HSSC MOCK TEST – 181 (SOLUTION)

1. (D) $\sin2A + \sin2B - \sin2C$

$\Rightarrow 2\sin\frac{2A+2B}{2}.\cos\frac{2A-2B}{2} - \sin2C$

$\left[\because \sin C+\sin D = 2\sin\frac{C+D}{2}.\cos\frac{C-D}{2}\right]$

$\Rightarrow 2\sin(A+B).\cos(A-B) - \sin2C$

$\Rightarrow 2\sin(180-C).\cos(A-B) - 2\sin C.\cos C$

$\Rightarrow 2\sin C.\cos(A-B) + 2\sin C.\cos(A+B)$ $[\because A+B+C = 180]$

$\Rightarrow 2\sin C[\cos(A-B) + \cos(A+B)]$

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

$\Rightarrow 4\sin C.\cos A.\cos B$

$\Rightarrow 4\cos A.\cos B.\sin C$

2. (D) Equation $x^2 + \alpha x - 2\beta = 0$

Roots are α and β,

then $\alpha + \beta = -\alpha$

$\Rightarrow 2\alpha + \beta = 0$ ...(i)

$\alpha.\beta = -2\beta \Rightarrow \alpha = -2$

from eq(i)

$2(-2) + \beta = 0 \Rightarrow \beta = 4$

Another equation $= -x^2 + \alpha x + \beta$

$= -x^2 - 2x + 4$

$= -(x+1)^2 + 3$

Greatest value of the equation = 3

3. (D) Equation $|2 - x| + x^2 = 6$

Now, $2 - x + x^2 = 6$

$\Rightarrow x^2 - x - 4 = 0$

$b^2 - 4ac = \sqrt{(-1)^2 - 4\times(-4)} = \sqrt{17}$

Roots are irrational.

and $-(2-x) + x^2 = 6$

$\Rightarrow x^2 + x - 8 = 0$

$b^2 - 4ac = \sqrt{(-1)^2 - 4\times(-8)} = \sqrt{33}$

Roots are irrational.

Hence equation has two irrational roots.

4. (A)

5. (D) Let Locus of a point = (h, k, l)

A.T.Q.,

$\sqrt{(h+1)^2 + (k-2)^2 + (l+3)^2}$

$= \sqrt{(h+2)^2 + (k-4)^2 + (l+5)^2}$

$\Rightarrow h^2 + 1 + 2h + k^2 + 4 - 4k + l^2 + 9 + 6l = h^2 + 4 + 4h + k^2 + 16 - 8k + l^2 + 25 + 10l$

On solving

$2h - 4k + 4l + 31 = 0$

Locus of a point

$2x - 4y + 4z + 31 = 0$

6. (B) Digits are 2, 3, 5, 7, 8, 9.

$n(S) = {}^6C_3 = 20$

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

$n(E) = 5$

The required Probability $= \frac{n(E)}{n(S)} = \frac{5}{20} = \frac{1}{4}$

7. (C) $I = \int e^x[x^2.\ln x + 2x\ln x + x]dx$

$I = e^x.x^2\ln x + c\left[\because \int e^x[f(x)+f'(x)]dx = e^x.f(x)+c\right]$

$I = x^2.e^x.\ln x + c$

8. (A) We know that

$(1+x)^n = C_1 + C_1x + C_2x^2 + \ldots\ldots + C_nx^n$ ...(i)

$x \to \frac{1}{x}$

$\left(1+\frac{1}{x}\right)^n = C_0 + \frac{C_1}{x} + \frac{C_2}{x^2} + \ldots\ldots + \frac{C_n}{x^n}$ ...(ii)

from eq(i) and eq(ii)

Coefficient of x^0 in $(1+x)^n\left(1+\frac{1}{x}\right)^n =$

$C_0^2 + C_1^2 + C_2^2 + \ldots\ldots + C_n^2$

$\Rightarrow C_0^2 + C_1^2 + C_2^2 + \ldots\ldots + C_n^2 =$ Coefficient of x^n in $\frac{(1+x)^{2n}}{x^n}$

$\Rightarrow C_0^2 + C_1^2 + C_2^2 + \ldots\ldots + C_n^2 =$ Coefficient of x^0 in $(1+x)^{2n}$

$\Rightarrow C_0^2 + C_1^2 + C_2^2 + \ldots\ldots + C_n^2 = {}^{2n}C_n$

$\Rightarrow C_0^2 + C_1^2 + C_2^2 + \ldots\ldots + C_n^2 = \frac{(2n)!}{n!n!}$

9. (C) We know that

$\omega = \frac{-1+i\sqrt{3}}{2}$ and $\omega^2 = \frac{-1-i\sqrt{3}}{2}$

Now, $(-1-i\sqrt{3})^{72} = 2^{72}\left(\frac{-1-i\sqrt{3}}{2}\right)^{72}$

$\Rightarrow (-1-i\sqrt{3})^{72} = 2^{72}(\omega^2)^{72}$

$\Rightarrow (-1-i\sqrt{3})^{72} = 2^{72}\times 1$ $[\because \omega^3 = 1]$

$\Rightarrow (-1-i\sqrt{3})^{72} = 2^{72}$

10. (C) Given that

$a = 2,\ b = \frac{7}{2}$

$f(x) = x^2 + x - 2$

$f'(x) = 2x + 1$

$f'(c) = 2c + 1$

$f(a) \Rightarrow f(2) = 4, f(b) \Rightarrow f\left(\frac{7}{2}\right) = \frac{55}{4}$

Now, $f'(c) = \frac{f(b) - f(a)}{b - a}$

$\Rightarrow 2c + 1 = \frac{\frac{55}{4} - 4}{\frac{7}{2} - 2}$

$\Rightarrow 2c + 1 = \frac{39/4}{3/2}$

$\Rightarrow 2c + 1 = \frac{13}{2} \Rightarrow c = \frac{11}{4}$

11. (B) The required no. of hand shakes in party $= {}^{14}C_2 = 91$

12. (D) $\theta = \left|\frac{11M - 60H}{2}\right|$

Time = 5 : 20

$\theta = \left|\frac{11 \times 20 - 60 \times 5}{2}\right|$

$\theta = 40°$

$\theta = 40 \times \frac{\pi}{180} = \frac{2\pi}{9}$

13. (B) We know that
Mode = 3 Median – 2 Mean
Mode = 3×27 – 2 × 37
Mode = 81 – 74 = 7

14. (C) Given that $b_{xy} = \frac{-13}{8}$ and $b_{yx} = \frac{-2}{13}$

Now, $r = \sqrt{b_{xy} \times b_{yx}}$

$\Rightarrow r = \sqrt{\left(\frac{-13}{8}\right) \times \left(\frac{-2}{13}\right)}$

$\Rightarrow r = \sqrt{\frac{1}{4}} = \frac{+1}{2}$

15. (C) Given that X = {9(n –1) : n∈N}
n = 1, 2, 3, 4,.....
X = {0, 9, 18, 27, ...}
Y = {4^n – 3n – 1 : n∈N}
n = 1, 2, 3, 4,.....
Y = {0, 9, 54, 243,.....}
(X∩Y) = {0, 9, 54, 243} = Y

70. (A) As, Plough is used by farmer.
Similalry, **Brush** is used by painter.

71. (A) As,

A E G G K M
+6

Similarly,

M Q S **S W Y**
+6

72. (D) Except **Magenetic field,** all other are the SI units.

73. (D) B G F F D H
+5 –1 –2 + 4

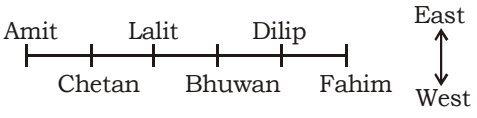
B A E **C D E**
–1 +4 +1 +2

74. (C) 4 + 5 = 9, 9 + 5 = 14, 14 + 9 = **23**
23 + 37 = 60, 60 + 37 = 97

75. (B) As, 8 + 3 + 5 – (4 + 2) = 10
and, 9 + 7 + 5 – (1 + 8) = 12
Similarly,
5 + 4 + 5 – (2 + 3) = **9**

76. (C)

77. (B)



So, Required pair is **Bhuwan and Fahim**

HSSC MOCK TEST – 181 (ANSWER KEY)

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