

HSSC MOCK TEST - 173 (SOLUTION)

1. (D) $\sin\left(\frac{A+B}{2}\right) \cdot \sin\left(\frac{B+C}{2}\right) \cdot \sin\left(\frac{C+A}{2}\right)$

$$\Rightarrow \sin\left(\frac{180-C}{2}\right) \cdot \sin\left(\frac{180-A}{2}\right) \cdot \sin\left(\frac{180-B}{2}\right)$$

$$\Rightarrow \cos\frac{C}{2} \cdot \cos\frac{A}{2} \cdot \cos\frac{B}{2}$$

$$\Rightarrow \frac{1}{2} \times 2 \cos\frac{C}{2} \cdot \cos\frac{A}{2} \cdot \cos\frac{B}{2}$$

$$\Rightarrow \frac{1}{2} \left[\cos\left(\frac{C+A}{2}\right) + \cos\left(\frac{C-A}{2}\right) \right] \cdot \cos\frac{B}{2}$$

$$\Rightarrow \frac{1}{2} \left[\cos\left(\frac{180-B}{2}\right) + \cos\left(\frac{C-A}{2}\right) \right] \cdot \cos\frac{B}{2}$$

$$\Rightarrow \frac{1}{2} \left[\sin\frac{B}{2} + \cos\frac{C-A}{2} \right] \cos\frac{B}{2}$$

$$\Rightarrow \frac{1}{2} \cdot \sin\frac{B}{2} \cdot \cos\frac{B}{2} + \frac{1}{2} \sin\frac{C+A}{2} \cdot \cos\frac{C-A}{2}$$

$$\Rightarrow \frac{1}{2} \times \frac{1}{2} \times 2 \sin\frac{B}{2} \cdot \cos\frac{B}{2} + \frac{1}{2} \times \frac{1}{2}$$

$$\times \left[2 \sin\frac{C+A}{2} \cdot \cos\frac{C-A}{2} \right]$$

$$\Rightarrow \frac{1}{4} \sin B + \frac{1}{4}$$

$$\left[\sin\left(\frac{C+A}{2} + \frac{C-A}{2}\right) + \sin\left(\frac{C+A}{2} - \frac{C-A}{2}\right) \right]$$

$$\Rightarrow \frac{1}{4} \sin B + \frac{1}{4} [\sin C + \sin A]$$

$$\Rightarrow \frac{1}{4} [\sin A + \sin B + \sin C]$$

2. (B) Given that $byx = \frac{-16}{9}$ and $bxy = \frac{-25}{36}$

Now, $r = \sqrt{bxy \times byx}$

$$\Rightarrow r = \sqrt{\left(\frac{-25}{36}\right) \times \left(\frac{-16}{9}\right)}$$

$$\Rightarrow r = -\frac{5}{6} \times \frac{4}{9} = -\frac{10}{27}$$

3. (A) Given that $\vec{a} = 3\hat{i} + \hat{j} + 5\hat{k}$, $\vec{b} = -\hat{i} + \hat{j} - 2\hat{k}$, $\vec{c} = \hat{i} - \hat{j} - 3\hat{k}$

Now, $\vec{a} \times (\vec{b} + \vec{c}) + \vec{b} \times (\vec{c} + \vec{a}) + \vec{c} \times (\vec{a} + \vec{b})$

$$\Rightarrow \vec{a} \times \vec{b} + \vec{a} \times \vec{c} + \vec{b} \times \vec{c} + \vec{b} \times \vec{a} + \vec{c} \times \vec{a} + \vec{c} \times \vec{b}$$

$$\Rightarrow \vec{a} \times \vec{b} - \vec{c} \times \vec{a} + \vec{b} \times \vec{c} - \vec{a} \times \vec{b} + \vec{c} \times \vec{a} - \vec{b} \times \vec{c} = 0$$

4. (C) Data 42, 44, 46 + 43 + 44 + 48 + 51 + 50

$$\text{Mean} = \frac{42 + 44 + 46 + 43 + 44 + 48 + 51 + 50}{8}$$

$$\text{Mean} = \frac{368}{8} = 46$$

$$\sum |x - \bar{x}| = |42 - 46| + |44 - 46| + |46 - 46| + |43 - 46| + |44 - 46| + |48 - 46| + |51 - 46| + |50 - 46|$$

$$\sum |x - \bar{x}| = 4 + 2 + 0 + 3 + 2 + 2 + 5 + 4 = 22$$

$$\text{Mean-deviation} = \frac{\sum |x - \bar{x}|}{n} = \frac{22}{8} = 2.75$$

5. (A) Digits are 1, 2, 3, 5, 7, 8, 9.

$$n(S) = {}^7C_3 = 35$$

$$E = \{(1, 2, 8), (1, 3, 7), (1, 3, 9), (1, 5, 9), (1, 7, 9), (2, 3, 8), (2, 7, 8), (2, 8, 9), (3, 5, 9), (3, 7, 9)\}$$

$$n(E) = 10$$

$$\text{The required Probability} = \frac{n(E)}{n(S)} = \frac{10}{35} = \frac{2}{7}$$

6. (C) In a leap year = 366 days
= 52 weeks and 2 days

$$\text{The required Probability} = \frac{2}{7}$$

7. (B)
$$\begin{array}{r} 10x011 \\ - 1y101 \\ \hline 11z0 \end{array}$$

$$x = 1, y = 1, z = 1$$

8. (B) Given that $\theta_1 = 75^\circ$, $\theta_2 = 105^\circ$
We know that

$$\theta = \frac{s}{r}$$

When arc 's' is same, then

$$\theta \propto \frac{1}{r}$$

A.T.Q,

- $\frac{\theta_1}{\theta_2} = \frac{r_2}{r_1}$
 $\Rightarrow \frac{75}{105} = \frac{r_2}{r_1}$
 $\Rightarrow \frac{5}{7} = \frac{r_2}{r_1}$
 Hence $r_1 : r_2 = 7 : 5$
9. (C) $S = 0.2 + 0.22 + 0.222 + \dots$
 $S = 2(0.1 + 0.11 + 0.111 + \dots)$
 $S = \frac{2}{9}(0.9 + 0.99 + 0.999 + \dots)$
 $S = \frac{2}{9} \left[\left(1 - \frac{1}{10}\right) + \left(1 - \frac{1}{100}\right) + \left(1 - \frac{1}{1000}\right) + \dots \right]$
 $S = \frac{2}{9} \left[(1 + \dots 8 \text{ terms}) - \left(\frac{1}{10} + \frac{1}{100} + \frac{1}{1000} + \dots 8 \text{ terms}\right) \right]$
 $S = \frac{2}{9} \left[8 - \frac{1 - \left(\frac{1}{10}\right)^8}{1 - \frac{1}{10}} \right]$
 $S = \frac{2}{9} \left[8 - \frac{1}{9} \left(1 - \frac{1}{10^8}\right) \right]$
10. (D) The required equation
 $\frac{x}{-2} + \frac{y}{4} = 1$
 $\Rightarrow 2x - y + 4 = 0$
11. (D) $A = \{1, 3, 5\}$, $B = \{2, 4, 6\}$, $C = \{4, 6, 8\}$
 $B \cap C = \{4, 6\}$
 No. of elements in $A = 3$
 No. of elements in $(B \cap C) = 2$
 Hence No. of elements in $A \times (B \cap C) = 3 \times 2 = 6$

12. (B) Word "SITUATION"
 No. of permutations = $\frac{9!}{2!2!} = \frac{9!}{4}$
13. (C) $A = \begin{bmatrix} -1 & 2 \\ -4 & 6 \end{bmatrix}$
 $|A| = -6 + 8 = 2$
 Given that
 $A^{-1} = k.(adjA)$
 $\Rightarrow \frac{adjA}{|A|} = k.(AdjA) \quad \left(\because A^{-1} = \frac{adjA}{|A|} \right)$
 $\Rightarrow \frac{1}{|A|} = k \Rightarrow k = \frac{1}{2}$
71. (B) As, $\frac{64}{(6+4) \times 4}$ $\frac{40}{(6+4) \times 4}$
 Similarly, $\frac{56}{(5+6) \times 4}$ $\frac{44}{(5+6) \times 4}$
72. (D) As, SURE $\xrightarrow{4 \times 3 + 3} 15$
 Similarly, SCHOOL $\xrightarrow{6 \times 3 + 3} 21$
73. (C) Except **492765831**, all others are written with the help of 8 digits.
74. (D) Except **PHRASE**, in all others vowel A used two times.
75. (A)
76. (D) After changing the signs,
 $36 \times 6 \div 3 + 5 - 3 = 74$
 $\Rightarrow 72 + 5 - 3 = 74$
 $\Rightarrow 74 = 74$
77. (A) $\frac{2}{\times 2 \times 3}$, $\frac{7}{\times 3 - 4}$, $\frac{17}{\times 4 + 5}$, $\frac{73}{\times 5 - 6}$, $\frac{359}{\times 6 + 7}$, **2161**
78. (D) $\frac{2}{\times 1 + 1^2}$, $\frac{3}{\times 2 + 2^2}$, $\frac{10}{\times 3 + 3^2}$, $\frac{39}{\times 4 + 4^2}$, $\frac{172}{\times 5 + 5^2}$, **885**

HSSC MOCK TEST - 173 (ANSWER KEY)

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