CCE RF
CCE RR

ಕರ್ನಾಟಕ ಪ್ರೌಢ ಶಿಕ್ಷಣ ಪರೀಕ್ಷಾ ಮಂಡಳಿ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು — 560 003

KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD, MALLESWARAM, BANGALORE – 560 003

ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆ, ಮಾರ್ಚ್ / ಏಪ್ರಿಲ್ — 2017

S. S. L. C. EXAMINATION, MARCH/APRIL, 2017

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 03. 04. 2017] ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Date : 03. 04. 2017] **CODE NO. : 81-E**

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಹೊಸ ಪಠ್ಯಕ್ರಮ / New Syllabus)

(ಶಾಲಾ ಅಭ್ಯರ್ಥಿ + ಪುನರಾವರ್ತಿತ ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / Regular Fresh + Regular Repeater)

(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / English Version)

[ಗರಿಷ್ಠ ಅಂಕಗಳು : **80**

[Max. Marks : 80

Qn. Nos.	Ans. Key	Value Points	Marks allotted
I. 1.	C	0	1
2.	B	– 2 and 1	1
3.	A	90°	1
4.	D	1540 c.c.	1
5.	B	$\frac{1}{2}$	1
6.	A	Composite number	1
7.	C	$S_\infty = \frac{a}{1-r}$	1
8.	D	$\pi(r_1 + r_2)l$.	1

Qn. Nos.	Value Points		Marks allotted
II.	(Question Nos. from 9 to 14, give full marks to direct answers.)		
9.	$A^{l} = U - A$	½	
	$= \{ 1, 2, 3, 4, 5, 6 \} - \{ 2, 3, 4, 5 \}$		
	$= \{ 1, 6 \}$	½	1
10.	Standard deviation = $\sqrt{\text{Variance}}$		
	OR		
	$\text{SD}^2 = \text{Variance}$		1
11.	$T_n = n^2 + 4$		
	$T_2 = 2^2 + 4$	½	
	$= 4 + 4$		
	$= 8$	½	1
12.	Sample space (S) = $\{ H, T \}$ $\therefore$ $n (S) = 2$	½	
	Event (A) = $\{ H \}$ $\therefore$ $n (A) = 1$		
	$\therefore \quad P (A) = \frac{n (A)}{n (S)} = \frac{1}{2}$.	½	1
13.	"In a right angled triangle, the square on the hypotenuse is equal to the sum of the squares on other two sides."		1
14.	General form $p (x) = ax^2 + bx + c$	½	
	where $a \neq 0$, a, b & $c \in R$.	½	1

Qn. Nos.	**Value Points**		**Marks allotted**
III. 15.	$A \cap B = \{3, 4\}$	½	
	$(A \cap B) \cap C = \{\}$ or ϕ ... (i)	½	
	$B \cap C = \{6\}$		
	$A \cap (B \cap C) = \{\ \}$ or ϕ ... (ii)	½	
	From (i) and (ii)		
	$(A \cap B) \cap C = A \cap (B \cap C)$.	½	2
16.	Let a and b be two numbers		
	Given $\frac{a+b}{2} = 5$		
	$\therefore\ a + b = 10$ ... (i)	½	
	And $\sqrt{ab} = 4$		
	$ab = 16$ ... (ii)	½	
	Harmonic mean (H.M.) $= \frac{2ab}{a+b}$	½	
	$= \frac{\cancel{2}\times 16}{\cancel{10}\ 5}$		
	$= \frac{16}{5}$	½	2
	Alternate Method :		
	$G^2 = AH$	½	
	$\frac{G^2}{A} = H$	½	
	$\frac{(4)^2}{5} = H$	½	
	$\frac{16}{5} = H.$	½	2
	OR		

Qn. Nos.	**Value Points**	**Marks allotted**
	Given $T_3 = 1$	
	$\frac{1}{a+2d} = 1$	
	$\therefore \quad a + 2d = 1$	
	$a = 1 - 2d$ ... (i)	
	$T_5 = \frac{1}{-5}$	
	$\frac{1}{a+4d} = \frac{1}{-5}$	½
	$a + 4d = -5$ ... (ii)	
	Substituting (i) in (ii)	
	$1 - 2d + 4d = -5$	
	$1 + 2d = -5$	½
	$2d = -5 - 1 = -6$	
	$\therefore \quad d = -\frac{6}{2} = -3$	
	If $d = -3$ then $a = 1 - 2(-3) = 1 + 6 = 7$	½
	Now $T_{10} = \frac{1}{a+9d}$	
	$= \frac{1}{7+9(-3)}$	½
	$= \frac{1}{7-27}$	
	$T_{10} = -\frac{1}{20}.$	
	(*Note* : Any alternate correct method full marks)	2

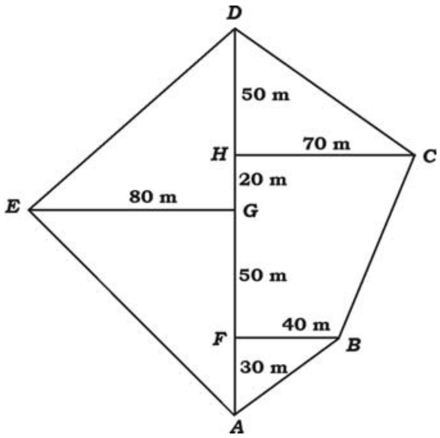
Qn. Nos.	**Value Points**		**Marks allotted**
17.	Let us assume, $5-\sqrt{3}$ is a rational number		
	i.e. $5-\sqrt{3} = \frac{p}{q}$ where $p, q \in z, \quad q \neq 0$	½	
	$5-\frac{p}{q} = \sqrt{3}$	½	
	$\frac{5q-p}{q} = \sqrt{3}$		
	This means $\sqrt{3}$ is a rational number but		
	$\sqrt{3}$ is not a rational number	½	
	This gives us a contradiction. Our assumption is wrong.		
	$\therefore \quad 5-\sqrt{3}$ is an irrational number.	½	2
18.	${}^nP_4 = 5 \,.\, {}^nP_3$		
	$\cancel{n}(n\cancel{-1})(n\cancel{-2})(n-3) = 5\cancel{n}(n\cancel{-1})(n\cancel{-2})$	1	
	$n-3 = 5$	½	
	$n = 5+3$		
	$n = 8.$	½	2

Qn. Nos.	**Value Points**		**Marks allotted**
19.	Given $\frac{P(A)}{P(\overline{A})} = \frac{5}{11}$		
	$11P(A) = 5P(\overline{A})$ $11P(A) = 5[1 - P(A)]$	½	
	$11P(A) = 5 - 5P(A)$ $11P(A) + 5P(A) = 5$ $16P(A) = 5$ $\therefore \quad P(A) = \frac{5}{16}$	½	
	$\therefore \quad P(\overline{A}) = 1 - P(A)$ $= 1 - \frac{5}{16}$ $= \frac{16-5}{16}$ $= \frac{11}{16}.$	1	2
20.	A group of surds having same order and same radicand in their simplest form are called like surds.	½	
	A group of surds having different orders or different radicands or both in their simplest form are called unlike surds.	½	
	Set of like surds — $\left\{ \sqrt{8},\ \sqrt{18},\ \sqrt{32},\ \sqrt{50} \right\}$	1	2

Qn. Nos.	Value Points		Marks allotted
21.	$\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}}$	½	
	$= \frac{(\sqrt{5}+\sqrt{3})^2}{5-3}$	½	
	$= \frac{5+3+2\sqrt{15}}{2}$		
	$= \frac{8+2\sqrt{15}}{2}$	½	
	$= \frac{\cancel{2}(4+\sqrt{15})}{\cancel{2}}$		
	$= 4 + \sqrt{15}$.	½	2
22.	Let $g(x)$ be divisor $= 2x - 1$		
	$q(x)$ be quotient $= 7x^2 + x + 5$		
	$r(x)$ be remainder = 4		
	$\therefore \quad p(x) = [g(x) \cdot q(x)] + r(x)$	½	
	$= [(2x-1)(7x^2+x+5)] + 4$	½	
	$= 14x^3 + 2x^2 + 10x - 7x^2 - x - 5 + 4$	½	
	$= 14x^3 - 5x^2 + 9x - 1$.	½	2
	OR		
	$\begin{array}{r\|cccc} -3 & 3 & -2 & 7 & -5 \\ \hline & 0 & -9 & 33 & -120 \\ \hline & 3 & -11 & 40 & \multicolumn{1}{\|c}{-125} \\ \hline \end{array}$	1	
	$\therefore$ Quotient $= 3x^2 - 11x + 40$	½	
	Remainder = -125.	½	2

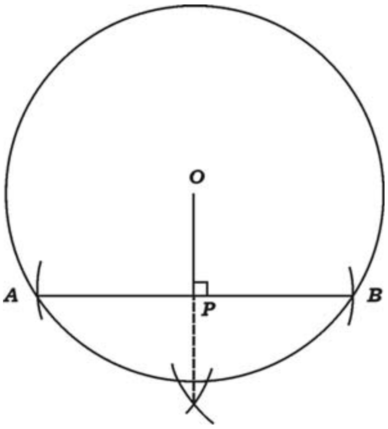
Qn. Nos.	**Value Points**		**Marks allotted**
23.	$A = \frac{\sqrt{3}}{4} a^2$		
	$4A = \sqrt{3}\, a^2$		
	$4 \times 16\cancel{\sqrt{3}} = \cancel{\sqrt{3}}\, a^2$	1	
	$a = 8$ cm		
	∴ Perimeter of triangle $= 3a$	½	
	$= 3 \times 8$		
	$= 24$ cm.	½	2
24.	$x^2 - 2x + 3 = 0$		
	∴ $a = 1, \quad b = -2, \quad c = 3$	½	
	Consider $b^2 - 4ac = (-2)^2 - 4(1)(3)$		
	$= 4 - 12$	½	
	$= -8$		
	$b^2 - 4ac < 0$	½	
	∴ roots are imaginary.	½	2
	Alternate method :		
	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	½	
	$= \frac{-(-2) \pm \sqrt{-8}}{2(1)}$	½	
	$= \frac{2 \pm \sqrt{4 \times -2}}{2}$		
	$= \frac{\cancel{2} \pm \cancel{2}\sqrt{-2}}{\cancel{2}}$		
	$= 1 \pm \sqrt{-2}$	½	
	∴ Roots are imaginary.	½	2

Qn. Nos.	**Value Points**		**Marks allotted**
25.	Consider ΔPXQ and ΔZXY		
	$P\hat{Q}X = X\hat{Y}Z = 90°$		
	$P\hat{X}Q = Y\hat{X}Z$ common	1	
	$\therefore \quad \Delta PXQ \sim \Delta ZXY$		
	$\therefore \quad \frac{XP}{XZ} = \frac{XQ}{XY}$	½	
	$\frac{4}{24} = \frac{XQ}{16}$		
	$XQ = \frac{4 \times \cancel{16}^{2}}{\cancel{24}^{3}} = \frac{8}{3}$		
	$XQ = 2{\cdot}66 \simeq 2{\cdot}6$ cm.	½	2
26.	LHS $= \frac{1 - \tan^2 A}{1 + \tan^2 A}$		
	$= \frac{1 - \frac{\sin^2 A}{\cos^2 A}}{1 + \frac{\sin^2 A}{\cos^2 A}}$	½	
	$= \frac{\cos^2 A - \sin^2 A}{\cos^2 A + \sin^2 A}$	½	
	$= \frac{\cos^2 A - (1 - \cos^2 A)}{1}$	½	
	$= \cos^2 A - 1 + \cos^2 A \qquad = 2\cos^2 A - 1.$	½	2
	Alternate method :		
	L.H.S. $= \frac{1 - \tan^2 A}{1 + \tan^2 A}$		
	$= \frac{1 - (\sec^2 A - 1)}{1 + (\sec^2 A - 1)}$	½	
	$= \frac{1 - \sec^2 A + 1}{1 + \sec^2 A - 1}$	½	
	$= \frac{2 - \sec^2 A}{\sec^2 A}$		
	$= \frac{2}{\sec^2 A} - 1$	½	
	$= 2\cos^2 A - 1.$	½	2

Qn. Nos.	Value Points		Marks allotted
27.	Let $(x_1, y_1) \equiv (4, -8)$ and $(x_2, y_2) \equiv (5, -2)$	½	
	Slope $= \dfrac{y_2 - y_1}{x_2 - x_1}$	½	
	$= \dfrac{-2+8}{5-4}$	½	
	$= 6.$	½	2
28.	Let $(x_1, y_1) = (2, 3)$ and $(x_2, y_2) = (4, 7)$ Mid-point $= \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$	½	
	$= \left(\dfrac{2+4}{2}, \dfrac{3+7}{2}\right)$	½	
	$= \left(\dfrac{6}{2}, \dfrac{10}{2}\right)$	½	
	$= (3, 5).$	½	2
29.	$30 \text{ m} = \dfrac{1}{20} \times 30 = 1{\cdot}5 \text{ cm}$ $80 \text{ m} = \dfrac{80}{20} = 4 \text{ cm}$ $100 \text{ m} = \dfrac{100}{20} = 5 \text{ cm}$ $150 \text{ m} = \dfrac{150}{20} = 7{\cdot}5 \text{ cm}$ $40 \text{ m} = \dfrac{40}{20} = 2 \text{ cm}$ $70 \text{ m} = \dfrac{70}{20} = 3{\cdot}5 \text{ cm.}$	½	
		1½	2

Qn. Nos.	Value Points	Marks allotted

30. $r = 3{\cdot}5$ cm Chord $= 6$ cm



Circle — ½

Chord — ½

$OP \perp AB$ — ½

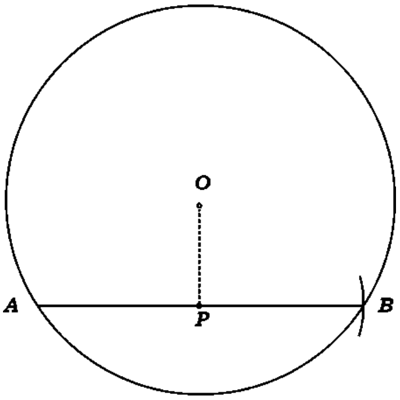
Ans. — ½

Distance $OP = 1{\cdot}8$ cm

2

Alternate method :

$r = 3{\cdot}5$ cm Chord $= 6$ cm



Circle — ½

Chord — ½

$OP \perp AB$ — ½

Ans. — ½

Distance $\overline{OP} = 1{\cdot}8$ cm

2

IV. 31. Let the number of persons in the function be n
Handshakes will be exchanged between two persons } 1

$\therefore \quad {}^{n}C_{2} = 45$ (given)

$$\frac{n(n-1)}{2 \times 1} = 45$$ ½

$n(n-1) = 90$ ½

$n(n-1) = 10 \times 9$ ½

$\therefore \quad n = 10$

Hence the number of persons = 10 } ½

Note : By applying quadratic equation and finds $n = 10$, give marks. 3

OR

Qn. Nos.	Value Points		Marks allotted
	Number of diagonals $= {}^{n}C_{2} - n$	1	
	$= \frac{n(n-1)}{2 \times 1} - n$	½	
	$= \frac{n^{2} - n - 2n}{2}$	½	
	$= \frac{n^{2} - 3n}{2}$	½	
	$= \frac{n(n-3)}{2}.$	½	3
32.	I. Actual mean method :		

X	$d = X - \overline{X}$	d^{2}
36	– 12	144
40	– 8	64
48	0	0
52	4	16
64	16	256
$\sum X = 240$		$\sum d^{2} = 480$

1

Mean $\overline{X} = \frac{\sum X}{N} = \frac{\cancel{240}}{\cancel{5}} = 48$

Standard deviation $(\sigma) = \sqrt{\frac{\sum d^{2}}{N}}$ ½

$= \sqrt{\frac{480}{5}}$

$= \sqrt{96}$

$\simeq 9 \cdot 8$ ½

Coefficient of variation (C.V.) $= \frac{\sigma}{\overline{X}} \times 100$ ½

$= \frac{9 \cdot 8}{48} \times 100$

$= \frac{980}{48}$

$\simeq 20 \cdot 41.$ ½ 3

Qn. Nos.	**Value Points**	**Marks allotted**

II. Step deviation method :

X	$d = X - A$	*Step deviation* $d = \frac{X-A}{C}$	d^2
36	– 12	– 3	9
40	– 8	– 2	4
48	0	0	0
52	+ 4	1	1
64	+ 16	4	16
$N = 5$		$\Sigma d = 0$	$\Sigma d^2 = 30$

1

Assumed mean = A = 48 = (Actual mean)

Common factor = C = 4

(σ) Standard deviation $= \sqrt{\frac{\Sigma d^2}{N} - \left(\frac{\Sigma d}{N}\right)^2} \times C$ ½

$$= \sqrt{\frac{30}{5} - 0^2} \times 4$$

$$= \sqrt{6} \times 4$$ ½

$$= 2{\cdot}42 \times 4$$

$$\sigma \simeq 9{\cdot}8.$$

Coefficient of variation (C.V.) $= \frac{\sigma}{\overline{X}} \times 100$ ½

$$= \frac{9 \cdot 8}{48} \times 100$$

$$\simeq 20{\cdot}41.$$ ½ 3

Qn. Nos.	Value Points	Marks allotted

Alternate method :

III. Assumed mean method :

X	$d = x - \text{A}$	d^2
36	$36 - 48 = -12$	144
40	$40 - 48 = -8$	64
48	$48 - 48 = 0$	0
52	$52 - 48 = 4$	16
64	$64 - 48 = 16$	256
$N = 5$	$\sum d = 0$	$\sum d^2 = 480$

1

Assumed mean = 48

$$\text{S.D. } (\sigma) = \sqrt{\frac{\sum d^2}{N} - \left(\frac{\sum d}{N}\right)^2}$$ ½

$$\sigma = \sqrt{\frac{480}{5} - \left(\frac{0}{5}\right)^2}$$

$$\sigma = \sqrt{96 - 0}$$

$$\sigma = \sqrt{96}$$

$$\sigma = 9{\cdot}8$$ ½

$$\text{C.V.} = \frac{\sigma}{\overline{x}} \times 100 = \frac{9 \cdot 8}{48} \times 100 = \frac{980}{48}$$ ½

$$\text{C.V.} = 20{\cdot}41.$$ ½

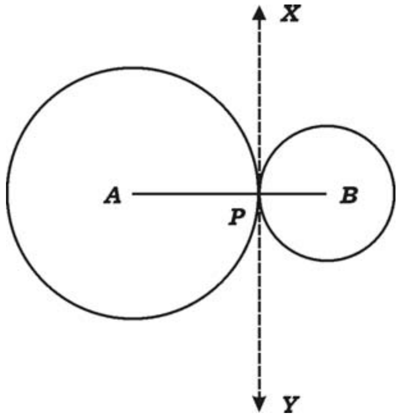
Alternate method :

IV. Direct method :

X	X^2
36	1296
40	1600
48	2304
52	2704
64	4096
$\sum x = 240$	$\sum x^2 = 12000$
$N = 5$	

1

$$\overline{x} = \frac{\sum x}{N} = \frac{240}{5} = 48$$

Qn. Nos.	**Value Points**	**Marks allotted**
	S.D. (σ) = $\sqrt{\frac{\sum x^2}{N} - \left(\frac{\sum x}{N}\right)^2}$ ½	
	$\sigma = \sqrt{\frac{12000}{5} - \left(\frac{240}{5}\right)^2}$	
	$\sigma = \sqrt{2400 - 2304}$	
	$\sigma = \sqrt{96}$	
	$\sigma = 9 \cdot 8$ ½	
	C.V. = $\frac{\sigma}{\bar{x}} \times 100$ ½	
	$= \frac{9 \cdot 8}{48} \times 100$	
	$= \frac{980}{48} \times 100$	
	$= 20 \cdot 41.$ ½	3
33.	 ½	
	Data : *A* and *B* are the centres of touching circles. *P* is the point of contact. ½	
	To prove : *A, P* and *B* are collinear. ½	
	Construction : Tangent *XY* is drawn at *P.* ½	
	Proof : In the figure	
	$A\hat{P}X = 90^\circ$ ... (i) $B\hat{P}X = 90^\circ$ ... (ii) } Radius drawn at the point of contact is perpendicular to the tangent ½	

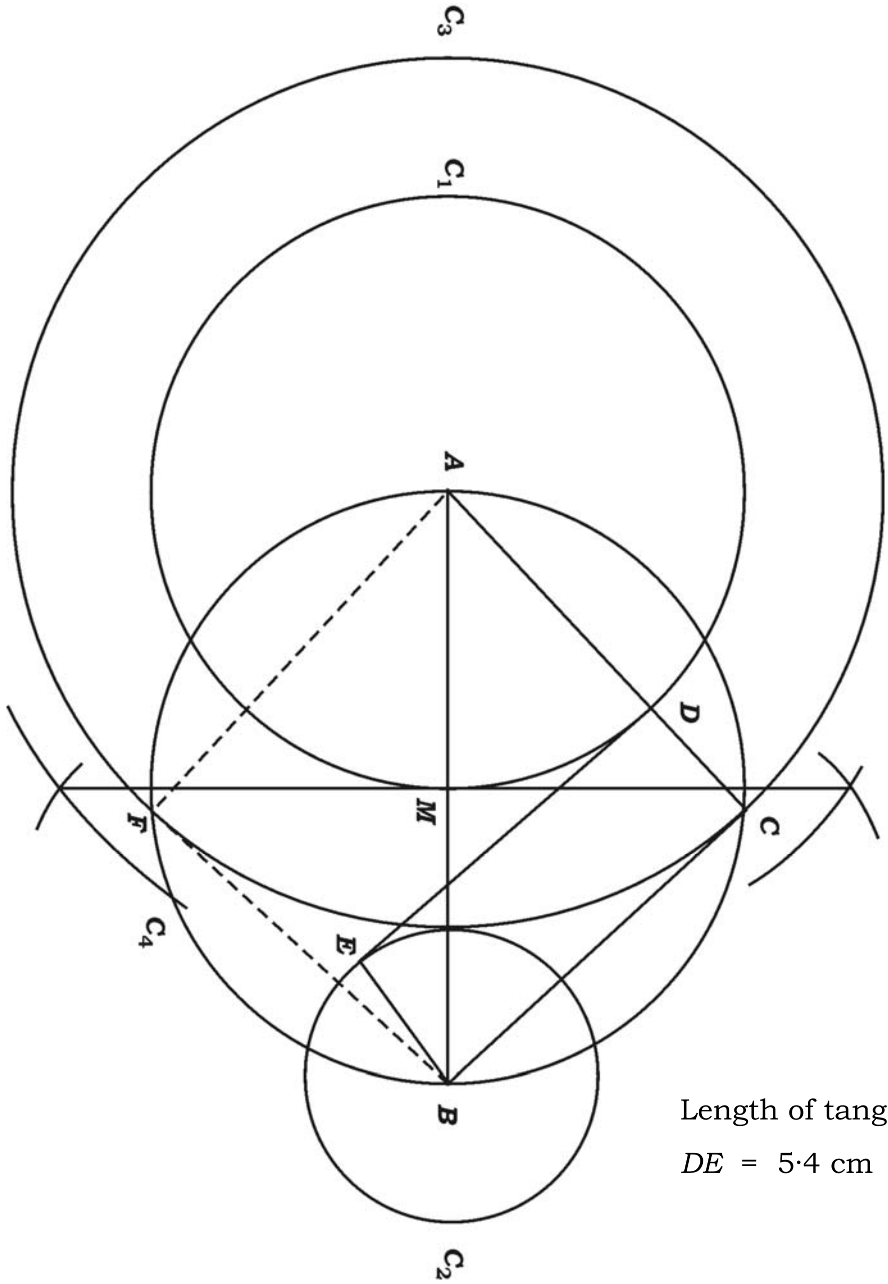
Qn. Nos.	Value Points		Marks allotted
	$A\hat{P}X + B\hat{P}X = 90^\circ + 90^\circ$ by adding (i) and (ii)		
	$A\hat{P}B = 180^\circ$ $A\hat{P}B$ is a straight angle.		
	$\therefore$ APB is a straight line		
	$\therefore$ A, P and B are collinear.	½	3
34.	In $\triangle\, LAN$, $L\hat{N}A = 90^\circ$		
	$\therefore \quad LA^2 = LN^2 + NA^2$	½	
	$= 6^2 + 8^2$		
	$= 36 + 64$	½	
	$= 100$		
	$\therefore \quad LA = \sqrt{100} = 10$ cm	½	
	In $\triangle\, LAW$, $L\hat{A}W = 90^\circ$		
	$\therefore \quad LW^2 = LA^2 + WA^2$	½	
	$WA^2 = LW^2 - LA^2$		
	$= 26^2 - 10^2$	½	
	$= (26 + 10)(26 - 10)$		
	$WA = \sqrt{36 \times 16}$		
	$= 6 \times 4$		
	$WA = 24$ cm.	½	3
	OR		
	In $\triangle\, MPG$, $M\hat{P}G = 90^\circ$		
	$\therefore \quad MG^2 = MP^2 + GP^2$	½	
	$\therefore \quad MP^2 = MG^2 - GP^2$		
	$= a^2 - c^2$ (i)	½	
	In $\triangle\, MPN$, $M\hat{P}N = 90^\circ$		
	$\therefore \quad MN^2 = MP^2 + PN^2$	½	
	$\therefore \quad MP^2 = MN^2 - PN^2$		
	$= b^2 - d^2$ (ii)	½	3

Qn. Nos.	Value Points		Marks allotted
	From (i) and (ii)		
	$a^2 - c^2 = b^2 - d^2$		
	$a^2 - b^2 = c^2 - d^2$	½	
	$(a+b)(a-b) = (c+d)(c-d)$		
	$\therefore \quad \dfrac{a-b}{c-d} = \dfrac{c+d}{a+b}$	½	
	Proved.		
35.	In $\triangle ABC$, $A\hat{B}C = 90°$ and $A\hat{C}B = 30°$		
	$\therefore \quad \tan 30° = \dfrac{AB}{BC}$	½	
	$\dfrac{1}{\sqrt{3}} = \dfrac{AB}{BX+6}$		
	$\therefore \quad AB = \dfrac{BX+6}{\sqrt{3}}$ ... (i)	½	
	In $\triangle ABX$, $A\hat{B}X = 90°$ and $A\hat{X}B = 60°$		
	$\therefore \quad \tan 60° = \dfrac{AB}{BX}$	½	
	$\sqrt{3} = \dfrac{AB}{BX}$		
	$\therefore \quad AB = \sqrt{3}\,.\,BX$ ... (ii)	½	
	Substituting (ii) in (i)		
	$\sqrt{3}\,.\,BX = \dfrac{BX+6}{\sqrt{3}}$	½	
	$\therefore \quad BX + 6 = 3BX$		
	$3BX - BX = 6$		
	$2BX = 6$		
	$\therefore \quad BX = 3$ m		
	If $BX = 3$ then $AB = BX\sqrt{3}$		
	$= 3\sqrt{3}$ m		
	$\therefore$ Height of the flag post $= 3\sqrt{3}$ m.	½	3
	OR		

Qn. Nos.	**Value Points**		**Marks allotted**
	$\sin(90^\circ - \theta) = \cos\theta$		
	$\operatorname{cosec}(90^\circ - \theta) = \sec\theta$		
	$\cot(90^\circ - \theta) = \tan\theta$		
	LHS $= \dfrac{\cos\theta}{\sec\theta - \tan\theta}$	½	
	$= \dfrac{\cos\theta}{\dfrac{1}{\cos\theta} - \dfrac{\sin\theta}{\cos\theta}}$	½	
	$= \dfrac{\cos\theta}{\dfrac{1-\sin\theta}{\cos\theta}}$		
	$= \cos\theta \times \dfrac{\cos\theta}{1-\sin\theta}$		
	$= \dfrac{\cos^2\theta}{1-\sin\theta}$	½	
	$= \dfrac{1-\sin^2\theta}{1-\sin\theta}$	½	
	$= \dfrac{\cancel{(1-\sin\theta)}(1+\sin\theta)}{\cancel{(1-\sin\theta)}}$	½	
	$= 1 + \sin\theta.$	½	
	∴ LHS = RHS.		3
36.	Radius $= r = \dfrac{7}{2}$ cm		
	Height of the cone $= h = 5$ cm		
	Volume of the toy = Volume of the cone + Volume of the hemi-sphere		
		½	
	$= \dfrac{1}{3}\pi r^2 h + \dfrac{2}{3}\pi r^3$	1	3

Qn. Nos.	**Value Points**	**Marks allotted**
	$= \frac{\pi r^2}{3}(h+2r)$ ½	
	$= \frac{\cancel{22}^{11}}{\cancel{7}} \times \frac{1}{3} \times \frac{\cancel{7}}{\cancel{2}} \times \frac{7}{2}\left(5+\cancel{2}\cdot\frac{7}{\cancel{2}}\right)$ ½	
	$= \frac{\cancel{77}}{6} \times \cancel{12}^{2}$	
	$= 154$ c.c. ½	
	OR	
	Radius $= r = 7$ cm	
	Slant height of the cone = height of the cylinder = 4 cm ½	
	Total surface area of the solid = Lateral surface area of (cone + cylinder + hemisphere) ½	
	$T.S.A. = \pi rl + 2\pi rh + 2\pi r^2$ 1	
	$= \pi r(l+2h+2r)$	
	$= \frac{22}{\cancel{7}} \times \cancel{7}(4+2\times4+2\times7)$ ½	
	$= 22\times(4+8+14)$	
	$= 22\times26 = 572$ sq.cm ½	3

Qn. Nos.	**Value Points**		**Marks allotted**
V. 37.	R = 4 cm, r = 2 cm, d = 8 cm $R + r$ = 4 + 2 = 6 cm		
	Drawing AB and marking mid-point	1	
	Drawing C_1 , C_2 , C_3	1½	
	Joining CB, DE	1	
	Measuring and writing the length of the tangent	½	4



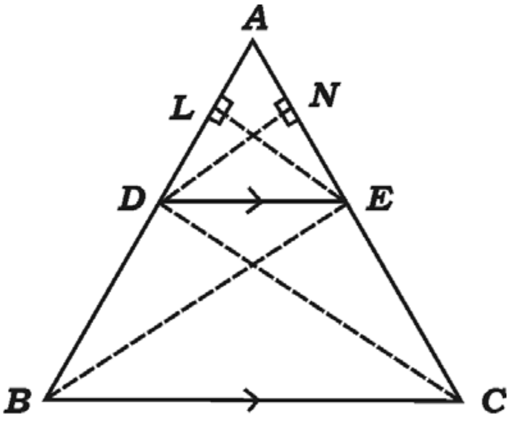
Length of tangent

DE = 5·4 cm

Qn. Nos.	**Value Points**	**Marks allotted**

38. Thales theorem or Basic Proportionality theorem.

"If a straight line is drawn parallel to a side of a triangle, then it divides the other two sides proportionally." 1



½

Data : In $\Delta\, ABC$, $DE \parallel BC$

To Prove : $\frac{AD}{DB} = \frac{AE}{EC}$ ½

Construction : D, C and E, B joined

$EL \perp AB$ and $DN \perp AC$ drawn. ½

Proof : Statement Reason

$$\frac{\text{Area of } \Delta\, ADE}{\text{Area of } \Delta\, BDE} = \frac{\frac{1}{\cancel{2}} \times AD \times \cancel{EL}}{\frac{1}{\cancel{2}} \times DB \times \cancel{EL}} \qquad \because\ A = \frac{1}{2} \times b \times h$$ ½

$$\therefore \quad \frac{\Delta\ ADE}{\Delta\ BDE} = \frac{AD}{DB} \qquad \ldots \text{(i)}$$

$$\frac{\text{Area of } \Delta\, ADE}{\text{Area of } \Delta\, CDE} = \frac{\frac{1}{\cancel{2}} \times AE \times \cancel{DN}}{\frac{1}{\cancel{2}} \times EC \times \cancel{DN}} \qquad \because\ A = \frac{1}{2} \times b \times h$$ ½

$$\therefore \quad \frac{\Delta\ ADE}{\Delta\ CDE} = \frac{AE}{EC} \qquad \ldots \text{(ii)}$$

$$\Rightarrow \quad \frac{AD}{DB} = \frac{AE}{CE} \qquad \because\ [\text{ Area } \Delta\ BDE = \text{area of } \Delta\ CDE \text{ and Axiom-1 }]$$ ½ 4

Qn. Nos.	Value Points		Marks allotted
39.	$T_3 = T_1^2$		
	$ar^2 = a^2$		
	$\therefore \quad a = r^2 \qquad \ldots \text{(i)}$	½	
	$T_5 = 64$		
	$ar^4 = 64 \qquad \ldots \text{(ii)}$	½	
	Substituting (i) in (ii)		
	$r^2 r^4 = 64 \quad , \qquad r^6 = 64$		
	$\therefore \quad r = 2$	½	
	If $r = 2$ then $a = 2^2 = 4$	½	
	If $r = 2$ and $a = 4$ then		
	$S_n = \dfrac{a(r^n - 1)}{r-1}$	½	
	$S_6 = \dfrac{4(2^6 - 1)}{2-1}$	½	
	$= 4(64 - 1)$	½	
	$= 4 \times 63$		
	$= 252.$	½	4
	OR		

Qn. Nos.	Value Points		Marks allotted
	$T_4 = 10$		
	$a + 3d = 10$ … (i)	½	
	$T_{11} = 3T_4 + 1$	½	
	$a + 10d = 3(10) + 1$		
	$a + 10d = 31$ … (ii)	½	
	By solving (i) and (ii)		
	$\cancel{a} + 10d = 31$		
	$(-)\ \cancel{a} + 3d = 10$		
	$7d = 21 \quad \therefore \quad d = 3$	½	
	If $d = 3$ then $a + 3(3) = 10$		
	$a + 9 = 10$		
	$\therefore \quad a = 10 - 9 = 1$	½	
	If $a = 1$ and $d = 3$ and $n = 20$		
	$S_n = \frac{n}{2}[2a + (n-1)d]$	½	
	$S_{20} = \frac{20}{2}[2 \times 1 + (20-1)3]$	½	
	$= 10[2 + 57]$		
	$= 10 \times 59$		
	$= 590.$	½	4

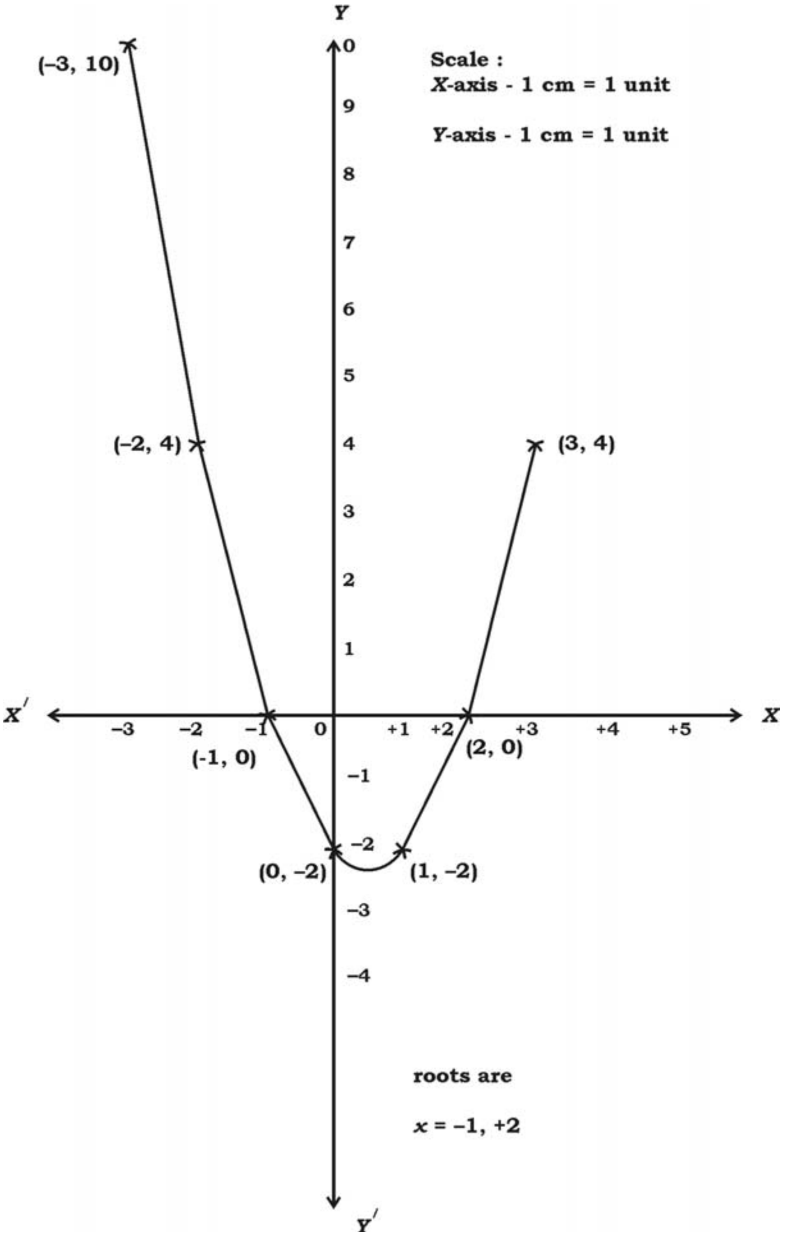
Qn. Nos.	Value Points	Marks allotted
40.	$x^2 - x - 2 = 0$ $\therefore \quad y = x^2 - x - 2$	

x	0	1	2	3	– 1	– 2	– 3
y	– 2	– 2	0	4	0	4	10

Table — 2

Drawing parabola — 1

Identifying roots — 1 4



Alternate method give full marks.

Qn. Nos.	**Value Points**	**Marks allotted**

Alternate method :

$$x^2 - x - 2 = 0$$

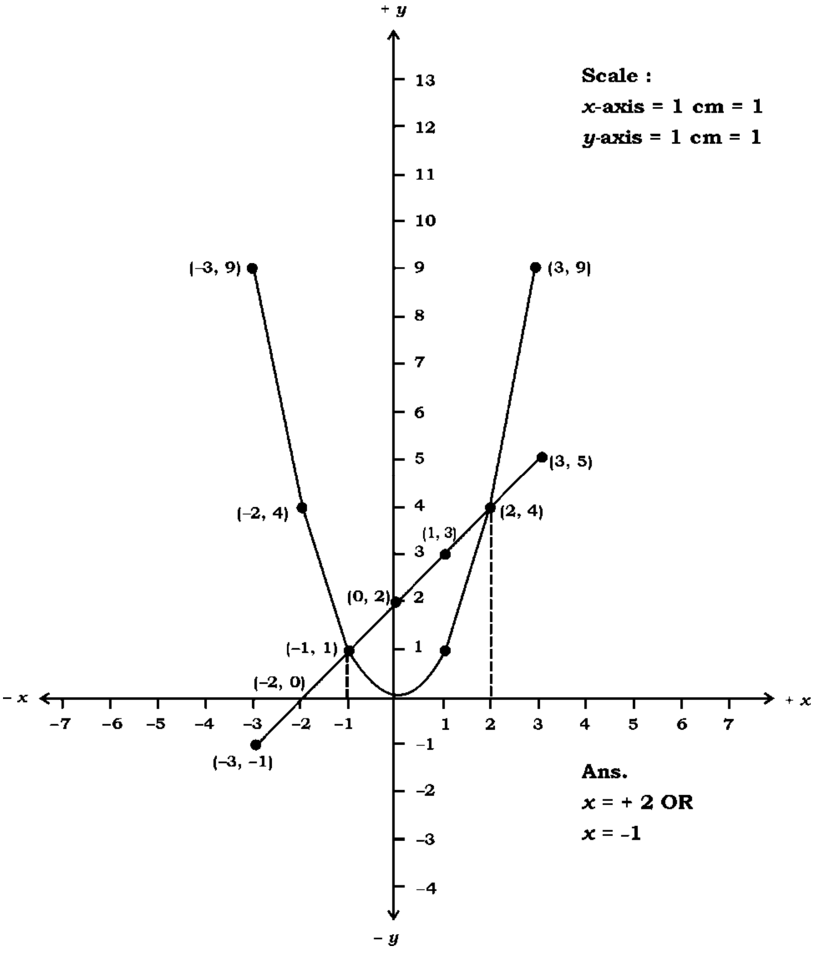
$$y = x^2$$

x	-3	-2	-1	0	1	2	3
y	9	4	1	0	1	4	9

$$y = x + 2$$

x	-3	-2	-1	0	1	2	3
y	-1	0	1	2	3	4	5

Table —	2	
Drawing parabola + Straight line —	1	
Identifying roots —	1	4



Alternate method give full marks.