1 - x$

$2x > 1$

$$x > \frac{1}{2}$$

67. Answer (2)

Equation of plane passing through line of intersection

$2x - 3y + z - 4 + \lambda(x - y + z + 1) = 0$

$x(2 + \lambda) + y(-3 - \lambda) + z(1 + \lambda) - 4 + \lambda = 0$ ...(i)

(i) is perpendicular to $x + 2y - 3z + 6 = 0$

$\therefore (2 + \lambda) + 2(-3 - \lambda) - 3(1 + \lambda) = 0$

$-4\lambda - 7 = 0$

$$\lambda = \frac{-7}{4}$$

Required equation of plane is

$x - 5y - 3z - 23 = 0$

68. Answer (1)

69. Answer (4)

Let p be the probability of coming no. then

$3p + 6p = 1$

$$p = \frac{1}{9}$$

Probability of coming any even no. = $\frac{2}{9}$

Probability of coming any odd no. = $\frac{1}{9}$

Probability of success = $\frac{5}{9}$

Probability of not success = $\frac{4}{9}$

Required probability = $^6C_3\left(\frac{5}{9}\right)^3\left(\frac{4}{9}\right)^3$

70. Answer (3)

$$\int_{\cos x}^{1} t^2 f(t)dt = 1+\cos x$$

$-\cos^2 x \cdot f(\cos x)\cdot(-\sin x) = -\sin x$

$-\cos^2 x \cdot f(\cos x) = 1$

$$f(\cos x) = \frac{-1}{\cos^2 x}$$

$$f\left(\frac{1}{4}\right) = -16$$

71. Answer (1)
72. Answer (3)
73. Answer (4)
74. Answer (2)
75. Answer (4)
76. Answer (1)
77. Answer (2)
78. Answer (3)
79. Answer (3)
80. Answer (2)
81. Answer (1)
82. Answer (1)

$x = a(t + \sin t), \quad y = a(1 - \cos t)$

$$\frac{dx}{dt} = a(1+\cos t), \quad \frac{dy}{dt} = a\sin t,$$

$$\frac{dy}{dx} = \frac{\sin t}{1+\cos t} = \frac{2\sin\frac{t}{2}\cdot\cos\frac{t}{2}}{2\cos^2\frac{t}{2}} = \tan\frac{t}{2}$$

Length of subtangent $= \dfrac{a(1-\cos t)}{\tan\frac{t}{2}}$

$$= \frac{a\cdot 2\sin^2\frac{t}{2}\cdot\cos\frac{t}{2}}{\sin\frac{t}{2}}$$

$= a\sin t$

83. Answer (4)

Length of subnormal $= y\cdot\dfrac{dy}{dx}$

$$= \tan\frac{t}{2}\cdot a(1-\cos t)$$

$$= a\tan\frac{t}{2}\cdot(1-\cos t)$$

84. Answer (4)

$$y = 3e^{\frac{x}{2}}$$

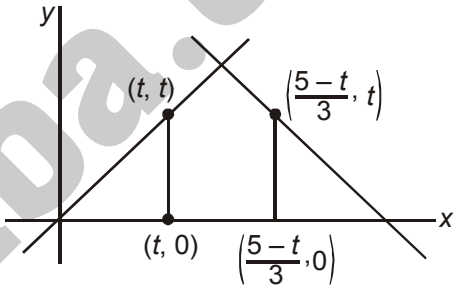
$$\frac{dy}{dx} = \frac{3}{2}e^{\frac{x}{2}}$$

Length of sub-normal $= 3e^{\frac{x}{2}}\cdot\dfrac{3}{2}e^{\frac{x}{2}}$

$$= \frac{9}{2}e^x$$

$$= \frac{9}{2}\cdot e^0 = \frac{9}{2}$$

85. Answer (3)
86. Answer (2)
87. Answer (3)
88. Answer (1)
89. Answer (2)



Area $= \dfrac{5-4t}{3}\cdot t$

$$\frac{dA}{dt} = 0$$

$$t = \frac{5}{8}$$

$$\frac{d^2A}{dt^2} < 0$$

Now, $\text{area}_{max} = \dfrac{5-4\cdot\frac{5}{8}}{3}\cdot\dfrac{5}{8}$

$$= \frac{5}{6}\times\frac{5}{8}$$

$$= \frac{25}{48}$$

90. Answer (4)