HSSC MOCK TEST – 158 (SOLUTION)

1. (D) Here S = {1, 2, 3, 4, ...19, 20}
Let E = event of gettig a multiple of 3 or 5 = {3, 6, 9, 12, 15, 18, 10, 20}

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{9}{20}$

2. (D) $n(S) = {}^{52}C_2 = \frac{52 \times 51}{2 \times 1} = 1326$
Let E = event of getting 2 kings out of 4.

$\therefore n(E) = {}^{4}C_2 = \frac{4 \times 3}{2 \times 1} = 6$

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{6}{1326} = \frac{1}{221}$

3. (A) We are adding same value to each ele ment of the set does not change the standard deviation. Therefore the new standard deviation is d.

14. (A) In ABC, $a = 2\sqrt{2}$, $b = 3$ and C = 45°

Now, $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$

$\Rightarrow \cos 45 = \frac{(2\sqrt{2})^2 + (3)^2 - c^2}{2 \times 2\sqrt{2} \times 3}$

$\Rightarrow \frac{1}{\sqrt{2}} = \frac{8 + 9 - c^2}{12\sqrt{2}}$

$\Rightarrow 12 = 17 - c^2 \Rightarrow c = \sqrt{5}$

15. (D) Given that $a = \frac{dy}{dx}$, $b = \frac{d^2y}{dx^2}$

$y = f(x)$
On differentiating both side w.r.t.'x'

$\Rightarrow \frac{dy}{dx} = f'(x)$

$\Rightarrow \frac{dx}{dy} = \frac{1}{f'(x)}$

Again, differentiating

$\Rightarrow \frac{d^2x}{dy^2} \times \frac{dy}{dx} = -1[f(x)]^{-2} f''(x)$

$\Rightarrow \frac{d^2x}{dy^2} \times a = -(a)^{-2} \times b$

$\Rightarrow \frac{d^2x}{dy^2} = \frac{-b}{a^3}$

16. (C) $z = \frac{3 + 2i}{2 - 3i} - \frac{2 - 3i}{3 + 2i}$

$z = \frac{(3 + 2i)(2 + 3i)}{(2 - 3i)(2 + 3i)} - \frac{(2 - 3i)(3 - 2i)}{(3 + 2i)(3 - 2i)}$

$z = \frac{13i}{4 - 9i^2} - \frac{-13i}{9 - 4i^2}$

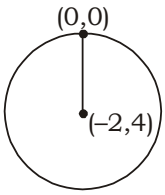
$z = \frac{13i}{13} + \frac{13i}{13}$

$z = i + i = 2i$ and $\bar{z} = -2i$

Now, $z^2 + z\bar{z} = z(z + \bar{z})$

$\Rightarrow z^2 + z\bar{z} = 2i(2i - 2i) = 0$

17. (C)



Equation of circle
$x^2 + y^2 + 4x - 8y = 0$
$\Rightarrow (x + 2)^2 - 4 + (y - 4)^2 - 16 = 0$
$\Rightarrow (x + 2)^2 + (y - 4)^2 = 20$
Equation of diameter

$y - 0 = \frac{4 - 0}{-2 - 0}(x - 0)$

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

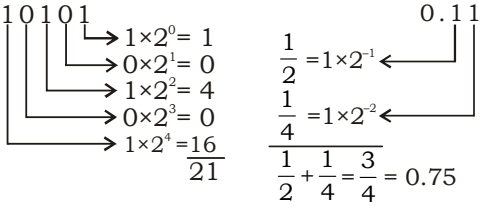
18. (D) Angle describe in 12 hr by hour-hand = 360°
Angle describe in 1 hr(60 min) by hour-hand = $\frac{360}{12}$
Angle describe in 1 min by hour-hand

$= \frac{360}{12 \times 60}$

Angle describe in 24 min by hour-hand

$= \frac{360}{12 \times 60} \times 24 = 12°$

19. (D) 10101 . 11



Hence $(10101.11)_2 = (21.75)_{10}$

20. (A) **Statement I**
$n = 12$

The required sum $= \frac{n}{6}(n + 1)(2n + 1)$

$= \frac{12}{6}(12 + 1)(2 \times 12 + 1)$

$= 2 \times 13 \times 25 = 650$

Statement I is correct.
Statement II

$n = 7$

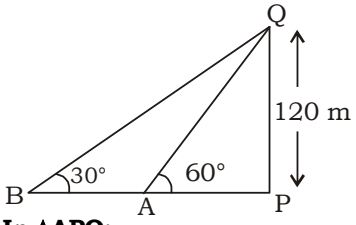
The required sum = $\left[\frac{n(n+1)}{2}\right]^2$

$= \left[\frac{7(7+1)}{2}\right]^2$

$= \left(\frac{7\times 8}{2}\right)^2 = 784$

Statement II is incorrect.

21. (A)



In ΔAPQ:-

$\tan 60° = \frac{PQ}{AP}$

$\Rightarrow \sqrt{3} = \frac{120}{AP} \Rightarrow AP = \frac{120}{\sqrt{3}}$

In ΔBPQ:-

$\tan 30° = \frac{PQ}{BP}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{120}{AB + AP}$

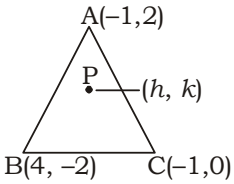
$\Rightarrow AB + AP = 120\sqrt{3}$

$\Rightarrow AB + \frac{120}{\sqrt{3}} = 120\sqrt{3}$

$\Rightarrow AB = 120\left(\sqrt{3} - \frac{1}{\sqrt{3}}\right) \Rightarrow AB = 80\sqrt{3}$

Distance between both trees = $80\sqrt{3}$ m

22. (B)



Let P is circumcentre,
then AP = BP = CP
Now, AP = BP

$\Rightarrow \sqrt{(h+1)^2 + (k-2)^2} = \sqrt{(h-4)^2 + (k+2)^2}$

On squaring

$\Rightarrow h^2 + 1 + 2h + k^2 + 4 - 4k = h^2 + 16 - 8h + k^2 + 4 + 4k$

$\Rightarrow 10h - 8k = 15$ ...(i)

and AP = CP

$\Rightarrow \sqrt{(h+1)^2 + (k-2)^2} = \sqrt{(h+1)^2 + k^2}$

On squaring

$\Rightarrow h^2 + 1 + 2h + k^2 + 4 - 4k = h^2 + 1 + 2h + k^2$

$\Rightarrow 4 - 4k = 0 \Rightarrow k = 1$ ...(ii)

from eq(i)

$10h - 8 = 15 \Rightarrow h = \frac{23}{10}$

Hence circumcentre P = $\left(\frac{23}{10}, 1\right)$

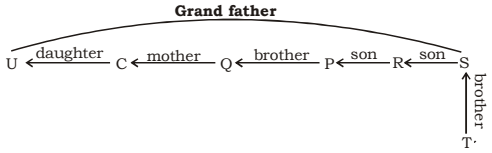
82. (B) As,

R	O	U	T	I	N	E
↓	↓	↓	↓	↓	↓	↓
18	15	21	20	19	4	5

Similarly,

V	E	H	I	C	L	E
↓	↓	↓	↓	↓	↓	↓
22	**5**	**8**	**9**	**3**	**12**	**5**

83. (B)



84. (C) ca(d)bab/(c)ad(d)ab/(c)ab(b)ab

86. (D) 40 + 10 ÷ 20× 8 – 17 = 17
After changing the signs
40 – 10 ÷ 2×8 + 17 = 17
⇓ 40 – 40 + 17 = 17
⇓ **17 = 17**

87. (*) Correct order is 3, 1, 4, 2, 5, 6

88. (D) SI unit of Resistance is Ohm and SI unit of **length** is **Metre**.

HSSC MOCK TEST – 158 (ANSWER KEY)

1.	(D)	11.	(D)	21.	(A)	31.	(B)	41.	(B)	51.	(D)	61.	(D)	71.	(D)	81.	(C)	91.	(C)
2.	(D)	12.	(D)	22.	(B)	32.	(A)	42.	(D)	52.	(D)	62.	(B)	72.	(C)	82.	(B)	92.	(C)
3.	(A)	13.	(A)	23.	(B)	33.	(C)	43.	(A)	53.	(D)	63.	(D)	73.	(A)	83.	(B)	93.	(D)
4.	(A)	14.	(A)	24.	(A)	34.	(C)	44.	(D)	54.	(C)	64.	(B)	74.	(D)	84.	(C)	94.	(A)
5.	(A)	15.	(D)	25.	(A)	35.	(D)	45.	(A)	55.	(B)	65.	(A)	75.	(D)	85.	(D)	95.	(B)
6.	(B)	16.	(D)	26.	(A)	36.	(A)	46.	(C)	56.	(A)	66.	(D)	76.	(A)	86.	(C)	96.	(C)
7.	(B)	17.	(C)	27.	(D)	37.	(D)	47.	(A)	57.	(D)	67.	(A)	77.	(C)	87.	(*)	97.	(D)
8.	(B)	18.	(D)	28.	(C)	38.	(B)	48.	(A)	58.	(B)	68.	(B)	78.	(B)	88.	(D)	98.	(C)
9.	(D)	19.	(D)	29.	(C)	39.	(C)	49.	(C)	59.	(A)	69.	(B)	79.	(C)	89.	(B)	99.	(C)
10.	(C)	20.	(A)	30.	(A)	40.	(A)	50.	(C)	60.	(B)	70.	(B)	80.	(C)	90.	(D)	100.	(A)