

HSSC MOCK TEST - 187 (SOLUTION)

1. (B) $P(n, r) = 840$

$$\Rightarrow \frac{n!}{(n-r)!} = 840 \quad \dots(i)$$

and $C(n, r) = 35$

$$\Rightarrow \frac{n!}{r!(n-r)!} = 35 \quad \dots(ii)$$

from eq(i) and eq(ii)

$$r! = \frac{840}{35} \Rightarrow r! = 24$$

$$\Rightarrow r! = 4! \Rightarrow r = 4$$

from eq(i)

$$\frac{n!}{(n-4)!} = 7 \times 6 \times 5 \times 4 \Rightarrow n = 7$$

Now, $C(n+2, r+2) \Rightarrow C(7+2, 4+2)$

$$\Rightarrow {}^9C_6 = \frac{9!}{6!3!} = 84$$

2. (C) No. of diagonals of a septagon

$$= \frac{7 \times (7-3)}{2} = 7 \times 2 = 14$$

3. (D) **Statement I :-**

$$1^\circ = 1 \times \frac{\pi}{180} = \frac{22}{7 \times 180} = 0.017 \text{ radian}$$

Statement I is incorrect.

Statement II :-

$$1 \text{ radian} = 1 \times \frac{180}{\pi} = \frac{180 \times 7}{22} = 57.27^\circ$$

4. (B) In the expansion of $\left(x^3 - \frac{1}{2x^2}\right)^7$

$$T_{r+1} = {}^7C_r (x^3)^{7-r} \left(\frac{-1}{2x^2}\right)^r$$

$$= {}^7C_r \left(\frac{-1}{2}\right)^r x^{21-5r}$$

Now, $21 - 5r = 1 \Rightarrow 5r = 20 \Rightarrow r = 4$

Coefficient of $x = {}^7C_4 \left(\frac{-1}{2}\right)^4$

$$= 35 \times \frac{1}{16} = \frac{35}{16}$$

5. (D) No. of two-digit numbers = $4 \times 4 = 16$

No. of three-digit number = $4 \times 4 \times 3 = 48$

The required numbers = $16 + 48 = 64$

6. (B) $A - (A \cap C) + (A \cap B \cap C)$

7. (B) The ellipse equation $9x^2 + 5y^2 - 30y = 0$

$$\Rightarrow 9x^2 + 5(y-3)^2 = 45$$

$$\Rightarrow \frac{x^2}{5} + \frac{(y-3)^2}{9} = 1$$

Hence $a^2 = 5$, $b^2 = 9$ then eccentricity is

given as $a^2 = b^2(1 - e^2)$

$$\Rightarrow \frac{5}{9} = 1 - e^2 \Rightarrow e^2 = 1 - \frac{5}{9} = \frac{4}{9}$$

$$\Rightarrow e = \frac{2}{3}$$

8. (A) The required probability

$$= \frac{{}^6C_2 \times {}^4C_1 \times {}^5C_0 + {}^6C_2 \times {}^4C_0 \times {}^5C_1}{{}^{15}C_3}$$

$$= \frac{15 \times 4 \times 1 + 15 \times 1 \times 5}{5 \times 7 \times 13} = \frac{(15 \times 9)}{(5 \times 7 \times 13)} = \frac{27}{91}$$

9. (A) $(\sqrt{2} + 1)^6 + (\sqrt{2} - 1)^6 = (1 + \sqrt{2})^6 + (1 - \sqrt{2})^6$

$$= 2[1 + {}^6C_2(\sqrt{2})^2 + {}^6C_4(\sqrt{2})^4 + {}^6C_6(\sqrt{2})^6]$$

$$= 2[1 + 30 + 60 + 8] = 2 \times 99 = 198$$

10. (B) In the expansion of $(1+x)^{18}$

The coefficient of $(2r+4)^{\text{th}}$ term = ${}^{18}C_{2r+4}$

The coefficient of $(r-2)^{\text{th}}$ term = ${}^{18}C_{r-3}$

Now, ${}^{18}C_{r-3} = {}^{18}C_{2r+3}$

$$\Rightarrow r-3 = 18 - (2r+3)$$

$$\Rightarrow r-3 = 15 - 2r$$

$$\Rightarrow 3r = 18 \Rightarrow r = 6$$

11. (C) "PATALIPUTRA"

In this "AAAIU" can be arranged in $\frac{5!}{3!} = 20$ ways.

"PPTTLR" can be arranged in $\frac{6!}{2!2!} = 180$ ways.

required number of ways = $20 \times 80 = 3600$ ways

12. (C) $y = x^2 - e^x$
 On differentiating both side w.r.t 'x'
 $\Rightarrow \frac{dy}{dx} = 2x - e^x$
 $\Rightarrow \frac{dx}{dy} = \frac{1}{2x - e^x} \dots(i)$
 On differentiating both w.r.t. 'y'
 $\Rightarrow \frac{d^2x}{dy^2} = (-1)(2x - e^x)^{-2} \cdot (2 - e^x) \cdot \frac{dx}{dy}$
 $\Rightarrow \frac{d^2x}{dy^2} = \frac{-1}{(2x - e^x)^2} (2 - e^x) \times \frac{1}{(2x - e^x)}$
 $\Rightarrow \frac{d^2x}{dy^2} = \frac{e^x - 2}{(2x - e^x)^3}$

13. (B) Vectors $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$ and $\vec{b} = 3\hat{i} + \hat{j} + 2\hat{k}$
 $\cos\theta = \frac{1 \times 3 - 2 \times 1 + 3 \times (2)}{\sqrt{(1)^2 + (-2)^2 + (3)^2} \sqrt{(3)^2 + (1)^2 + (2)^2}}$
 $\cos\theta = \frac{7}{\sqrt{14}\sqrt{14}} = \frac{1}{2}$

Hence $\sin\theta = \frac{\sqrt{3}}{4}$

14. (B) two parameters
 15. (A)
 70. (C) Plumbline is used by Manson for determining the vertical on an upright surface. While **scalpel** is used by surgeon for **surgery**.
 71. (A) $\begin{array}{ccc} \text{BFL} & \text{IMS} & \text{NRI} & \text{UYP} \\ & \underbrace{\hspace{1cm}}_{+7} & & \underbrace{\hspace{1cm}}_{+7} \end{array}$
 72. (C)
 73. (D) $\begin{array}{ccc} \text{D} & \text{I} & \text{H} & & \text{G} & \text{E} & \text{I} \\ \downarrow & \uparrow & \uparrow & & \downarrow & \uparrow & \uparrow \\ +5 & -1 & & & -2 & +4 & \end{array}$
 $\begin{array}{ccc} \text{L} & \text{K} & \text{O} & & \text{F} & \text{G} & \text{I} \\ \downarrow & \uparrow & \uparrow & & \downarrow & \uparrow & \uparrow \\ -1 & +4 & & & +1 & +2 & \end{array}$
 74. (C) $5 + 6 = 11, 11 + 6 = 17, 17 + 11 = 28$
 $28 + 17 = 45, 28 + 45 = 73, 73 + 45 = 118$
 75. (B) As, $9 + 4 + 6 - (5 + 3) = 11$
 and, $8 + 6 + 4 - (4 + 2) = 12$
 Similarly,
 $5 + 4 + 5 - (2 + 3) = 9$
 76. (C)
 77. (C) $\begin{array}{ccccccccc} & | & & | & & | & & | & & | \\ \text{T} & \text{S} & \text{U} & \text{R} & \text{P} & \text{Q} & & & & \end{array}$

HSSC MOCK TEST - 187 (ANSWER KEY)

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

Note:- If your opinion differs regarding any answer, please message the mock test and question number to 8860330003

Note:- Whatsapp with Mock Test No. and Question No. at 7053606571 for any of the doubts. Join the group and you may also share your suggestions and experience of Sunday Mock Test.

Note:- If you face any problem regarding result or marks scored, please contact 9313111777