

Choose the correct answer Mathematics. X std

1) b) 10	6) a) (2, 0)	11) c) $\sin \theta$
2) d) a^n	7) a) 0°	12) c) 9
3) b) 0	8) c) $\frac{2}{7}$	13) b) $2\pi abc$
4) c) $x+1$	9) b) 16	14) b) 12
5) d) 31	10) b) 4:9	15) b) 0.16

Section - II

16) $A = \{-10, 0, 1, 2, 4, 5, 9\}$ — 1
 $B = \{-2, -1, 2, 3, 4, 5, 6\}$ — 1

17) Range = $\{1, 4, 9, 16, 25\}$ — 2

18) $b = ak; c = ak^2; d = ak^3$ — 1
 $\frac{b+c}{a+b} = \frac{c+d}{b+c}$
 $\frac{ak(1+k)}{a(1+k)} = \frac{ak^2(1+k)}{ak(1+k)}$
 $k = k$
 $\therefore a+b, b+c, c+d$ form G.P. — 1

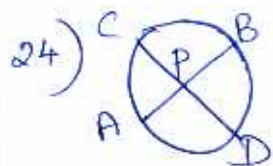
19) $2x^2 - 3x - 2 = (x-2)(2x+1)$ — 1
 $4x^2 + 4x + 1 = (2x+1)(2x+1)$
 G.C.D = $2(2x+1)$ — 1

20) $\frac{x^3}{x-3} - \frac{27}{x-3} = \frac{x^3 - 3^3}{x-3}$ — 1
 $\frac{(x/3)(x^2 + 3x + 9)}{(x/3)} = x^2 + 3x + 9$ — 1

21) $\begin{pmatrix} x+1 & 2 \\ 2 & y-4 \end{pmatrix} = \begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$ — 1
 $x = 0; y = 8$ — 1

22) $(6, 4)$ $(1, -7)$ ratio $l:m$
 x_1, y_1, x_2, y_2
 $\left(\frac{l+6m}{l+m}, \frac{-7l+4m}{l+m}\right) = (a, 0)$ — 1
 equating y-co-ordinates
 $\frac{-7l+4m}{l+m} = 0$
 $-7l+4m = 0$
 $+7l = +4m$ — 1
 $l:m = 4:7$ internally

23) $\theta = 30^\circ$
 $m = \frac{1}{\sqrt{3}}$
 mid pt = $\left(\frac{7}{2}, \frac{3}{2}\right)$
 eq. of st. line: $y - \frac{3}{2} = \frac{1}{\sqrt{3}}(x - \frac{7}{2})$
 $2x - 2\sqrt{3}y + (3\sqrt{3} - 7) = 0$ — 1



$$PA \times PB = PC \times PD$$

$$8 \times 2 = 4 \times x \quad \text{--- (1)}$$

$$4x = 16$$

$$\boxed{x = 4} \quad \text{--- (1)}$$

29) $n(S) = 36$

$$A = \{(2, 6)(3, 5)(4, 4)(5, 3)(6, 2)\}$$

$$n(A) = 5 \quad \text{--- (1)}$$

$$P(A) = \frac{5}{36} \quad \text{--- (1)}$$

30) $3A = \begin{pmatrix} 15 & -3 \\ 6 & 9 \end{pmatrix} \quad \text{--- (1)}$

$$(3A)^T = \begin{pmatrix} 15 & 6 \\ -3 & 9 \end{pmatrix} \quad \text{--- (1)}$$

b) $a = \sqrt{2}$

$$d = 3\sqrt{2} - \sqrt{2}$$

$$d = 2\sqrt{2} \quad \text{--- (1)}$$

$$t_{12} = \sqrt{2} + (12-1)2\sqrt{2}$$

$$= \sqrt{2} + 22\sqrt{2}$$

$$\boxed{t_{12} = 23\sqrt{2}} \quad \text{--- (1)}$$

25) $\frac{\sin \theta}{1/\sin \theta} + \frac{\cos \theta}{1/\cos \theta} \quad \text{--- (1)}$

$$= \sin^2 \theta + \cos^2 \theta$$

$$= 1 \quad \text{--- (1)}$$

$$= \text{RHS}$$

26) $2\pi rh = 880$

$$2 \times \frac{22}{7} \times r \times h = 880 \quad \text{--- (1)}$$

$$\boxed{h = 20 \text{ cm}} \quad \text{--- (1)}$$

27) $V = \frac{4}{3} \pi r^3$

$$V = \frac{4}{3} \times \frac{22}{7} \times 4^3 \quad \text{--- (1)}$$

$$\boxed{V = 310.464 \text{ Cu. cm.}} \quad \text{--- (1)}$$

$$\text{(OR) } 98.78 \pi \text{ cm}^3$$

28) $\sigma = 2 \sqrt{\frac{n^2 - 1}{12}}$

$$= 2 \sqrt{\frac{100 - 1}{12}} \quad \text{--- (1)}$$

$$= 2 \frac{\sqrt{33}}{2}$$

$$\approx 5.7 \quad \text{--- (1)}$$

(OR) any method carries 2 marks.

Section - III

31) $A | (B \cup C) = (A | B) \cap (A | C)$

L.H.S $B \cup C = \{-5, -3, -1, 0, 1, 2, 3, 4\} \quad \text{--- (1)}$

$$A | (B \cup C) = \{-2\} \quad \text{--- (1)}$$

R.H.S $A | B = \{-3, -2, -1, 0\} \quad \text{--- (1)}$

$$A | C = \{-2, 2\} \quad \text{--- (1)}$$

$$(A | B) \cap (A | C) = \{-2\} \quad \text{--- (1)}$$

$$\text{L.H.S} = \text{R.H.S}$$

Any one law carries 5 marks.

$$* A \setminus (B \cap C) = (A \setminus B) \cup (A \setminus C)$$

L.H.S

$$B \cap C = \{1, 3\} \quad \text{--- (1)}$$

$$A \setminus (B \cap C) = \{-3, -2, -1, 0, 2\} \quad \text{--- (1)}$$

R.H.S

$$A \setminus B = \{-3, -2, -1, 0\} \quad \text{--- (1)}$$

$$A \setminus C = \{-2, 2\} \quad \text{--- (1)}$$

$$(A \setminus B) \cup (A \setminus C) = \{-3, -2, -1, 0, 2\} \quad \text{--- (1)}$$

\therefore LHS = RHS.

$$32) \textcircled{i} f(-7) = (-7)^2 + 2(-7) + 1$$

$$= 49 - 14 + 1$$

$$\boxed{f(-7) = 36}$$

$$f(-3) = -3 + 5$$

$$\boxed{f(-3) = 2}$$

$$\textcircled{ii} 4f(-3) = 4(2)$$

$$= 8$$

$$f(4) = 3$$

$$2f(4) = 6$$

$$f(-6) = 25$$

$$f(1) = 6$$

$$3f(1) = 3 \times 6$$

$$= 18.$$

$$\textcircled{i} f(-7) - f(-3) = 36 - 2$$

$$= 34 \quad \text{--- (1)}$$

$$\textcircled{ii} \frac{4f(-3) + 2f(4)}{f(-6) - 3f(1)} = \frac{8 + 6}{25 - 18}$$

$$= \frac{14}{7} \quad \text{--- (1)}$$

$$= 2 \quad \text{--- (1)}$$

$$33) m + m = n + n \quad \text{--- (1)}$$

$$m(a + (m-1)d) = n(a + (n-1)d)$$

$$ma + m^2d - md - na - n^2d + nd = 0 \quad \text{--- (1)}$$

$$a(m-n) + d(m^2 - n^2) - d(m-n) = 0 \quad \text{--- (1)}$$

$$a + (m+n)d - d = 0 \quad \text{--- (1)}$$

$$a + (m+n-1)d = 0$$

$$\therefore tm + n = 0 \quad \text{--- (1)}$$

$$34) 6 [1 + 11 + 111 + \dots + n \text{ terms}] \quad \text{--- (1)}$$

$$= \frac{6}{9} [9 + 99 + 999 + \dots + n \text{ terms}] \quad \text{--- (1)}$$

$$= \frac{2}{3} [(10 + 100 + \dots) - (1 + \dots + n)] \quad \text{--- (1)}$$

$$= \frac{2}{3} \left[\frac{10(10^n - 1)}{10 - 1} - n \right] \quad \text{--- (1)}$$

$$= \frac{2}{3} \left[\frac{10(10^n - 1)}{9} - n \right]$$

$$= \frac{20(10^n - 1)}{27} - \frac{2n}{3} \quad \text{--- (1)}$$

35)

M.A.

$$36) x^2 - 4x + 6 = 0.$$

$$\alpha + \beta = 4, \alpha\beta = 6.$$

$$\text{SOR: } \frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{\alpha^3 + \beta^3}{\alpha\beta}$$

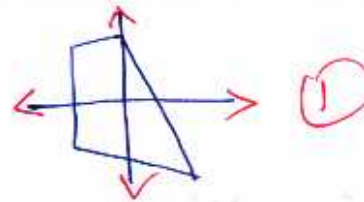
$$= \frac{-4}{3} \quad \text{--- (2)}$$

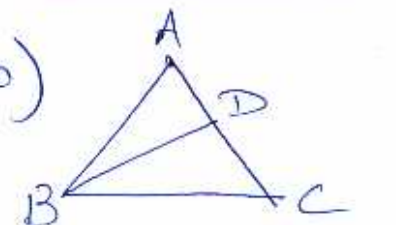
$$\text{POR: } \frac{\alpha^2}{\beta} \times \frac{\beta^2}{\alpha} = 6 \quad \text{--- (1)}$$

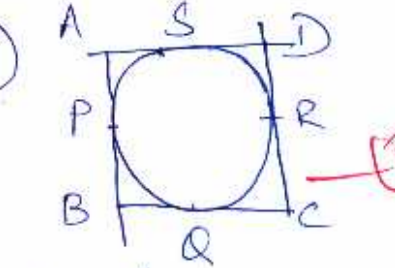
eq: $x^2 - (-\frac{4}{3})x + 6 = 0$
 $3x^2 + 4x + 6 = 0$ — (1)

37) $6x^2 + 5x - 6 = (2x+3)(3x-2)$ — (2)
 $6x^2 - x - 2 = (3x-2)(2x+1)$ — (2)
 $4x^2 + 8x + 3 = (2x+3)(2x+1)$ — (2)
 \therefore eq. root = $(2x+3)(2x+1)(3x-2)$ — (1)

38) $A^2 = \begin{bmatrix} 7 & 18 \\ 6 & 19 \end{bmatrix}$ — (2)
 $6A = \begin{bmatrix} 12 & 18 \\ 6 & 24 \end{bmatrix}$ — (1)
 $5I = \begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$ — (1)
 $A^2 - 6A + 5I = \begin{bmatrix} 7-12+5 & 18-18+0 \\ 6-6+0 & 19-24+5 \end{bmatrix}$
 $= 0$ — (1)

39)  — (1)
 $A0Q = \frac{1}{2} \begin{bmatrix} 0 & -4 & -4 & 5 & 0 \\ 7 & 5 & -2 & -5 & 7 \end{bmatrix}$ — (1)
 $= \frac{1}{2} [(0+8+20+35) - (-28-20-10-0)]$
 $= \frac{1}{2} [63+58]$ — (1)
 $= \frac{1}{2} [121]$ — (1)
 $= 60.5$ sq units — (1)

40) 
 Slope of AC = $\frac{5-2}{-4-1} = \frac{3}{-5}$ — (1)
 \perp slope = $5/3$ — (1)
 eq. thr. B and $m = 5/3$
 $y - 5 = \frac{5}{3}(x + 4)$ — (1)
 $3y - 15 = 5x + 20$ — (1)
 $5x - 3y + 35 = 0$ — (1)

41)  — (1)
 $AB = 6$
 $AP = AS = x$
 $PB = 6 - x$
 $PB = BQ = 6 - x$ — (3)
 $BC = 6.5$
 $QC = 6.5 - 6 + x$
 $QC = CR = 0.5 + x$
 $DR = SD = 6.5 - x$
 $\therefore AD = 6.5$ — (1)
 (or)

$$45) a) n(S) = 36$$

$$A = \{(1,2) (1,5) (2,1) (2,4) \\ (3,3) (3,6) (4,2) (4,5) (5,1) \\ (5,4) (6,3) (6,6)\}$$

$$n(A) = 12$$

$$P(A) = \frac{12}{36} \rightarrow (1)$$

$$B = \{(1,3) (2,2) (2,6) (3,1) \\ (3,5) (4,4) (5,3) (6,2) \\ (6,6)\}$$

$$n(B) = 9$$

$$P(B) = \frac{9}{36} \rightarrow (1)$$

$$P(A \cap B) = \frac{1}{36} \rightarrow (1)$$

$$P(A \cup B) = \frac{5}{9} \rightarrow (1)$$

$$P(A \cup B)' = \frac{4}{9} \rightarrow (1)$$

$$43) R = 18 \text{ cm} \quad r_1 = 2 \text{ cm}, r_2 = 12 \text{ cm} \\ r_3 = ?$$

$$\frac{4}{3} \pi R^3 = \frac{4}{3} \pi (r_1^3 + r_2^3 + r_3^3) \rightarrow (2)$$

$$18^3 = 12^3 + 2^3 + r_3^3$$

$$5832 = 1736 + r_3^3 \rightarrow (1)$$

$$r_3^3 = 4096 \rightarrow (1)$$

$$r_3 = 16 \text{ cm} \rightarrow (1)$$

$$46) a) R.D \rightarrow (1)$$

base line segment $\rightarrow (1)$

first circle $\rightarrow (2)$

\perp bisector $\rightarrow (1)$

2nd circle $\rightarrow (1)$

2 tangents $\rightarrow (2)$

length of tangents $\rightarrow (1)$

steps $\rightarrow (1)$

(or)

$$b) R.D \rightarrow (1)$$

$$AB = 6 \text{ cm} \rightarrow (1)$$

$$\text{angle} = 40^\circ \rightarrow (1)$$

$$\text{angle} = 90^\circ \rightarrow (1)$$

\perp bisector $\rightarrow (1)$

circle $\rightarrow (1)$

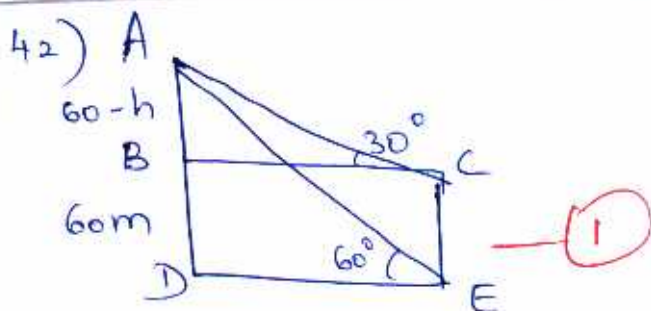
altitude $\rightarrow (2)$

triangle $\rightarrow (1)$

steps $\rightarrow (1)$

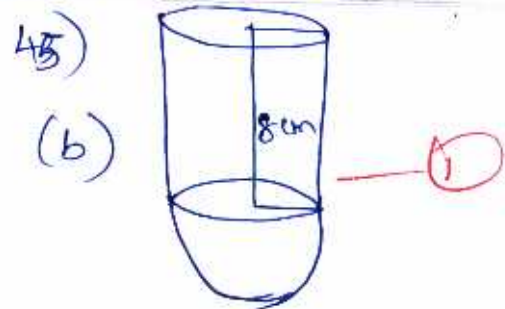
AP=AS, BP=BQ, CR=CQ, DR=DS
 AP + BP + CR + DR = AS + BQ + CQ + DS

AB + CD = AD + BC
 AD = AB + CD - BC
 = 6 + 7 - 6.5
AD = 6.5 cm



In $\triangle ABC$
 $\tan 30^\circ = \frac{60-h}{BC}$
 $\frac{1}{\sqrt{3}} = \frac{60-h}{BC}$
 $BC = (60-h)\sqrt{3}$

In $\triangle ADE$
 $\tan 60^\circ = \frac{60}{DE}$
 $\sqrt{3} = \frac{60}{DE}$
 $DE = \frac{60}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$
 $DE = 20\sqrt{3}$
 $BC = DE$
 $(60-h)\sqrt{3} = 20\sqrt{3}$
 $h = 60 - 20$
 $h = 40m$



T.S.A of solid =
 C.S.A of Cy + C.S.A of hemi
 $= 2\pi rh + 2\pi r^2$
 $= 2\pi r (h+r)$
 $= 2 \times \frac{22}{7} \times 3.5 (8+3.5)$
 $= 22 (11.5)$
 $= 253 \text{ cm}^2$

44)

x	d = x - 44	d ²
40	-4	16
42	-2	4
48	4	16
$\Sigma d = -2$		$\Sigma d^2 = 36$

$\sigma = \sqrt{\frac{\Sigma d^2}{n} - \left(\frac{\Sigma d}{n}\right)^2}$
 $= \sqrt{\frac{36}{3} - \left(-\frac{2}{3}\right)^2}$
 $= \sqrt{\frac{104}{9}} = \frac{\sqrt{104}}{3}$

each value is multiplied by 3, the σ is also multiplied by 3
 new $\sigma = \sqrt{104}$

47) a) $x^2 - 2x - 3 = 0$.

(-3, 12) (-2, 5) (-1, 0) (0, -3) (1, -4) (2, -3) (3, 0) (4, 5).
table. — (5)

axis. — (1)

Scale — (1)

Plotting plots — (1)

Joining Curve — (1)

Sol. set $\{-1, 3\}$ — (1)

(or)

b) $xy = 20$

table. — (2)

type of variation — (1)

axis — (1)

Scale — (1)

Plotting points — (1)

Joining Curve. — (1)

when $x = 5, y = 4$
when $y = 10, x = 2$ } (2)

dotted lines. — (1)

Handling teachers.

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