CCE RF

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 — 2015

S. S. L. C. EXAMINATION, MARCH/APRIL, 2015

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 06. 04. 2015] ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Date : 06. 04. 2015] CODE NO. : **81-E**

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಹೊಸ ಪಠ್ಯಕ್ರಮ / New Syllabus)

(ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / Regular Fresh)

(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / English Version)

[ಪರಮಾವಧಿ ಅಂಕಗಳು : **80**

[Max. Marks : 80

Qn. Nos.	Ans. Key	Value Points	Marks allotted
I. 1.	A	$\frac{8}{3}$	1
2.	C	1	1
3.	D	$\frac{1}{6}$	1
4.	B	2250	1
5.	B	– 2	1
6.	D	3	1
7.	A	5 units	1
8.	C	7	1

Qn. Nos.	Value Points	Marks allotted
II.		
9.	$210 = \boxed{2 \times 3 \times 5 \times 7}$ $\begin{array}{r\|l} 2 & 210 \\ \hline 3 & 105 \\ \hline 5 & 35 \\ \hline & 7 \end{array}$ ½ + ½	1
10.	$A \setminus B = \{ 2, 3, 4 \}$	1
11.	$C : V = \left(\frac{\sigma}{\bar{x}} \right) \times 100$ ½ $= \frac{4}{80} \times 100$ $\therefore \quad CV = 5$ ½	1
12.	$f(x) = x^2 - 4$ $f(4) = 4^2 - 4$ ½ $= 16 - 4$ $\therefore \quad f(4) = 12$ ½	1
13.	$\frac{AX}{BX} = \frac{AY}{CY}$ ½ $\frac{4}{BX} = \frac{1}{2}$ $\therefore \quad BX = 8$ ½	1
14.	$x = 90°$	1
III. 15.	If possible let us assume $3 + \sqrt{5}$ is a rational number. $3 + \sqrt{5} = \frac{p}{q}$ where $p, q \in z, \; q \neq 0$ ½ $3 - \frac{p}{q} = -\sqrt{5}$ $\frac{3q - p}{q} = -\sqrt{5}$ ½ $\Rightarrow$ $-\sqrt{5}$ is a rational number. $\because$ $\frac{3q - p}{q}$ is a rational number. ½ But, $-\sqrt{5}$ is not a rational number $\therefore$ Our supposition $3 + \sqrt{5}$ is a rational number is wrong. ½ $\Rightarrow$ $3 + \sqrt{5}$ is an irrational number.	2

Qn. Nos.	**Value Points**	**Marks allotted**	
16.	Number of students who have passed in Physics, $n(P) = 55$.		
	Number of students who have passed in Mathematics, $n(M) = 67$.		
	Number of students who have passed in both subjects, $n(P \cap M) = ?$		
	Number of students in the classroom, $n(P \cup M) = 100$	½	
	$n(P) + n(M) = n(P \cup M) + n(P \cap M)$	½	
	$55 + 67 = 100 + n(P \cap M)$		
	$n(P \cap M) = 122 - 100$		
	$n(P \cap M) = 22$	½	
	Number of students who have passed in Physics only		
	$= n(P) - n(P \cap M)$		
	$= 55 - 22$		
	$= 33.$	½	2
	OR		
	$n(\cup) = 700$		
	$n(A) = 200$		
	$n(B) = 300$		
	$n(A \cap B) = 100$		
	$n(A) + n(B) = n(A \cup B) + n(A \cap B)$	½	
	$200 + 300 = n(A \cup B) + 100$		
	$500 - 100 = n(A \cup B)$		
	$n(A \cup B) = 400$	½	
	$n(A \cup B)' = n(A' \cap B')$		
	$= n[\cup \setminus A \cup B]$	½	
	$= n(\cup) \setminus n(A \cup B)$		
	$= 700 - 400$		
	$n(A \cup B)' = 300$	½	2
	OR $n(A' \cap B') = 300$		
17.	Given digits : 1, 2, 3, 7, 8, 9		
	a) 4-digit number can be formed in ${}^{6}P_{4}$ ways	½	
	${}^{6}P_{4} = 6 \times 5 \times 4 \times 3$		
	${}^{6}P_{4} = 360.$	½	

Qn. Nos.	Value Points	Marks allotted

b) Even numbers :

T	H	Ten	U
$^3P_1$	$^4P_1$	$^5P_1$	$^2P_1$

Units place can be filled in $^2P_1$ ways

Tens place can be filled in $^5P_1$ ways

Hundreds place can be filled in $^4P_1$ ways

Thousands place can be filled in $^3P_1$ ways

Total number of ways $= {}^2P_1 \times {}^5P_1 \times {}^4P_1 \times {}^3P_1$ ½

$= 2 \times 5 \times 4 \times 3$

$= 120.$ ½ 2

18. $D = 35, \ n = ?$

$D = {}^nC_2 - n$

$35 = \frac{{}^nP_2}{2!} - n$ ½

$35 = \frac{n(n-1)}{2} - n$

$35 = \frac{n^2 - n}{2} - n$ ½

$35 = \frac{n^2 - 3n}{2}$

$n^2 - 3n - 70 = 0$ ½

$n^2 - 10n + 7n - 70 = 0$

$n(n-10) + 7(n-10) = 0$

$n = 10$ OR $n = -7$ ½

Neglecting $n = -7$

$n = 10$ 2

$\Rightarrow$ Number of sides = 10.

19. $S = \{ (1, 1), (1, 2), \ldots \ldots (1, 6)$

$(6, 1), (6, 2), \ldots \ldots (6, 6) \}$

$\therefore \quad n(S) = 36.$ ½

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

a) Same number on both faces :

Let A be the even.

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

$n(A) = 6$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A) = \frac{6}{36}.$$ ½

b) Both faces having multiples of five :

Let B be the event.

$B = \{ (5, 5) \}$

$\therefore \quad n(B) = 1$ ½

$$P(B) = \frac{n(B)}{n(S)}$$

$$\therefore \quad P(B) = \frac{1}{36}.$$ ½ 2

20. $X = 2, 4, 6, 8, 10$

X	$D = X - \overline{x}$	D^2
2	– 4	16
4	– 2	4
6	0	0
8	2	4
10	4	16

$n = 5$ $\quad \sum D^2 = 40$ ½

$\overline{x} = \frac{\sum X}{n} = \frac{30}{5} = 6$ $\quad \therefore \quad \overline{x} = 6$ ½

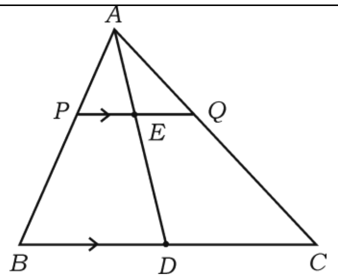
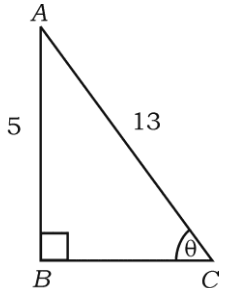
$$\text{Variance} = \sigma^2 = \frac{\sum D^2}{n}$$ ½

$$= \frac{40}{5}$$

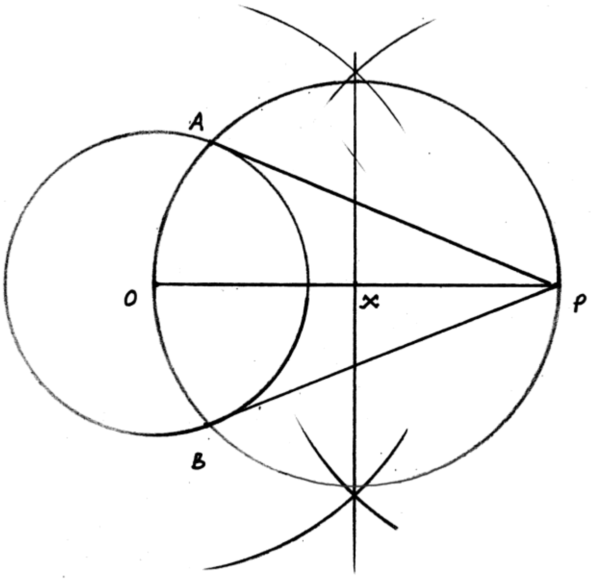
$\text{Variance} = \sigma^2 = 8.$ ½ 2

Qn. Nos.	**Value Points**	**Marks allotted**	
21.	L.C.M. of orders = 6		
	$\sqrt{2} = 2^{\frac{1}{2}} = 2^{\frac{3}{6}} = \sqrt[6]{8}$	½	
	$\sqrt[3]{5} = 5^{\frac{1}{3}} = 5^{\frac{2}{6}} = \sqrt[6]{25}$	½	
	$\therefore \quad \sqrt{2} \times \sqrt[3]{5} = \sqrt[6]{8} \times \sqrt[6]{25}$	½	
	$= \sqrt[6]{200}$.	½	2
22.	$\frac{\sqrt{6}+\sqrt{3}}{\sqrt{6}-\sqrt{3}} \times \frac{\sqrt{6}+\sqrt{3}}{\sqrt{6}+\sqrt{3}}$ (Multiplying by RF)	½	
	$= \frac{\left(\sqrt{6}+\sqrt{3}\right)^2}{6-3}$		
	$= \frac{6+3+2\sqrt{18}}{3}$	½	
	$= \frac{9+6\sqrt{2}}{3}$		
	$= \frac{3\left(3+2\sqrt{2}\right)}{3}$	½	
	$= 3 + 2\sqrt{2}$.	½	2
23.	Let $P(x) = x^3 - 3x^2 + ax - 10$	½	
	By factor theorem,		
	$(x-5)$ is a factor of $P(x)$ iff $P(5) = 0$		
	$P(5) = (5)^3 - 3(5)^2 + a(5) - 10$	½	
	$0 = 125 - 75 + 5a - 10$		
	$0 = 5a + 40$	½	
	$5a = -40$		
	$a = -8$.	½	2
	OR		

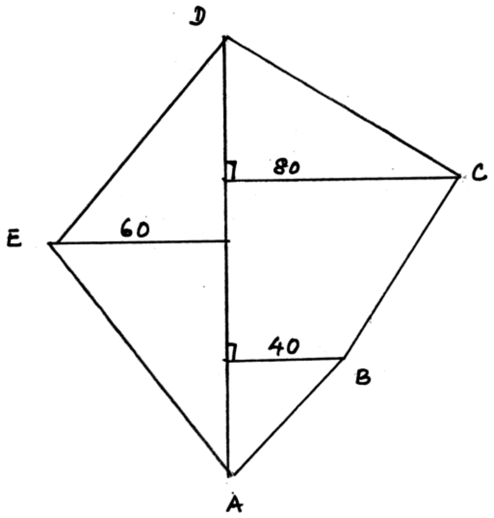
Qn. Nos.	Value Points	Marks allotted	
	By division algorithm for polynomials,		
	$P(x) = [\, g(x) \,.\, q(x) \,] + r(x)$		
	$P(x) - r(x) = g(x) \,.\, q(x)$		
	$P(x) + \{ - r(x) \} = g(x) \,.\, q(x)$		
	$x^2 + 1$	½	
	$x^2 + 2x - 3 \overline{\big) x^4 + 2x^3 - 2x^2 + x - 1}$		
	$x^4 + 2x^3 - 3x^2$		
	$- \quad - \quad +$	½	
	$x^2 + x - 1$		
	$x^2 + 2x - 3$	½	
	$- \quad - \quad +$		
	$- \ x + 2$		
	∴ $r(x) = -x + 2 \Rightarrow \{ - r(x) \} = x - 2$	½	2
	Hence, we should add $(x - 2)$ to $P(x)$ so that the resulting polynomial is exactly divisible by $g(x)$.		
24.	$x^2 - 4x + 2 = 0$		
	$a = 1$		
	$b = -4$	½	
	$c = 2$		
	$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$		
	$= \dfrac{-(-4) \pm \sqrt{16 - 4(1)(2)}}{2(1)}$	½	
	$= \dfrac{4 \pm \sqrt{16 - 8}}{2}$		
	$= \dfrac{4 \pm \sqrt{8}}{2}$		
	$= \dfrac{4 \pm 2\sqrt{2}}{2}$	½	
	$= \dfrac{2\left(2 \pm \sqrt{2}\right)}{2}$		
	$x = 2 \pm \sqrt{2}$.	½	2
	∴ Roots are $2 + \sqrt{2}$ OR $2 - \sqrt{2}$.		

Qn. Nos.	Value Points	Marks allotted
25.		
	To prove : $PE = EQ$	
	Proof : In $\Delta\ ABD$,	
	$PE \parallel BD \quad \because \quad PQ \parallel BC$	
	$\therefore \quad \frac{AP}{AB} = \frac{AQ}{AC} = \frac{PE}{BD}$ .... (i) ($\because$ Thale's theorem)	½
	Similarly In $\Delta\ ADC$,	½
	$\frac{AE}{AD} = \frac{AQ}{AC} = \frac{EQ}{DC}$ .... (ii)	
	From (i) and (ii)	½
	$\frac{PE}{BD} = \frac{EQ}{DC}$	
	But, $BD = DC$ ($\because$ AD is the median)	½ 2
	$\therefore \quad PE = EQ.$	
26.		
	In $\Delta\ ABC$,	
	$\angle B = 90°$	
	$\therefore \quad AC^2 = AB^2 + BC^2$	
	$13^2 = 5^2 + BC^2$ (Pythagoras' theorem)	½
	$BC^2 = 169 - 25 = 144$	
	$BC = 12$	½
	$\cos\theta = \frac{\text{Adjacent side}}{\text{Hypotenuse}} = \frac{BC}{AC}$	
	$\therefore \quad \cos\theta = \frac{12}{13}$	½
	$\tan\theta = \frac{\text{Opposite side}}{\text{Adjacent side}} = \frac{AB}{BC}$	
	$\therefore \quad \tan\theta = \frac{5}{12}.$	½ 2

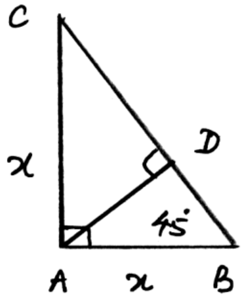
Qn. Nos.	Value Points	Marks allotted	
27.	Let		
	$A = (x_1, y_1) = (3, 10)$		
	$B = (x_2, y_2) = (5, 2)$		
	$C = (x_3, y_3) = (14, 12)$		
	$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(5-3)^2 + (2-10)^2}$		
	$AB = \sqrt{4+64} = \sqrt{68}$ units.	½	
	Similarly		
	$BC = \sqrt{(14-5)^2 + (12-2)^2} = \sqrt{81+100} = \sqrt{181}$ units	½	
	$AC = \sqrt{(14-3)^2 + (12-10)^2} = \sqrt{121+4} = \sqrt{125}$ units	½	
	Perimeter $= AB + BC + AC$		
	$P = \left(\sqrt{68} + \sqrt{181} + \sqrt{125}\right)$ units.	½	2
28.	$r = 3$ cm, $d = 8$ cm.		



	PA and PB are tangents.		
	Drawing circle of radius 3 cm	½	
	Bisecting OP	½	
	Drawing tangents PA, PB.	1	2

Qn. Nos.	Value Points	Marks allotted	
29.	Scale : 20 m = 1 cm		
	40 m = 2 cm		
	60 m = 3 cm		
	80 m = 4 cm Calculation	½	
	100 m = 5 cm Field drawing	1½	2
	150 m = 7·5 cm		
			
30.	$F = 6$		
	$V = 8$		
	$E = 12$	½	
	$F + V = E + 2$	½	
	$6 + 8 = 12 + 2$	½	
	$14 = 14.$	½	2
IV. 31.	$T_3 = \frac{1}{7}, \; T_7 = \frac{1}{5}$		
	$\therefore$ T_3 and T_7 of A.P. are 7, 5		
	$d = \frac{T_p - T_q}{p - q}$		
	$= \frac{T_7 - T_3}{7 - 3} = \frac{5 - 7}{4} = \frac{-2}{4} = -\frac{1}{2}$	1	
	$\therefore \; d = -\frac{1}{2}$		
	$T_3 = 7$		
	$a + 2d = 7$		

Qn. Nos.	Value Points	Marks allotted	
	$a + 2\left(-\frac{1}{2}\right) = 7 \qquad a - 1 = 7 \qquad \therefore \quad a = 8$	1	
	$T_n = a + (n-1)\,d$		
	$T_{15} = 8 + \left(14 \times -\frac{1}{2}\right)$	½	
	$= 8 - 7$		
	$T_{15} = 1$		
	∴ 15th term of HP = 1	½	3
	Note : For alternate method full marks may be given.		
32.	Let the number of books be x		
	Total cost = Rs. 60		
	∴ Cost of each book = Rs. $\frac{60}{x}$	½	
	If the number of books = $(x + 5)$		
	Then cost of each book = Rs. $\frac{60}{(x+5)}$	½	
	But, $\frac{60}{x} - \frac{60}{(x+5)} = 1$	½	
	$\frac{60(x+5) - 60x}{x(x+5)} = 1$		
	$\frac{60x + 300 - 60x}{x^2 + 5x} = 1$		
	$x^2 + 5x = 300$	½	
	$x^2 + 5x - 300 = 0$		
	$x^2 + 20x - 15x - 300 = 0$	½	
	$x(x + 20) - 15(x + 20) = 0$		
	$x = -20$ OR 15		
	Neglecting $x = -20 \quad \therefore \quad x = 15$	½	3
	⇒ No. of books purchased by Aniruddha = 15		
	OR		

Qn. Nos.	Value Points	Marks allotted
	Let the number of years be x	
	$\therefore$ Kavya's and Karthik's ages are $(11 + x)$ and $(14 + x)$	½
	Product of their ages = 304	
	$(11 + x)(14 + x) = 304$	½
	$154 + 11x + 14x + x^2 - 304 = 0$	½
	$x^2 + 25x - 150 = 0$	½
	$x^2 + 30x - 5x - 150 = 0$	
	$x(x + 30) - 5(x + 30) = 0$	½
	$x = 5$ OR -30	
	Neglecting $x = -30$	½ 3
	$x = 5.$	
	i.e. After 5 years, product of their ages will be 304.	
33.		½
	In ΔABC,	
	$\hat{A} = 90°$, $AB = x$, $\hat{B} = 45°$ $\Rightarrow \hat{C} = 45°$	
	$\Rightarrow AB = AC = x$	½
	$BD = CD = \frac{BC}{2}$	
	$BC^2 = AC^2 + AB^2$ ..... Pythagoras' theorem	
	$= x^2 + x^2$	
	$BC^2 = 2x^2$	½
	$\therefore BC = x\sqrt{2}$	
	$AD^2 = CD \cdot BD$	
	$= \frac{1}{2} BC \cdot \frac{1}{2} BC$	
	$= \left(\frac{BC}{2}\right)^2$	

Qn. Nos.	Value Points	Marks allotted

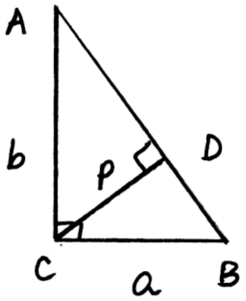
$$= \left(\frac{x\sqrt{2}}{2} \right)^2$$ 1

$$= \frac{x^2 \,.\, 2}{4}$$

$$\therefore \quad AD^2 = \frac{x^2}{2}$$

$$\therefore \quad AD = \frac{x}{\sqrt{2}}$$ ½ | 3

OR



To prove : $\frac{1}{P^2} = \frac{1}{a^2} + \frac{1}{b^2}$ ½

Proof : In $\Delta\, ABC$

$CD^2 = AD \,.\, BD$

$P^2 = AD \,.\, BD$ .... (i) ½

$CB^2 = AB \,.\, AD$

$a^2 = AB \,.\, AD$ $\quad \therefore \quad \frac{1}{a^2} = \frac{1}{AB \,.\, BD}$ .... (ii) ½

$AC^2 = AB \,.\, AD$

$b^2 = AB \,.\, AD$ $\quad \therefore \quad \frac{1}{b^2} = \frac{1}{AB \,.\, AD}$ .... (iii) ½

Adding (ii) and (iii)

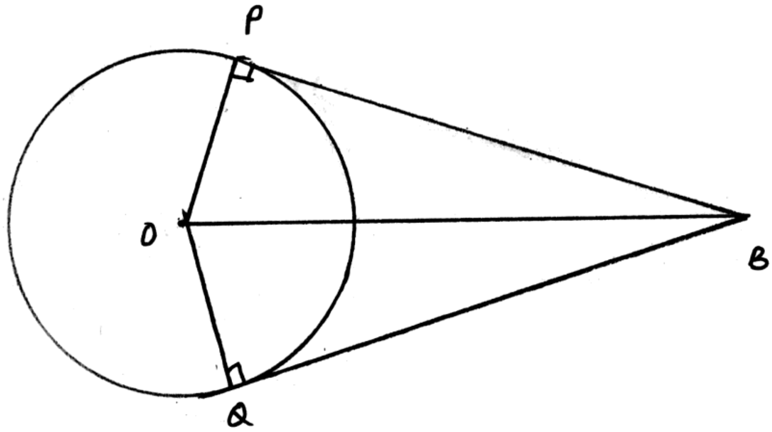
$$\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{AB \,.\, BD} + \frac{1}{AB \,.\, AD}$$

$$= \frac{1}{AB} \left(\frac{1}{BD} + \frac{1}{AD} \right)$$ 1 | 3

$$= \frac{1}{AB} \left(\frac{AD + BD}{BD \,.\, AD} \right) = \frac{1}{AB} \cdot \frac{AB}{P^2}$$ [from (i)]

$$\therefore \quad \frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{P^2}$$

Qn. Nos.	**Value Points**	**Marks allotted**	
34.	*To prove* : $\dfrac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta} = 1 - 2\sec\theta \, . \, \tan\theta + 2\tan^2\theta$		
	Proof : LHS $= \dfrac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta}$		
	$= \dfrac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta} \times \dfrac{\sec\theta - \tan\theta}{\sec\theta - \tan\theta}$	½	
	$= \dfrac{(\sec\theta - \tan\theta)^2}{\sec^2\theta - \tan^2\theta}$	½	
	$= \dfrac{\sec^2\theta + \tan^2\theta - 2\sec\theta \, . \tan\theta}{1}$ $(\because \ \sec^2\theta - \tan^2\theta = 1)$	½	
	$= \sec^2\theta + \tan^2\theta - 2\sec\theta \, . \, \tan\theta$	1	
	$= 1 + \tan^2\theta + \tan^2\theta - 2\sec\theta \, . \, \tan\theta$		
	$(\because \ \sec^2\theta = 1 + \tan^2\theta)$		
	$= 1 - 2\sec\theta \, . \, \tan\theta + 2\tan^2\theta$	½	3
	= RHS.		
	OR		
	LHS $= \sqrt{\dfrac{1+\cos\theta}{1-\cos\theta}}$		
	Multiplying by RF		
	$= \sqrt{\dfrac{1+\cos\theta}{1-\cos\theta} \times \dfrac{1+\cos\theta}{1+\cos\theta}}$	½	
	$= \sqrt{\dfrac{(1+\cos\theta)^2}{1-\cos^2\theta}}$	½	
	$= \sqrt{\dfrac{(1+\cos\theta)^2}{\sin^2\theta}}$	½	
	$= \dfrac{1+\cos\theta}{\sin\theta}$	½	
	$= \dfrac{1}{\sin\theta} + \dfrac{\cos\theta}{\sin\theta}$	½	
	$= \operatorname{cosec}\theta + \cot\theta$	½	3
	= RHS		

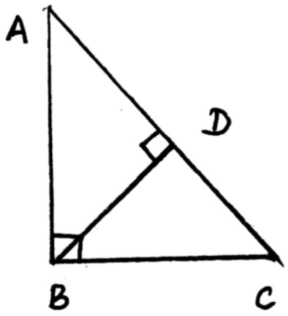
Qn. Nos.	Value Points	Marks allotted	
35.		½	
	Data : O is the centre of the circle B is the external point BP and BQ are the tangents.	½	
	To prove : $BP = BQ$	½	
	Proof : In $\Delta\ BOP,\ B\hat{P}O = 90°$		
	Similarly in $\Delta\ BOQ,\ B\hat{Q}O = 90°$		
	(∵ radius, tangents at the point of contact are perpendicular)		
	In 2 right angled triangles BOP and BOQ		
	Hypotenuse BO = Hypotenuse BO .... Common side		
	$OP = OQ$ ... radii		
	$\therefore\ \Delta\ BOP \cong \Delta\ BOQ$		
	$\therefore\ BP = BQ.$	1½	3
36.	CSA of cylinder = $\frac{1}{3}$ TSA of cylinder	½	
	$2\pi rh = \frac{1}{3} . 2\pi r (r + h)$		
	$= \frac{1}{3} \times 462$		
	$2\pi rh = 154$	½	
	TSA of cylinder = $2\pi r (r + h)$	½	
	$462 = 2\pi r^2 + 2\pi rh$		
	$462 = 2\pi r^2 + 154$		
	$462 - 154 = 2\pi r^2$		
	$2\pi r^2 = 308$	½	

Qn. Nos.	**Value Points**	**Marks allotted**	
	$r^2 = \dfrac{308}{2 \times \dfrac{22}{7}}$		
	$= \dfrac{308 \times 7}{44}$	½	
	$r^2 = 49$	½	3
	$r = 7$ cm.		
	OR		
	$r_1 = 12$ cm, $h_1 = 20$ cm, $r_2 = 3$ cm, $h_2 = ?$		
	We know,		
	$\dfrac{r_1}{r_2} = \dfrac{h_1}{h_2}$	½	
	$\dfrac{12}{3} = \dfrac{20}{h_2}$		
	$12 h_2 = 60 \qquad \therefore \quad h_2 = 5$ cm	1	
	Volume of frustum $= \frac{1}{3} \pi h \, (r_1^2 + r_2^2 + r_1 \, r_2)$	½	
	$= \dfrac{1}{3} \times \dfrac{22}{7} \times 15 \; (12^2 + 3^2 + 12 \times 3)$		
	$= \dfrac{110}{7} \; (144 + 9 + 36)$	½	
	$= \dfrac{110}{7} \times 189$		
	Volume of frustum $= 2970$ cubic cm.	½	3
V. 37.	Let the three consecutive terms of the A.P. be $(a - d)$, a, $(a + d)$	½	
	Sum = 6		
	$a - \cancel{d} + a + a + \cancel{d} = 6$		
	$3a = 6$		
	$\therefore \quad a = 2$	1	
	Product $= -120$		
	$(a - d) \, . \, a \, (a + d) = -120$	½	
	$(a^2 - d^2) \, a = -120$		
	$(2^2 - d^2) \, 2 = -120$		
	$4 - d^2 = -60$	½	
	$-d^2 = -64$		

Qn. Nos.	Value Points	Marks allotted	
	$d^2 = 64$ ∴ $d = \pm 8$	½	
	If $a = 2$, $d = 8$ then the three numbers are $-6, 2, 10$		
	If $a = 2$, $d = -8$, then the three numbers are $10, 2, -6$	1	4
	OR		
	Let the three consecutive terms be $\frac{a}{r}$, a, ar		
	Product = 216		
	$\frac{a}{r} . a . ar = 216$		
	$a^3 = 216$ ∴ $a = 6$	1	
	Sum of their products in pairs = 156		
	$\left(\frac{a}{r} . a\right) + (a . ar) + \left(\frac{a}{r} . ar\right) = 156$	½	
	$\frac{a^2}{r} + a^2r + a^2 = 156$		
	$\frac{36}{r} + 36r + 36 = 156$	½	
	$\frac{36}{r} + 36r = 120$		
	$\frac{36 + 36r^2}{r} = 120$		
	$36r^2 - 120r + 36 = 0$		
	$3r^2 - 10r + 3 = 0$		
	$r = 3$ or $\frac{1}{3}$	½ + ½	
	a) If $a = 6$, $r = 3$, the 3 consecutive numbers are 2, 6, 18	½	
	b) If $a = 6$, $r = \frac{1}{3}$, the 3 consecutive numbers are 18, 6, 2	½	4

Qn. Nos.	Value Points	Marks allotted

38.



½

Data : In ΔABC, $\hat{B} = 90°$ ½

To prove : $AC^2 = AB^2 + BC^2$ ½

Constn. : Draw $BD \perp AC$ ½

Proof : In 2 triangles ABC, ADB

$A\hat{B}C = 90°$, $A\hat{D}B = 90°$

$B\hat{A}D$ ... common angle

$\therefore \quad \Delta ABC \sim \Delta ADB$

$\Rightarrow \quad \dfrac{AB}{AD} = \dfrac{AC}{AB}$

$AB^2 = AC . AD.$ .... (i) ½

In 2 triangles ABC and BDC

$A\hat{B}C = B\hat{D}C = 90°$

$A\hat{C}B$ is common

$\therefore \quad \Delta ABC \sim \Delta BDC$

$\Rightarrow \quad \dfrac{BC}{DC} = \dfrac{AC}{BC} \quad \therefore \quad BC^2 = AC . DC$ .... (ii) ½

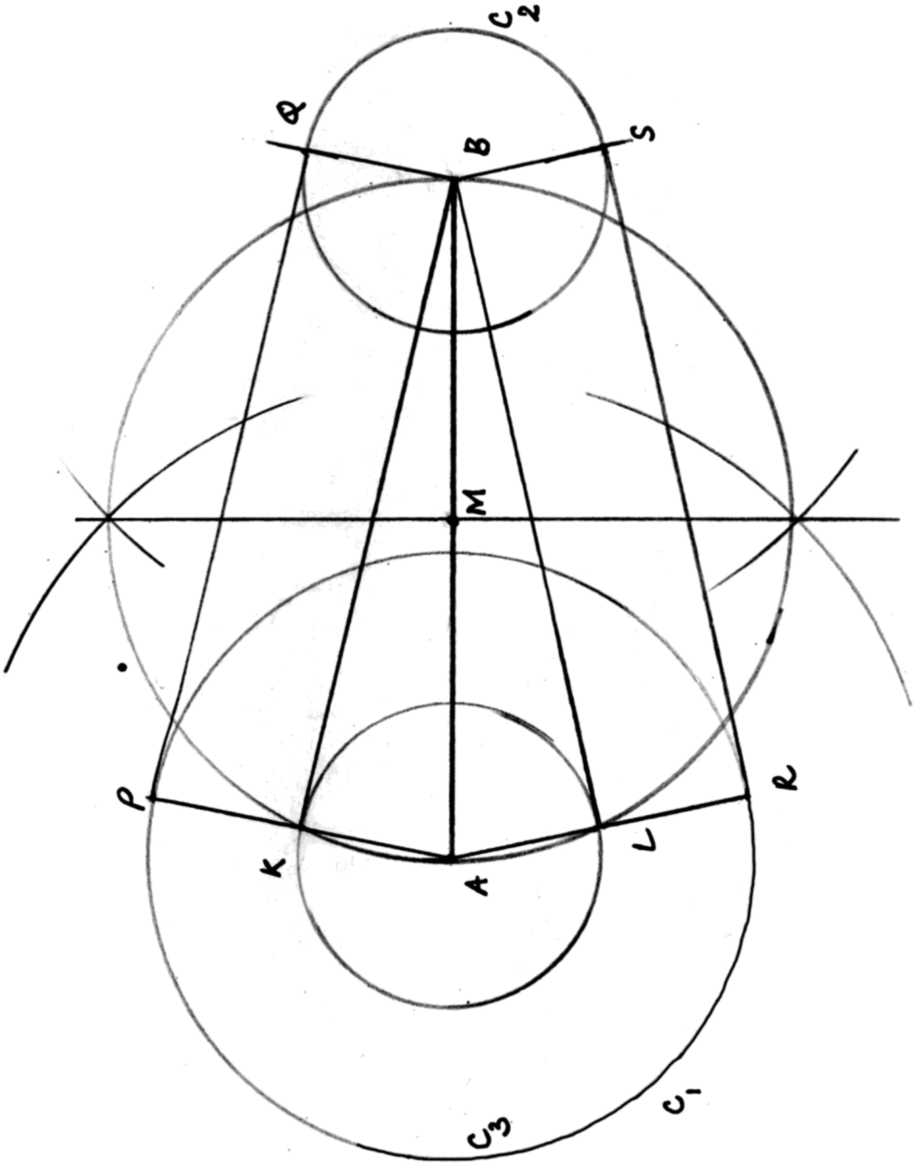
Adding (i) and (ii)

$AB^2 + BC^2 = (AC . AD) + (AC . DC)$

$= AC (AD + DC)$

$AB^2 + BC^2 = AC^2$ OR $AC^2 = AB^2 + BC^2$ 1 4

Qn. Nos.	Value Points	Marks allotted	
39.	d = 9 cm, R = 4 cm, r = 2 cm, $R - r$ = 2cm.		
	Drawing AB and marking mid-point M	1	
	Drawing circles C_1 , C_2 and C_3	1½	
	Joining BK, BL, PQ, RS	1	
	Measuring and writing the length of tangents = 8·7 cm	½	4



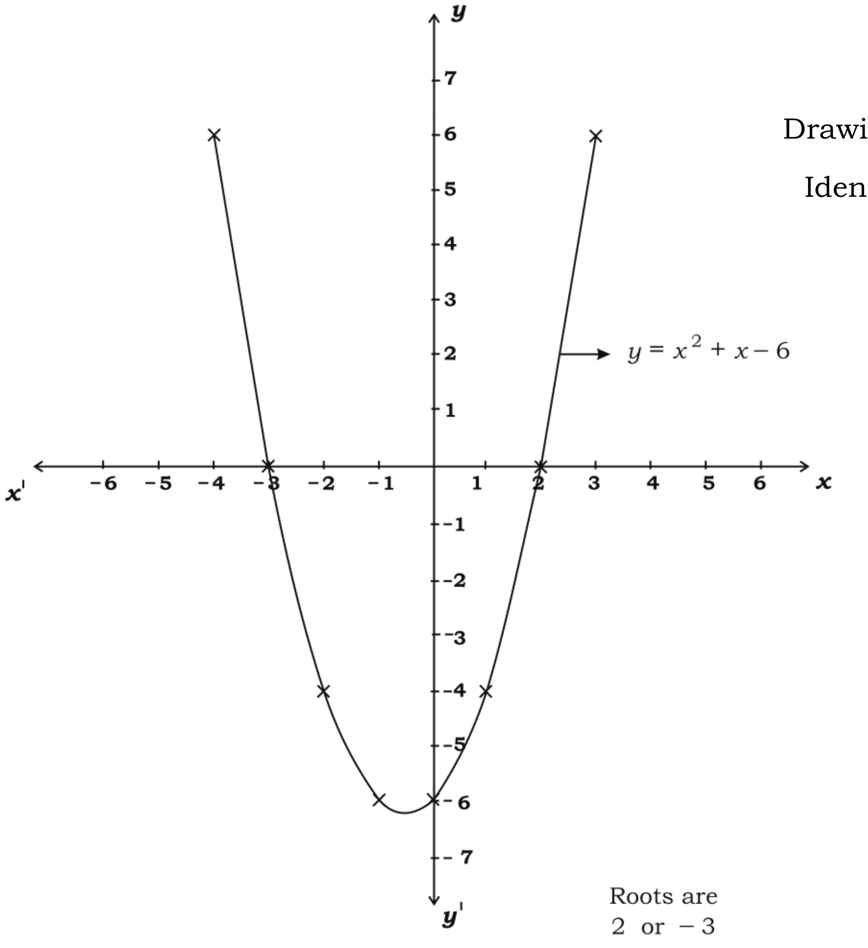
Required tangents PQ = RS = 8·7 cm.

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

40. $x^2 + x - 6 = 0$

Let $y = x^2 + x - 6$

x	0	1	– 1	2	– 2	3	– 3	– 4
y	– 6	– 4	– 6	0	– 4	6	0	6



Roots are
2 or − 3

Table	2	
Drawing parabola	1	
Identifying roots	1	4

Alternate Method :

Table	1 + 1
Parabola	½
Straight line	½
Drawing perpendiculars and identifying roots	½ + ½

4