HSSC MOCK TEST – 184 (SOLUTION)

1. (D) Given that, $\tan A = x+1$ and $\tan B = x-1$

Now, $x^2 \tan(A-B) \Rightarrow x^2\left(\frac{\tan A - \tan B}{1+\tan A.\tan B}\right)$

$\Rightarrow x^2\left\{\frac{(x+1)-(x-1)}{1+(x+1).(x-1)}\right\}$

$\Rightarrow x^2\left\{\frac{2}{1+x^2-1}\right\} \Rightarrow x^2.\frac{2}{x^2} = 2$

2. (A) $a\cos A = b\cos B$
$\Rightarrow K \sin A \cos A = K \sin B \cos B$
$\Rightarrow 2\sin A\cos A = 2\sin B\cos B$
$\Rightarrow \sin 2A - \sin 2B = 0$
$\Rightarrow 2\cos(A+B)\sin(A-B) = 0$
$\Rightarrow \cos(A+B) = 0$ or $\sin(A-B) = 0$
$\Rightarrow A+B = 90°$ or $A-B = 0°$
$\Rightarrow \angle C = 90°$ or $A = B$
$\Rightarrow \Delta ABC$ is either right angled or isosceles.

3. (D) Given that equations
$x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$
have real roots.
$\therefore k^2 \geq 4 \times 64 \quad [\because B^2 - 4AC \geq 0]$
$\Rightarrow k^2 \geq 16 \quad \ldots(i)$
and $64 \geq 4k \Rightarrow k \leq 16 \quad \ldots(ii)$
From eq(i) and (ii),
$k = 16$

4. (B) Given $A = \begin{bmatrix}1 & 2\\ 1 & 1\end{bmatrix}$ and $B = \begin{bmatrix}0 & -1\\ 1 & 2\end{bmatrix}$

Here, $|A| = \begin{vmatrix}1 & 2\\ 1 & 1\end{vmatrix} = 1-2 = -1$

$\text{adj}(A) = \begin{bmatrix}1 & -1\\ -2 & 1\end{bmatrix}^T = \begin{bmatrix}1 & -2\\ -1 & 1\end{bmatrix}$

$\therefore A^{-1} = \frac{adj(A)}{|A|} = -1\begin{bmatrix}1 & -2\\ -1 & 1\end{bmatrix} = \begin{bmatrix}-1 & 2\\ 1 & -1\end{bmatrix}$

Here, $|B| = \begin{vmatrix}0 & -1\\ 1 & 2\end{vmatrix} = 0-(-1) = 1$

$\text{adj}(B) = \begin{bmatrix}2 & -1\\ 1 & 0\end{bmatrix}^T = \begin{bmatrix}2 & 1\\ -1 & 0\end{bmatrix}$

$\therefore B^{-1} = \frac{adj(B)}{|B|} = 1.\begin{bmatrix}2 & 1\\ -1 & 0\end{bmatrix} \Rightarrow B^{-1} = \begin{bmatrix}2 & 1\\ -1 & 0\end{bmatrix}$

$\therefore B^{-1}A^{-1} = \begin{bmatrix}2 & 1\\ -1 & 0\end{bmatrix}\begin{bmatrix}-1 & 2\\ 1 & -1\end{bmatrix}$

$= \begin{bmatrix}-2+1 & 4-1\\ 1+0 & -2+0\end{bmatrix}$

$= \begin{bmatrix}-1 & 3\\ 1 & -2\end{bmatrix}$

5. (C) $(\text{adj}A^T) = (\text{adj}A)^T \Rightarrow (\text{adj}A^T) - (\text{adj}A)^T$
= null matrix

6. (C) Given that, $\frac{1}{4}, \frac{1}{x}$ and $\frac{1}{10}$ are in HP.
4, x and 10 are in AP.

$\therefore$ Arithmetic mean, $x = \frac{4+10}{2} = \frac{14}{2} = 7$

7. (D) $(a^4 - 2a^2b^2 + b^4)^{x-1} = (a-b)^{2x}.(a+b)^{-2}$
$\Rightarrow \left[(a^2-b^2)^2\right]^{(x-1)} = (a-b)^{2x}.(a+b)^{-2}$
$\Rightarrow (a^2-b^2)^{2(x-1)} = (a-b)^{2x}.(a+b)^{-2}$
$\Rightarrow (a-b)^{(2x-2)}(a+b)^{(2x-2)} = (a-b)^{2x}.(a+b)^{-2}$
$\Rightarrow \frac{(a-b)^{(2x-2)}}{(a-b)^{2x}}.\frac{(a+b)^{(2x-2)}}{(a+b)^{-2}} = 1$
$\Rightarrow (a-b)^{-2}(a+b)^{+2x} = 1$
$\Rightarrow -2\log(a-b) + 2x.\log(a+b) = \log 1$
$\Rightarrow 2x\log(a+b) = 2\log(a-b)$
$\Rightarrow x = \frac{\log(a-b)}{\log(a+b)}$

8. (D) Now, $\lim_{x\to\pi/2}\left(\frac{1-\sin x}{(\pi-2x)^2}\right) \quad \left[\frac{0}{0}\text{form}\right]$
by L'Hospital's rule
$\Rightarrow \lim_{x\to\pi/2}\frac{-\cos x}{2(\pi-2x)(-2)}$
$\Rightarrow \lim_{x\to\pi/2}\frac{\cos x}{4(\pi-2x)} \quad \left[\frac{0}{0}\text{form}\right]$
Again, by L'Hospital's rule
$\Rightarrow \lim_{x\to\pi/2}\frac{-\sin x}{4(-2)} \Rightarrow \lim_{x\to\pi/2}\frac{\sin x}{8}$
$\Rightarrow \frac{1}{8}.\sin\frac{\pi}{2} \Rightarrow \frac{1}{8}\times 1 = \frac{1}{8}$

9. (C) Possibilities of sum of the dice is more than 10{(5, 6), (6, 5), (6, 6)} = 3
Possibilities of sum of the dice is divisible by 3{(1, 2), (1, 5), (2, 1), (2, 4), (3, 3), (3, 6) (4, 2), (4, 5), (5, 1), (5, 4), (6, 3), (6, 6)} = 12

Required ratio = $\frac{3}{36} : \frac{12}{36} = 1 : 4$

10. (D) Work done $\vec{W} = \vec{F}.(\overrightarrow{AB}) = \vec{F}.(\overrightarrow{OB} - \overrightarrow{OA})$

$\vec{W} = (2\hat{i} + 4\hat{j} + 5\hat{k}).(-5\hat{i} + \hat{j} + 2\hat{k})$

$\vec{W} = 2\times(-5) + 4\times1 + 5 \times 2$

$\vec{W} = -10 + 4 + 10 = 4$ units

11. (B) No. of students who are good in Physics and Mathematics but not in Chemistry = 15

12. (C) No. of students who are in either Mathematics or Chemistry but not in Physics = 86 + 22 + 60 = 168

13. (C) No. of students who are good in Physics and Chemistry but not in Mathematics
= 300 – (74 + 15 + 86 + 21 + 22 + 60)
= 300 – 278 = 22

14. (C) $(1 + x + x^2 + x^3 + \ldots + \infty)^2$

$\Rightarrow \left(\frac{1}{1-x}\right)^2 = (1-x)^{-2} \quad \left(\because S_\infty = \frac{a}{1-r}\right)$

$\Rightarrow 1 + 2x + 3x^2 + \ldots + (n+1)x^n + \ldots\infty$

Hence coefficient of $x^n = (n + 1)$

15. (C) $\because r_{xy} = \frac{\text{cov}(x,y)}{\sigma_x.\sigma_y} \Rightarrow 0.6 = \frac{16}{4.\sigma_y}$

$\Rightarrow \sigma_y = \frac{16}{4\times0.6} = \frac{20}{3}$

16. (A) The shaded region is $(A \cap B) \cup (A \cap C)$

70. (B) As, Neglect is opposite of Nurture.
Similarly, **Extol** is opposite of Defame.

71. (C) E K B N H H H H
+3, –3, +6, –6

Similarly,

C X V E **F U B Z**
+3, –3, +6, –6

72. (D) Except **Nagpur**, all others are north Indian cities.

73. (B) 37 – 19 = 18 (Factor of 9)
46 – 27 = **19** (Not factor of 9)
40 – 31 = 9 (Factor of 9)
41 – 14 = 27 (Factor of 9)

74. (D) As, $6^3 + 5^2 = 241$
And, $7^3 + 3^2 = 352$
Similarly, $8^3 + 4^2$ = **528**

75. (A) As, (8 + 6) × 9 = 126 $\Rightarrow$ 126 × 12 = 1512
Similarly, (12 + 4) × 5 = 80 $\Rightarrow$ 80 × 12 = **960**

76. (D)

77. (B) (4 ÷ 16 – 17) + 9 × 12
After changing the signs,
(4 × 16 + 17) ÷ 9 – 12
= 81 ÷ 9 – 12 = **–3**

HSSC MOCK TEST – 184 (ANSWER KEY)

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

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