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IN JEE MAIN AND ADVANCED

Solutions All India Test Series

Test-4

PHYSICS

1. (3)
2. (2)
3. (1)
4. (2)
5. (4)
6. (2)
7. (1)
8. (2)
9. (1)
10. (2)
11. (1)
12. (3)
13. (2)
14. (4)
15. (1)
16. (2)
17. (1)
18. (2)
19. (3)
20. (2)
21. (4)
22. (2)
23. (2)
24. (2)
25. (1)
26. (2)
27. (3)
28. (2)
29. (2)
30. (4)

CHEMISTRY

31. (4)
32. (3)
33. (1)
34. (1)
35. (4)
36. (2)
37. (4)
38. (1)
39. (3)
40. (4)
41. (1)
42. (3)
43. (4)
44. (1)
45. (3)
46. (1)
47. (3)
48. (3)
49. (2)
50. (2)
51. (4)
52. (1)
53. (3)
54. (3)
55. (4)
56. (1)
57. (1)
58. (4)
59. (2)
60. (2)

MATHEMATICS

61. (3)
62. (4)
63. (3)
64. (1)
65. (3)
66. (1)
67. (3)
68. (3)
69. (2)
70. (1)
71. (2)
72. (2)
73. (3)
74. (1)
75. (2)
76. (3)
77. (3)
78. (2)
79. (3)
80. (4)
81. (2)
82. (1)
83. (2)
84. (3)
85. (1)
86. (4)
87. (1)
88. (2)
89. (1)
90. (3)

1. Answer (3)

2. Answer (2)

$$\therefore T \cos \theta = 2mg \sin \theta$$

$$T = 2mg \frac{\sin \theta}{\cos \theta}$$

$$2mg \cos \theta + 2mg \frac{\sin^2 \theta}{\cos \theta} = Mg$$

$$\frac{2mg}{\cos \theta} = Mg$$

$$\therefore \frac{2m}{M} = \cos \theta$$

$$\frac{2m}{M} \leq 1 \Rightarrow M \geq 2m$$

3. Answer (1)

4. Answer (2)

5. Answer (4)

6. Answer (2)

7. Answer (1)

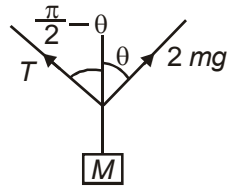
8. Answer (2)

9. Answer (1)

10. Answer (2)

11. Answer (1)

12. Answer (3)



13. Answer (2)

14. Answer (4)

15. Answer (1)

16. Answer (2)

17. Answer (1)

18. Answer (2)

19. Answer (3)

20. Answer (2)

21. Answer (4)

22. Answer (2)

23. Answer (2)

24. Answer (2)

25. Answer (1)

$$T_B = \frac{3mg}{2} \quad T_A = \frac{5mg}{4}$$

$$\therefore \frac{T_B}{T_A} = \frac{\frac{3}{2}}{\frac{5}{4}} = \frac{6}{5}$$

26. Answer (2)


27. Answer (3)

28. Answer (2)

29. Answer (2)

30. Answer (4)

CHEMISTRY

31. Answer (4)
32. Answer (3)
33. Answer (1)
[OH⁻] are decreased
34. Answer (1)
[PBr₄]⁺Br⁻
35. Answer (4)
36. Answer (2)
nb becomes negligible.
37. Answer (4)
Fact
38. Answer (1)
39. Answer (3)
Hoffman elimination.
40. Answer (4)
Maximum α hydrogen.
41. Answer (1)
 is aromatic.
42. Answer (3)
 $r \propto \frac{n^2}{z}$
43. Answer (4)
44. Answer (1)
45. Answer (3)
46. Answer (1)
47. Answer (3)
Both are aromatic.
48. Answer (3)
 $\Delta G = 0$ (at Equilibrium)
49. Answer (2)
50. Answer (2)
Fact.
51. Answer (4)
SiO₂ is less acidic.
52. Answer (1)
53. Answer (3)
54. Answer (3)
55. Answer (4)
56. Answer (1)
 $N_1V_1 = N_2V_2$
57. Answer (1)
Diel's Alder reaction.
58. Answer (4)
59. Answer (2)
Most stable radical is formed.
60. Answer (2)

61. Answer (3)

$$\sin^2 x - 4\sin x + 3 = 0$$

$$\Rightarrow (\sin x - 1)(\sin x - 3) = 0$$

$$\sin x = 1, \sin x = 3 \text{ (not possible)}$$

$$\Rightarrow x = \frac{\pi}{2}, \frac{5\pi}{2}$$

Hence only two solutions exist.

62. Answer (4)

$$\text{Number of reflexive relation is } {}^6C_0 + {}^6C_1 + {}^6C_2 + {}^6C_3 + {}^6C_4 + {}^6C_5 + {}^6C_6 = 2^6 = 64$$

63. Answer (3)

$$|z_1 + z_2| = 3, |z_1| = 1 \Rightarrow z_1 \bar{z}_1 = 1 \text{ and } z_2 \bar{z}_2 = 16$$

$$\Rightarrow |\bar{z}_1 + \bar{z}_2| = 3$$

$$\Rightarrow \left| \frac{1}{z_1} + \frac{16}{z_2} \right| = 3$$

$$\Rightarrow |z_2 + 16z_1| = 3|z_1||z_2| = 3 \times 1 \times 4 = 12$$

64. Answer (1)

$$\text{Let } f(x) = ax^2 + bx + c$$

$$\text{Since } f(-1) = a - b + c > 0 \text{ hence } f(1) > 0$$

$$\Rightarrow a + b + c > 0$$

65. Answer (3)

$$\text{Sum of coefficients} = (5 + 3 - 8)^{30} = 0$$

66. Answer (1)

Using A.M. \geq G.M.

$$\frac{x^4 + \frac{1}{x} + \frac{1}{x} + \frac{1}{x} + \frac{1}{x}}{5} \geq \left(x^4 \cdot \frac{1}{x} \cdot \frac{1}{x} \cdot \frac{1}{x} \cdot \frac{1}{x} \right)^{1/5}$$

$$\Rightarrow x^4 + \frac{4}{x} \geq 5$$

67. Answer (3)

$$\text{The lines are } x + y + 4 = 0 \text{ and } x + y - 4 = 0.$$

For (α, α) to lie in between the lines, we must have

$$(\alpha + \alpha + 4)(\alpha + \alpha - 4) < 0$$

$$\Rightarrow (\alpha + 2)(\alpha - 2) < 0$$

$$\Rightarrow -2 < \alpha < 2$$

68. Answer (3)

Period of $|\sin x|$, $|\cos x|$, $\cos(\cos x)$ is π . Hence period of $f(x)$ is π .

69. Answer (2)

$$-5 \leq 2k \leq 5$$

$$-\frac{5}{2} \leq k \leq \frac{5}{2}$$

Integral value of $k = -2, -1, 0, 1, 2$

non-negative integral value = 0, 1, 2

70. Answer (1)

The domain of $\sin^{-1}x$ is $[-1, 1]$

$$x^2 - 2x + 2 = (x-1)^2 + 1 \geq 1$$

Hence for solution $x = 1$

$$\Rightarrow k \times 1 + \sin^{-1}1 + \cos^{-1}1 = \pi \Rightarrow k = \frac{\pi}{2}$$

71. Answer (2)

72. Answer (2)

73. Answer (3)

74. Answer (1)

75. Answer (2)

76. Answer (3)

77. Answer (3)

Statement-2 is false because for x-axis and y-axis $m_1 m_2 = 0 \times \infty \neq -1$.

78. Answer (2)

Statement 1 and Statement 2 both are true.

79. Answer (3)

Statement 2 is false because if the circles are concentric or one circle is completely inside the other then circles do not have a common tangent.

80. Answer (4)

Statement 1 is false, because if $a = 0$, then $y^2 = 4ax$ will not be a parabola.

81. Answer (2)

$$a^2 = 9 \Rightarrow a = 3$$

$$b^2 = 4 \Rightarrow b = 2$$

$$\text{Area} = 4ab = 4 \times 3 \times 2 = 24$$

Hence statement 1 is true.

$$\text{Statement 2 : } xy + x + y = 0 \Rightarrow (x+1)(y+1) = 1$$

which is a rectangular hyperbola, hence its eccentricity is $\sqrt{2}$.**Solutions for Q.Nos. 82 to 84**

The given curve can be written as

$$\frac{(x-1)^2}{2} + \frac{(y-1)^2}{1} = 1.$$

82. Answer (1)

Locus will be director circle that is given by $(x-1)^2$

$$+ (y - 1)^2 = 2 + 1 = 3.$$

$$\Rightarrow x^2 + y^2 - 2x - 2y - 1 = 0$$

83. Answer (2)

The product of perpendiculars = The square of semi minor axis = 1.

84. Answer (3)

The parametric equation can be written as

$$x = 1 + \sqrt{2} \cos \theta$$

$$y = 1 + \sin \theta$$

$$x + y = 2 + \sqrt{2} \cos \theta + \sin \theta$$

Maximum value of $x + y$ is $2 + \sqrt{3}$

85. Answer (1)

86. Answer (4)

87. Answer (1)

88. Answer (2)

89. Answer (1)

90. Answer (3)

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