CCE PF
CCE PR

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 — 2016

S. S. L. C. EXAMINATION, MARCH/APRIL, 2016

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 04. 04. 2016] ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Date : 04. 04. 2016] **CODE NO. : 81-E**

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಹೊಸ ಪಠ್ಯಕ್ರಮ / New Syllabus)

(ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ + ಪುನರಾವರ್ತಿತ ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / Private Fresh + Private Repeater)

(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / English Version)

[ಪರಮಾವಧಿ ಅಂಕಗಳು : **100**

[Max. Marks : 100

Qn. Nos.	Ans. Key	Value Points	Marks allotted
I. 1.	C	12	1
2.	A	5	1
3.	C	0·7	1
4.	D	3	1
5.	B	5 units	1
6.	D	$\sqrt{3}$	1
7.	B	$\frac{5}{3}$	1
8.	A	12.	1

Qn. Nos.	**Value Points**		**Marks allotted**
II.			
9.	$A^{l} = U - A$	½	
	$A^{l} = \{1, 2, 3, 4, 5\} - \{2, 4, 5\}$		
	$\therefore \quad A^{l} = \{1, 3\}$	½	1
10.	$(a, b)\text{ L.C.M.} = \frac{a \times b}{(a, b)\text{ H.C.F.}}$	½	
	$\text{L.C.M.} = \frac{12 \times 18}{6}\,^{3}$		
	$\text{L.C.M.} = 36$	½	1
11.	$f(x) = 2x^2 + 3x + 2$		
	$f(2) = 2(2)^2 + 3(2) + 2$	½	
	$= 8 + 6 + 2$		
	$= 16$	½	1
12.	$d = 10$ cm $\qquad d = 4$ cm		
	$R = \frac{10}{2} = 5$ cm $\qquad r = \frac{4}{2} = 2$ cm	½	
	Distance between centres $d = R + r$		
	$d = 5 + 2 = 7$ cm	½	1
13.	In a right angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.		1
14.	Total surface area of cylinder $= 2\pi r(r + h)$ sq.units.		1
III. 15.	$n = 8$		
	Number of diagonals $= {}^{n}C_2 - n$	½	
	$= {}^{8}C_2 - 8$	½	
	$= \frac{1}{2}\,{}^{8}P_2 - 8$		
	$= \frac{8 \times 7}{2} - 8$	½	
	$= 28 - 8.$		
	Number of diagonals $= 20$	½	2
	OR		

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

$$n = 8$$

Number of diagonals $= {}^{n}C_2 - n$ ½

$= \dfrac{n(n-3)}{2}$ ½

$= \dfrac{8(8-3)}{2}$ ½

$\overset{4}{=} \dfrac{8 \times 5}{2}$

Number of diagonals $= 20.$ ½ 2

16. If possible, let us assume $2 + \sqrt{5}$ is a rational number. ½

$2 + \sqrt{5} = \dfrac{p}{q}$ where $p, q \in z, \; q \neq 0,$

$2 - \dfrac{p}{q} = -\sqrt{5}$

$\dfrac{2q - p}{q} = -\sqrt{5}.$ ½

$\Rightarrow -\sqrt{5}$ is a rational number

$\because \; \dfrac{2q - p}{q}$ is a rational number ½

But $-\sqrt{5}$ is not a rational number.

$\therefore$ Our supposition $2 + \sqrt{5}$ is a rational number is wrong. ½

$\Rightarrow$ $2 + \sqrt{5}$ is an irrational number. 2

17. Total number of watches $n(S) = 500$ ½

Number of watches defective $n(A) = 50$ ½

$P(A) = \dfrac{n(A)}{n(S)}$ ½

$P(A) = \dfrac{50}{500}\begin{matrix}1\\10\end{matrix}$

Probability of watches

to be defective $= \dfrac{1}{10}$ or $\dfrac{50}{500}$ ½ 2

Qn. Nos.	Value Points		Marks allotted
18.	$\sqrt{3} \times \sqrt[3]{2}$		
	L.C.M. of 2 and 3 is 6	½	
	$\sqrt{3} = 3^{\frac{1}{2}\times\frac{6}{6}} = 3^{3/6} = \sqrt[6]{3^3} = \sqrt[6]{27}$	½	
	$\sqrt[3]{2} = 2^{\frac{1}{3}\times\frac{6}{6}} = 2^{2/6} = \sqrt[6]{2^2} = \sqrt[6]{4}$	½	
	$\sqrt{3} \times \sqrt[3]{2} = \sqrt[6]{27 \times 4}$		
	$= \sqrt[6]{108}$	½	2
19.	$\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}}$	½	
	$\frac{\sqrt{9}+\sqrt{6}+\sqrt{6}+\sqrt{4}}{\sqrt{9}-\sqrt{4}}$	½	
	$\frac{3+2\sqrt{6}+2}{3-2}$	½	
	$\frac{5+2\sqrt{6}}{1}$	½	2
	OR		
	$\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}}$	½	
	$\frac{(\sqrt{3}+\sqrt{2})^2}{(\sqrt{3})^2-(\sqrt{2})^2}$	½	
	$\frac{3+2\sqrt{6}+2}{3-2}$	½	
	$5 + 2\sqrt{6}$.	½	2

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

20.

$$\begin{array}{r l}
 & x^2 + 3x - 8 \\
x+1 \,\big) & x^3 + 4x^2 - 5x + 6 \\
 & x^3 + 1x^2 \\
 & (-) \quad (-) \\
 & \quad + 3x^2 - 5x + 6 \\
 & \quad + 3x^2 + 3x \\
 & \quad (-) \quad (-) \\
 & \qquad - 8x + 6 \\
 & \qquad - 8x - 8 \\
 & \qquad (+) \quad (+) \\
 & \qquad\qquad 14
\end{array}$$

½ (for $x+1\,\big)\,x^3 + 4x^2 - 5x + 6$)

½ (for $+ 3x^2 - 5x + 6$)

½ (for $- 8x - 8$)

$q(x) = x^2 + 3x - 8$ ½

$R(x) = 14.$ 2

OR

Alternate method :

– 1	1	4	– 5	6	
	0	– 1	– 3	8	½
	1	3	– 8	14	½

$R(x) = 14$ ½

$q(x) = x^2 + 3x - 8$ ½ 2

Note : Finding remainder by using remainder theorem method give 1 mark only

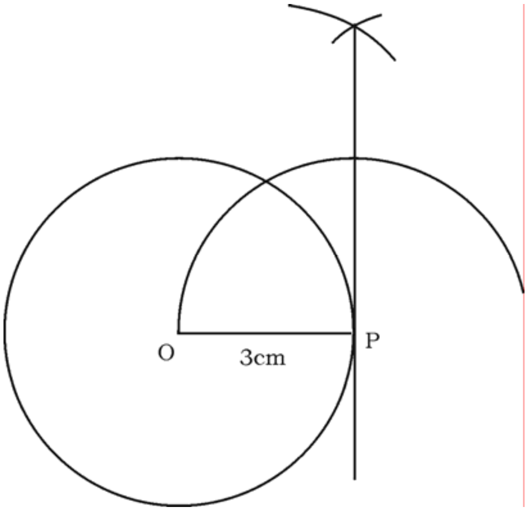
OR

Qn. Nos.	**Value Points**		**Marks allotted**
	$x^2 + 1$		
	$x^2 + 2x - 3\overline{)x^4 + 2x^3 - 2x^2 + x - 1}$	½	
	$x^4 + 2x^3 - 3x^2$		
	(–) (–) (+)	½	
	$x^2 + x - 1$		
	$x^2 + 2x - 3$		
	(–) (–) (+)		
	$- x + 2$	½	
	$r (x) = - x + 2 \Rightarrow \{ - r (x) \} = x - 2$		
	Hence we should add $(x - 2)$ to $P (x)$		
	so that the resulting polynomial is exactly divisible by $g (x)$	½	2
21.	In ΔABC, $DE \parallel AB$		
	$\frac{CD}{CA} = \frac{CE}{CB}$ (Corollary to B.P.T.)	½	
	$\frac{5}{12} = \frac{CE}{18}$	½	
	$12 \times CE = 5 \times 18$		
	$CE = \frac{5 \times 18}{12} = \frac{15}{2}$	½	
	$CE = 7{\cdot}5$ cm	½	2
22.	$\sqrt{3} \tan \theta = 1$		
	$\tan \theta = \frac{1}{\sqrt{3}}$	½	
	We know that $\tan 30° = \frac{1}{\sqrt{3}}$ $\therefore \theta = 30°$	½	
	$\therefore \sin 3\theta = \sin 3 (30°)$	½	
	$\sin 3\theta = \sin 90° = 1.$	½	2

Qn. Nos.	**Value Points**		**Marks allotted**
23.	$(x_1, y_1) = (2, 3)$ and $(x_2, y_2) = (4, 7)$	½	
	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	
	$= \left(\dfrac{6}{2}, \dfrac{10}{2} \right)$		
	$= (3, 5)$.	½	2
24.	$r = 7$ cm $l = 10$ cm		
	C.S.A. of cone $= \pi r l$	½	
	$= \dfrac{22}{7} \times 7 \times 10$	½ + ½	
	$= 220$ sq.cm.	½	2
	OR		
	Volume of cylinder $= \pi r^2 h$	½	
	$= \dfrac{22}{7} \times 7 \times 7 \times 10$	½	
	$= 22 \times 70$	½	
	$= 1540$ c.c.	½	2
25.	$x^2 - 4x + 2 = 0$		
	$a = 1, \quad b = -4, \quad c = 2$	½	
	$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	½	
	$x = \dfrac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(2)}}{2(1)}$	½	
	$x = \dfrac{4 \pm \sqrt{16 - 8}}{2}$		
	$x = \dfrac{4 \pm \sqrt{8}}{2}$		
	$x = \dfrac{4 \pm 2\sqrt{2}}{2}$		
	$= \dfrac{2(2 \pm \sqrt{2})}{2}$	½	
	$x = 2 \pm \sqrt{2}$.		2

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

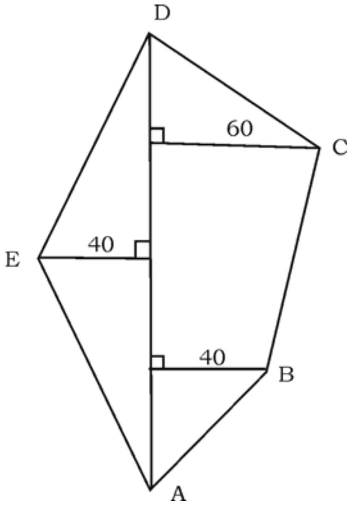
26.



Construction of circle	½	
Radius *OP*	½	
Arcs	½	
Tangent at *P*	½	2

27.

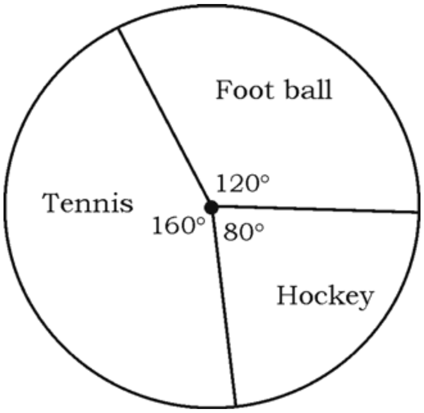
Scale : 20 m = 1 cm
40 m = 2 cm
80 m = 4 cm
120 m = 6 cm
160 m = 8 cm
60 m = 3 cm



Calculation	½	
Field drawing	1½	2

Qn. Nos.	**Value Points**		**Marks allotted**
28.	$n(M) = 12, \quad n(D) = 15, \quad n(M \cap D) = 7$		
	$n(M \cup D) = ?$	½	
	$n(M) + n(D) = n(M \cup D) + n(M \cap D)$		
	OR		
	$n(M \cup D) = n(M) + n(D) - n(M \cap D)$	½	
	$= 12 + 15 - 7$		
	$= 27 - 7$	½	
	$n(M \cup D) = 20$		
	Number of people in the group = 20	½	2
29.	Volume of hemisphere = Volume of cylinder	½	
	$\frac{2}{3}\pi r_1^3 = \pi r_2^2 h$	½	
	$\frac{2}{3} \times 12 \times 12 \times 12 = 6 \times 6 \times h$	½	
	$32 = h$		
	$\therefore \quad h = 32$ cm	½	2
30.	$4 + 7 + 10 + \ldots\ldots$		
	$a = 4, \quad d = 7 - 4$		
	$= 3 \quad S_{20} = ?$	½	
	$S_n = \frac{n}{2}[2a + (n-1)d]$	½	
	$S_{20} = \frac{20}{2}[2 \times 4 + (20-1)3]$	½	
	$= 10[8 + 57]$		
	$= 10 \times 65$		
	$S_{20} = 650$	½	
	Sum of the first 20 terms of the series = 650		2
31.	$A \cup (B \cap C) = \{1, 2, 3, 4\} \cup \{5\}$	1	
	$= \{1, 2, 3, 4, 5\}$	1	2

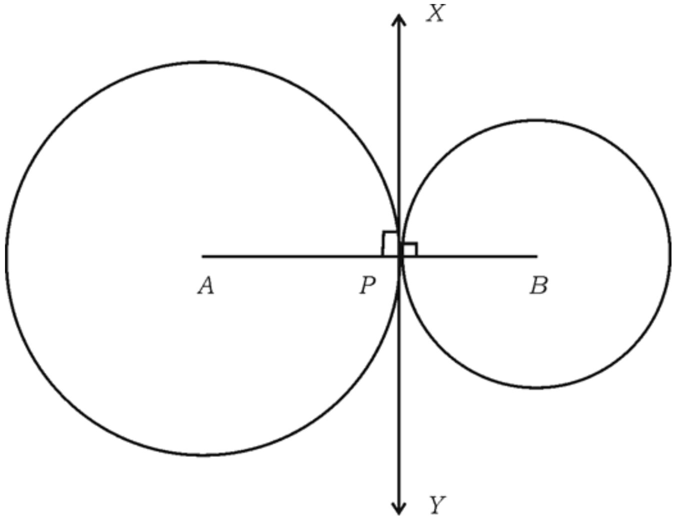
Qn. Nos.	Value Points		Marks allotted
32.	$\frac{1}{2}, \frac{1}{4}, \frac{1}{6}$ ..... H.P.		
	2, 4, 6 ..... AP.		
	$a = 2, \quad d = 4 - 2 = 2 \qquad T_{10} = ?$	½	
	$T_n = a + (n - 1)d$	½	
	$T_{10} = 2 + (10 - 1)2$	½	
	$= 2 + 18$		
	$T_{10} = 20$ AP		
	$\therefore \quad T_{10} = \frac{1}{20}$ HP	½	2
	OR		
	$a = 2, \quad d = 2, \quad T_{10} = ?$	½	
	$T_n = \frac{1}{a + (n-1)d}$	½	
	$T_{10} = \frac{1}{2 + (10-1)2}$	½	
	$= \frac{1}{2 + 18}$		
	$= \frac{1}{20}.$	½	2
33.	$1 + \frac{1}{3} + \frac{1}{9} + \ldots$ up to ∞		
	$a = 1, \quad r = \frac{1}{3} \qquad S_\infty = ?$	½	
	$S_\infty = \frac{a}{1 - r}$	½	
	$S_\infty = \frac{1}{1 - \frac{1}{3}}$	½	
	$S_\infty = \frac{1}{2/3}$		
	$S_\infty = 1 \times \frac{3}{2}$		
	$S_\infty = \frac{3}{2}.$	½	2

Qn. Nos.	Value Points		Marks allotted
34.	$4\sqrt{63} + 5\sqrt{7} - 8\sqrt{28}$		
	$= 4\sqrt{9 \times 7} + 5\sqrt{7} - 8\sqrt{4 \times 7}$	½	
	$= 12\sqrt{7} + 5\sqrt{7} - 16\sqrt{7}$	½	
	$= (12 + 5 - 16)\sqrt{7}$	½	
	$= \sqrt{7}$.	½	2
35.	$S = \{(HH)(TT)(HT)(TH)\}$	½	
	$n(S) = 4$		
	Exactly one tail $(A) = (HT)(TH)$	½	
	$n(A) = 2$		
	$P(A) = \frac{n(A)}{n(S)}$	½	
	$P(A) = \frac{2^{1}}{4^{2}}$ or $\frac{1}{2}$	½	2
36.	Total number of students = 36		
	Football = $\frac{12}{36} \times 360 = 120^\circ$		
	Tennis = $\frac{16}{36} \times 360 = 160^\circ$	½	
	Hockey = $\frac{8}{36} \times 360 = 80^\circ$		
		1½	
			2

Qn. Nos.	Value Points		Marks allotted
37.	Let $m = 5, \quad n = 7$		
	$m + n = 5 + 7 = 12$	½	
	$mn = 5 \times 7 = 35$	½	
	$x^2 - x(m + n) + mn = 0$	½	
	$x^2 - x(12) + 35 = 0$	½	
	$x^2 - 12x + 35 = 0$		2
38.	$k = \frac{1}{2} mv^2$		
	$mv^2 = 2k$	½	
	$v^2 = \frac{2k}{m}$		
	$v = \pm \sqrt{\frac{2k}{m}}$	½	
	$v = \pm \sqrt{\frac{2 \times 100}{2}}$	½	
	$= \pm \sqrt{100}$		
	$v = \pm 10.$	½	2
39.	In $\Delta\ ABC, \quad \angle B = 90°, \quad BD \perp AC$		
	$BD^2 = AD \times CD$	½	
	$8^2 = 4 \times CD$	½	
	$4CD = 64$	½	
	$CD = \frac{64}{4} = 16$ cm	½	2
40.	$r = 7$ cm	½	
	T.S.A. of sphere $= 4\pi r^2$	½	
	$= 4 \times \frac{22}{7} \times 7 \times 7$	½	
	$= 88 \times 7$		
	$= 616$ sq.cm.	½	2

Qn. Nos.	Value Points	Marks allotted

IV. 41.



½

Data : A and B are the centres of touching circles. P is point of contact. ½

To prove : A, P and B are collinear ½

Construction : Draw the common tangent XPY ½

Proof : $\angle APX = 90°$ (i) $(AP \perp XY)$

$\angle BPX = 90°$ (ii) $(BP \perp XY)$ ½

Add (i) and (ii)

$\angle APX + \angle BPX = 180°$

$\angle APB = 180°$

APB is a straight line

$\therefore$ A, P, B are collinear. ½ 3

42.

C.I.	f	x	fx	$x - \bar{x} = D$	D^2	$f D^2$
1 – 5	4	3	12	– 5	25	100
6 – 10	3	8	24	0	00	00
11 – 15	2	13	26	5	25	50
16 – 20	1	18	18	10	100	100

$N = 10$ $\sum fx = 80$ $\sum f D^2 = 250$

1½

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

Mean $\bar{x} = \frac{\sum fx}{N} = \frac{80}{10} = 8$ ½

$\sigma = \sqrt{\frac{\sum f D^2}{N}} = \sqrt{\frac{250}{10}} = \sqrt{25} = 5$ 1

For any other correct method full marks is to be given. 3

43\. Given digits : 1, 2, 3, 4, 5, 6

a) 4-digit number can be formed in ${}^6P_4$ ways ½

${}^6P_4 = 6 \times 5 \times 4 \times 3$ ½

${}^6P_4 = 360.$ ½

b) Less than 5000 :

Th	*H*	*Ten*	*U*
${}^4P_1$ ways	${}^5P_1$ ways	${}^4P_1$ ways	${}^3P_1$ ways

½

Unit's place can be filled in ${}^3P_1$ ways

Ten's place can be filled in ${}^4P_1$ ways

Hundred's place can be filled in ${}^5P_1$ ways

Thousand's place can be filled in ${}^4P_1$ ways

Total number of ways $= {}^3P_1 \times {}^4P_1 \times {}^5P_1 \times {}^4P_1$ ½

$= 3 \times 4 \times 5 \times 4$

The number less than 5000 = 240. ½ 3

OR

$16\ {}^nP_3 = 13\ {}^{n+1}P_3$

$16 \,.\, n(n-1)(n-2) = 13(n+1)\,n(n-1)$ ½

$16(n-2) = 13(n+1)$ ½

$16n - 32 = 13n + 13$ ½

$16n - 13n = 13 + 32$ ½

$3n = 45$ ½

$n = \frac{45}{3}$

$n = 15.$ ½ 3

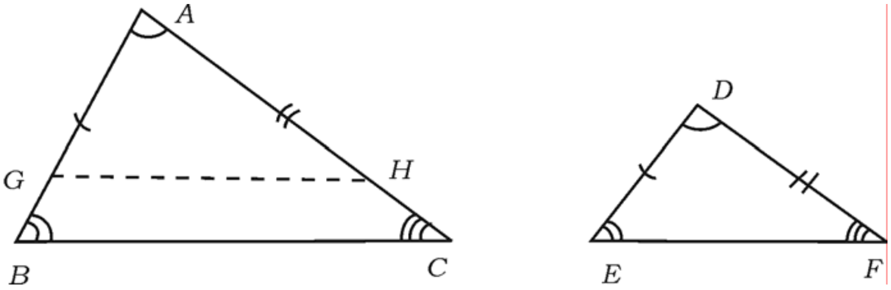
Qn. Nos.	**Value Points**	**Marks allotted**
44.	LHS $= \dfrac{\sin(90^\circ - \theta)}{1+\sin\theta} + \dfrac{\cos\theta}{1-\cos(90^\circ-\theta)}$	
	$= \dfrac{\cos\theta}{1+\sin\theta} + \dfrac{\cos\theta}{1-\sin\theta}$ ½	
	$= \dfrac{\cos\theta(1-\sin\theta)+\cos\theta(1+\sin\theta)}{1-\sin^2\theta}$ ½	
	$= \dfrac{\cos\theta - \cos\theta \,.\, \sin\theta + \cos\theta + \cos\theta \,.\, \sin\theta}{1-\sin^2\theta}$ ½	
	$= \dfrac{2\cos\theta}{\cos^2\theta}$ ½	
	$= \dfrac{2}{\cos\theta}$ ½	
	$= 2\sec\theta$ ½	
	LHS = RHS	3
	OR	
	LHS $= \cos(A+B)$	
	$= \cos(60^\circ + 30^\circ)$ ½	
	$= \cos 90^\circ$	
	$= 0$ ½	
	RHS $= \cos A \,.\, \cos B - \sin A \,.\, \sin B$	
	$= \cos 60^\circ \,.\, \cos 30^\circ - \sin 60^\circ \,.\, \sin 30^\circ$ ½	
	$= \left(\dfrac{1}{2}\times\dfrac{\sqrt{3}}{2}\right) - \left(\dfrac{\sqrt{3}}{2}\times\dfrac{1}{2}\right)$ ½	
	$= \dfrac{\sqrt{3}}{4} - \dfrac{\sqrt{3}}{4}$ ½	
	$= 0$ ½	
	LHS = RHS.	3

Qn. Nos.	**Value Points**		**Marks allotted**
45.	Let the number of pupils = x		
	Total cost = Rs. 1000		
	Each share = Rs. $\frac{1000}{x}$	½	
	If 10 of them are failed to join the function		
	then number of pupils joined = $x - 10$		
	Total cost = Rs. 1000		
	Each share = Rs. $\frac{1000}{x-10}$	½	
	Each would have to pay Rs. 5 more		
	$\frac{1000}{x-10} - \frac{1000}{x} = 5$	½	
	$\frac{1000x - 1000(x-10)}{x(x-10)} = 5$		
	$1000x - 1000x + 10000 = 5x^2 - 50x$		
	$5x^2 - 50x - 10000 = 0$		
	÷ by 5	½	
	$x^2 - 10x - 2000 = 0$		
	$x^2 - 50x + 40x - 2000 = 0$		
	$x(x-50) + 40(x-50) = 0$	½	
	$(x-50)(x+40) = 0$		
	$x = 50, \quad -40$		
	$\therefore \quad x = 50$		
	Number of pupils of the class = 50.	½	3
	OR		
	$x^2 - 5x + 3 = 0$		
	$a = 1, \quad b = -5, \quad c = 3$	½	
	$m + n = \frac{-b}{a} = \frac{-(-5)}{1} = 5$		
	$m + n = \frac{c}{a} = \frac{3}{1} = 3$	½	

Qn. Nos.	Value Points		Marks allotted
	i) $(m+n)^2+(m-n)^2 = (m+n)^2+[(m+n)^2-4mn]$	½	
	$= 5^2+5^2-4(3)$		
	$= 25+25-12$		
	$= 50-12$		
	$= 38$	½	
	ii) $(m+n)^3+4mn = (5)^3+4(3)$	½	
	$= 125+12$		
	$= 137.$	½	3
46.	$AM^2+CN^2 = AB^2+BM^2+BN^2+BC^2$		
	$(AB^2+BC^2 = AC^2)$	½	
	$AM^2+CN^2 = AC^2+BM^2+BN^2$	½	
	$= AC^2+\left(\frac{BC}{2}\right)^2+\left(\frac{AB}{2}\right)^2$	½	
	$AM^2+CN^2 = AC^2+\frac{BC^2}{4}+\frac{AB^2}{4}$		
	$= \frac{4AC^2+BC^2+AB^2}{4}$	½	
	$4(AM^2+CN^2) = 4AC^2+BC^2+AB^2$	½	
	$(BC^2+AB^2 = AC^2)$		
	$4(AM^2+CN^2) = 4AC^2+AC^2$	½	
	$4(AM^2+CN^2) = 5AC^2.$		3
	OR		
	In ΔAOB $\lfloor\underline{O} = 90^\circ$	½	
	$AB^2 = OA^2+OB^2$	½	
	$= \left(\frac{AC}{2}\right)^2+\left(\frac{BD}{2}\right)^2$	½	
	$= \frac{AC^2}{4}+\frac{BD^2}{4}$	½	
	$AB^2 = \frac{AC^2+BD^2}{4}$	½	
	$\therefore \quad 4AB^2 = AC^2+BD^2.$	½	3

Qn. Nos.	Value Points	Marks allotted

V. 47.



½

Data : In ΔABC and ΔDEF

$\angle BAC = \angle EDF$

$\angle ABC = \angle DEF$ ½

To prove : $\dfrac{AB}{DE} = \dfrac{BC}{EF} = \dfrac{CA}{FD}$ ½

Construction : Mark points G and H on AB and AC such that

$AG = DE$ and $AH = DF$. Join G and H. ½

Proof : In ΔAGH and ΔDEF

$AG = DE$ ∵ Construction

$\angle GAH = \angle EDF$ ∵ Data ½

$AH = DF$ ∴ Construction

∴ $\Delta AGH \cong \Delta DEF$ ∵ SAS

$\angle AGH = \angle DEF$ ½

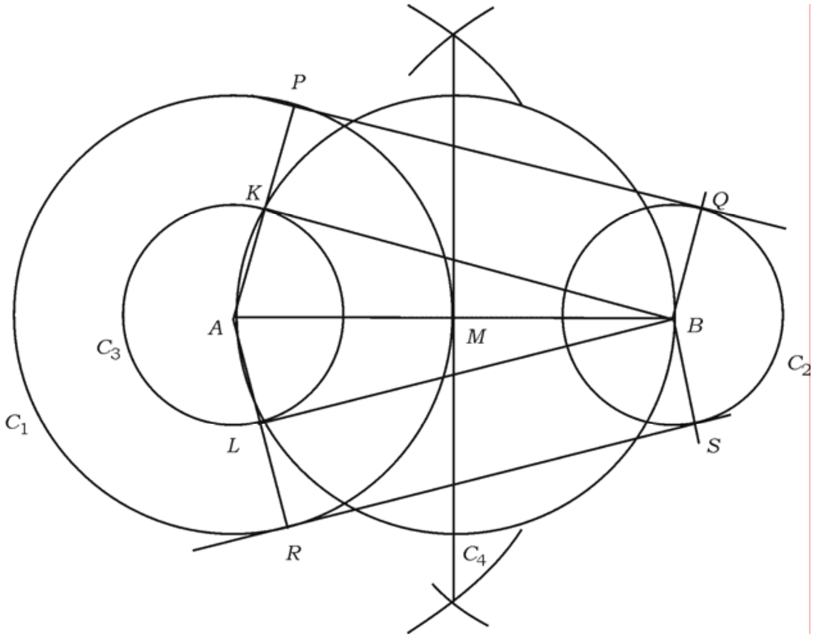
But, $\angle ABC = \angle DEF$

⇒ $\angle AGH = \angle ABC$

∴ $GH \,||\, BC$. ½

In ΔABC $\dfrac{AB}{AG} = \dfrac{BC}{GH} = \dfrac{CA}{HA}$

Hence $\dfrac{AB}{DE} = \dfrac{BC}{EF} = \dfrac{CA}{FD}$. ½ 4

Qn. Nos.	**Value Points**		**Marks allotted**
48.	$d = 8$ cm, $R = 4$ cm $r = 2$ cm		
	$R - r = 4 - 2 = 2$ cm		
	Drawing AB and marking mid-point M	1	
	Drawing circles C_1 , C_2 , C_3	1½	
	Joining BK, BL, PQ, RS	1	
	Measuring and writing the length of tangents $PQ = RS$		
	($PQ = RS = 7{\cdot}8$ cm)	½	4
			
49.	$a, \quad a + d, \quad a + 2d \; \ldots$ A.P.		
	$a + a + 2d + a + 4d = 39$	½	
	$3a + 6d = 39$		
	$3(a + 2d) = 39$		
	$a + 2d = \frac{39}{3} = 13$ … (i)	½	
	$a + d + a + 3d + a + 5d = 51$	½	
	$3a + 9d = 51$		
	$3(a + 3d) = 51$		

Qn. Nos.	Value Points	Marks allotted
	$a + 3d = \frac{51}{3} = 17$ … (ii) ½	
	From eq. (i) and (ii)	
	$a + 2d = 13$	
	$a + 3d = 17$ ½	
	$(-) \quad (-) \qquad (-)$	
	$-d = -4$	
	$\therefore \quad d = 4$	
	From eq. (i) ½	
	$a + 2d = 13$	
	$a + 2(4) = 13$	
	$a = 13 - 8$	
	$a = 5$ Now $a = 5, \quad d = 4$	
	$T_n = a + (n-1)d$	
	$T_{10} = 5 + (10-1)4$ ½	
	$T_{10} = 5 + 36$	
	$T_{10} = 41.$ ½	4
	OR	
	$a, \quad ar, \quad ar^2$ … G.P.	
	$a + ar + ar^2 = 7$ ½	
	$a(1 + r + r^2) = 7$	
	$1 + r + r^2 = \frac{7}{a}$ (i) ½	
	$ar^3 + ar^4 + ar^5 = 56$	
	$ar^3(1 + r + r^2) = 56$ ½	
	$ar^3 \times \frac{7}{a} = 56$	
	$r^3 = \frac{56}{7} = 8$ ½	
	$r^3 = 2^3$	
	$r = 2$ ½	

$1 + r + r^2 = \frac{7}{a}$

$1 + 2 + 4 = \frac{7}{a}$ ½

$a = \frac{7}{7} = 1$

$T_1 = a = 1, \quad T_2 = 1 \times 2 = 2, \quad T_3 = 2 \times 2 = 4$ ½

$\therefore \quad 1, 2, 4, 8 \quad \ldots$ G.P. ½

Alternate method :

$S_3 = 7$

$a\left(\frac{r^3 - 1}{r - 1}\right) = 7$ ½

$\frac{r^3 - 1}{r - 1} = \frac{7}{a} \quad \ldots \text{(i)}$ ½

$S_6 - S_3 = a\left(\frac{r^6 - 1}{r - 1}\right) - 7 = 56$ ½

$\frac{a(r^3 + 1)(r^3 - 1)}{(r - 1)} = 56 + 7 = 63$ ½

$a\ (r^3 + 1)\ \frac{7}{a} = 63$

$r^3 + 1 = \frac{63}{7} = 9$

$r^3 = 9 - 1 = 8$

$r^3 = 2^3$

$r = 2$ ½

$\frac{7}{a} = \frac{r^3 - 1}{r - 1} = \frac{2^3 - 1}{2 - 1}$ ½

$\frac{7}{a} = \frac{7}{1}$

$a = \frac{7}{7} = 1$ ½

$T_1 = a = 1, \quad T_2 = 1 \times 2 = 2, \quad T_3 = 2 \times 2 = 4$

Qn. Nos.	Value Points	Marks allotted
	1, 2, 4 .... G.P. ½	4
50.		

$x^2 + x - 2 = 0$

$x^2 = 2 - x$

$y = x^2$; $y = 2 - x$

$y = x^2$

x	0	1	2	3	– 1	– 2	– 3
y	0	1	4	9	1	4	9

$y = 2 - x$

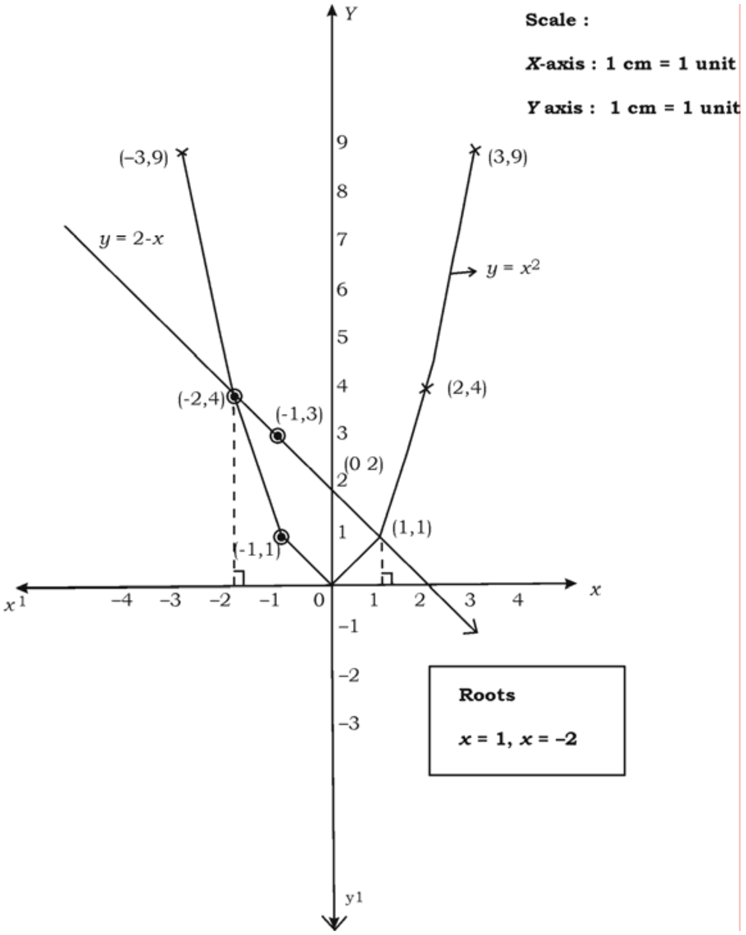
x	0	1	– 1	2	– 2	3
y	2	1	3	0	4	– 1

Table — (1 + 1) = 2

Parabola — ½

Straight line — ½

Drawing perpendiculars and identifying roots — 1 4



Alternate Method :

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

$$y = x^2 + x - 2$$

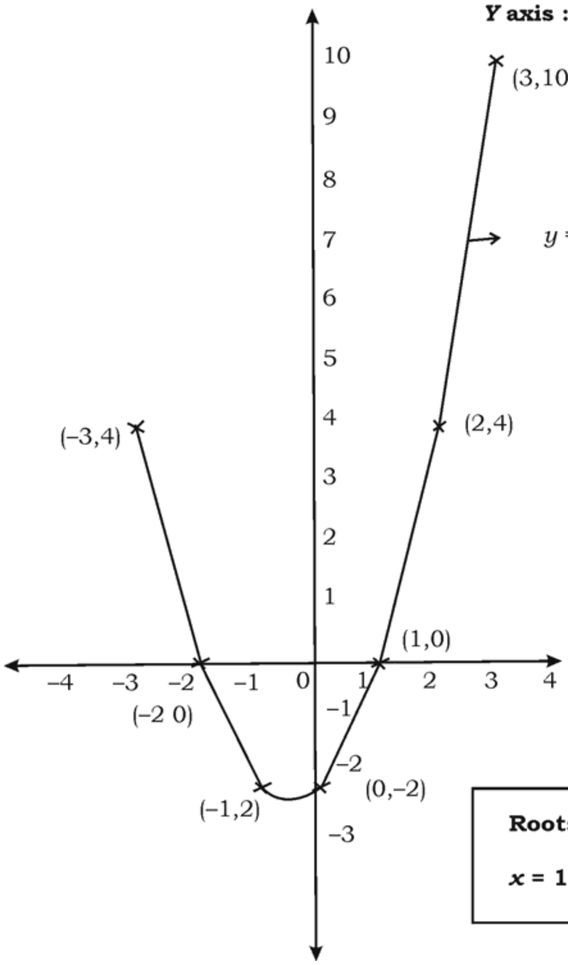
x	0	1	2	3	– 1	– 2	– 3
y	– 2	0	4	10	– 2	0	4

Table — 2

Drawing parabola — 1

Identifying roots — 1 4

Qn. Nos.	**Value Points**	**Marks allotted**
	Scale : ***X*-axis : 1 cm = 1 unit** ***Y* axis : 1 cm = 1 unit**	



Roots

$x = 1$, $x = –2$