CCE RR/PR/NSR/NSPR
REDUCED SYLLABUS

B

ಕರ್ನಾಟಕ ಶಾಲಾ ಪರೀಕ್ಷೆ ಮತ್ತು ಮೌಲ್ಯನಿರ್ಣಯ ಮಂಡಲಿ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು - 560 003

KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD, MALLESHWARAM, BENGALURU – 560 003

ಜೂನ್ 2024 ರ ಪರೀಕ್ಷೆ - 2

JUNE 2024 EXAMINATION – 2

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ಸಂಕೇತ ಸಂಖ್ಯೆ : 81-E **CODE NO. : 81-E**

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

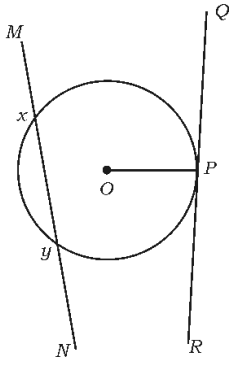
(ಆಂಗ್ಲ ಮಾಧ್ಯಮ / English Medium)

(ಶಾಲಾ ಪುನರಾವರ್ತಿತ ಅಭ್ಯರ್ಥಿ / ಖಾಸಗಿ ಪುನರಾವರ್ತಿತ ಅಭ್ಯರ್ಥಿ / ಎನ್.ಎಸ್.ಆರ್. / ಎನ್.ಎಸ್.ಪಿ.ಆರ್.)

(Regular Repeater / Private Repeater / NSR / NSPR)

ದಿನಾಂಕ : 18. 06. 2024] **[ಗರಿಷ್ಠ ಅಂಕಗಳು : 80**

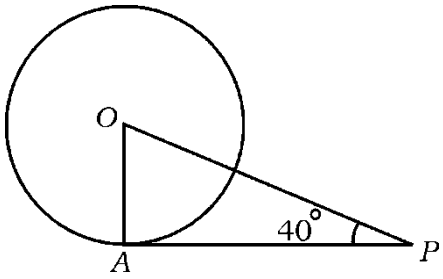
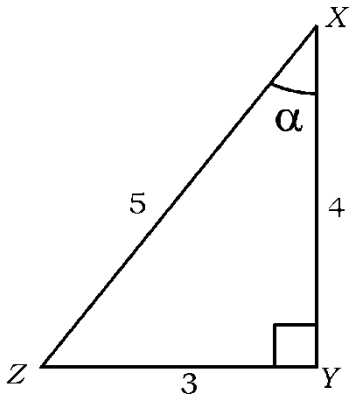
Date : 18. 06. 2024] **[Max. Marks : 80**

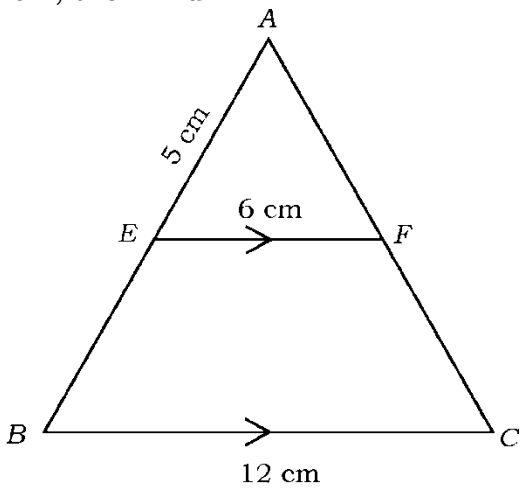
Qn. Nos.	Ans. Key	Value Points	Marks allotted
I.		**Multiple choice questions :** **8 × 1 = 8**	
1.		In the figure, the secant of the circle is  (A) *OP* (B) *MN* (C) *PR* (D) *RQ*	

Qn. Nos.	Ans. Key	Value Points	Marks allotted
		Ans. :	
	(B)	*MN*	1
2.		The discriminant of the equation $x^2 + 4x + 4 = 0$ is (A) 0 (B) 12 (C) 16 (D) 48	
		Ans. :	
	(A)	0	1
3.		$\frac{\sin(90^\circ - \theta)}{\cos(90^\circ - \theta)}$ is equal to (A) $\sin\theta$ (B) $\cos\theta$ (C) $\tan\theta$ (D) $\cot\theta$	
		Ans. :	
	(D)	$\cot\theta$	1
4.		The distance of the point $M(4, 3)$ from the origin is (A) 5 units (B) 7 units (C) $\sqrt{5}$ units (D) $\sqrt{7}$ units	
		Ans. :	
	(A)	5 units	1
5.		The mode of the scores 15, 13, 12, 11, 16, 12, 10 is (A) 10 (B) 11 (C) 12 (D) 16	
		Ans. :	
	(C)	12	1
6.		The surface area of a sphere of radius 7 cm is (A) 468 cm^2 (B) 616 cm^2 (C) 704 cm^2 (D) 812 cm^2	
		Ans. :	
	(B)	616 cm^2	1

Qn. Nos.	Ans. Key	Value Points	Marks allotted
7.		The volume of a cube of edge 5 cm is (A) $15\ cm^3$ (B) $30\ cm^3$ (C) $100\ cm^3$ (D) $125\ cm^3$ *Ans.* :	
	(D)	$125\ cm^3$	1
8.		An arithmetic progression contains 20 terms. If the first term is 2 and last term is 78, then the arithmetic progression is (A) 2, 5, 8, ... (B) 2, 7, 12, ... (C) 2, 6, 10, ... (D) 2, 4, 6, ... *Ans.* :	
	(C)	2, 6, 10	1

Qn. Nos.	Value Points	Marks allotted
II.	**Answer the following questions : $8 \times 1 = 8$** **(For direct answers from Q. Nos. 9 to 16 full marks should be given)**	
9.	The corresponding sides of two similar triangles are in the ratio 4 : 9, then find the ratio of their areas. *Ans.* :	
	16 : 81	1
10.	If the lines representing the pair of linear equations are intersecting lines, then how many solutions do they have ? *Ans.* :	
	Only one solution (unique)	1
11.	Write the formula to find the sum of first *'n'* natural numbers. *Ans.* :	
	$S_n = \frac{n(n+1)}{2}$	1

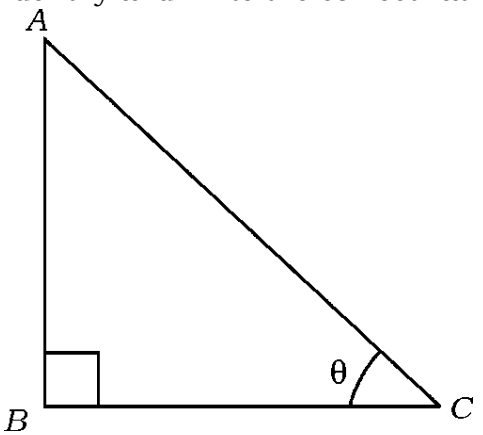
Qn. Nos.	Value Points	Marks allotted
12.	In the figure *'O'* is the centre of the circle. *OA* is the radius and *AP* is the tangent. If $\angle OPA = 40°$, then find $\angle AOP$.  *Ans.* : $\angle AOP = 50°$	1
13.	In the given figure, if $\angle XYZ = 90°$, then find the value of $\sin \alpha$.  *Ans.* : $\sin\alpha = \frac{3}{5}$	1
14.	Write the formula to find the total surface area of a solid hemisphere of radius *'r'* units. *Ans.* : $A = 3\pi r^2$	1

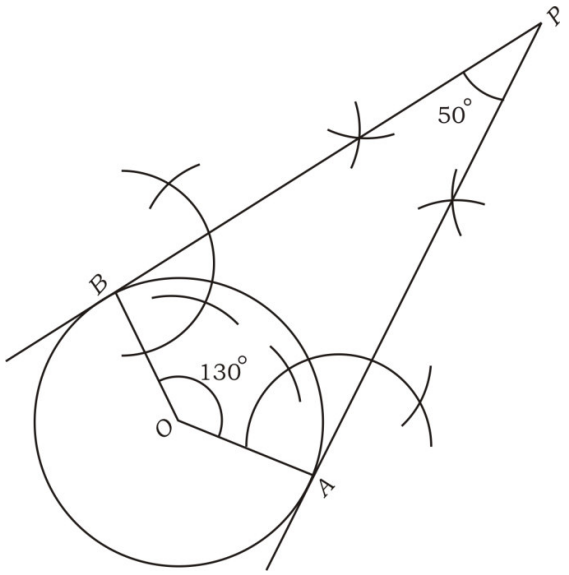
Qn. Nos.	Value Points	Marks allotted
15.	In the given figure, $EF \parallel BC$. If EF = 6 cm, BC = 12 cm and AE = 5 cm, then find AB 	
	Ans. :	
	$\frac{AE}{AB}=\frac{EF}{BC}$ ½	
	$\frac{5}{AB}=\frac{6}{12}$	
	AB = 10 cm ½	
	NOTE : For Direct answer give full marks.	1
16.	Express the equation $2x^2 = 3x + 5$ in the standard form of a quadratic equation.	
	Ans. :	
	$2x^2-3x-5=0$	1
III.	**Answer the following questions : 8 × 2 = 16**	
17.	Find the distance between the points P (3, 5) and Q (4, 7) using distance formula.	
	OR	
	The co-ordinates of the mid-point of the line segment joining the points K (x, 7) and L (8, 3) is (6, 5). Find the value of x.	
	Ans. :	

Qn. Nos.	Value Points		Marks allotted
	$P(3, 5)$ $Q(4, 7)$		
	x_1, y_1 x_2, y_2		
	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	½	
	$= \sqrt{(4-3)^2 + (7-5)^2}$	½	
	$= \sqrt{1^2 + 2^2}$		
	$= \sqrt{1+4}$	½	
	$d = \sqrt{5}$ units	½	2
	OR		
	$P(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	½	
	$(6, 5) = \left(\frac{x+8}{2}, \frac{7+3}{2}\right)$	½	
	$(6, 5) = \left(\frac{x+8}{2}, 5\right)$	½	
	$\frac{x+8}{2} = 6$		
	$x + 8 = 12$		
	$x = 12 - 8$	½	
	$x = 4$		2
18.	Solve the given pair of linear equations by Elimination method :		
	$2x + y = 8$		
	$x - y = 1$		
	Ans. :		
	$2x + y = 8$ ..... (1)		
	$x - y = 1$ ..... (2)		
	Adding		
	$3x = 9$	½	

Qn. Nos.	Value Points	Marks allotted
	$x = \frac{9}{3}$	
	$\boxed{x = 3}$ ½	
	Substitute $x = 3$ in ..... (1)	
	$2(3) + y = 8$	
	$6 + y = 8$ ½	
	$y = 8 - 6$	
	$\boxed{y = 2}$ ½	2
19.	Find the sum of first 20 terms of the Arithmetic progression 5, 11, 17, ... using formula.	
	Ans. :	
	$a = 5$	
	$d = 11 - 5$	
	$d = 6$	
	$n = 20$ ½	
	$S_n = \frac{n}{2}[2a + (n-1)d]$ ½	
	$= \frac{20}{2}[2(5) + (20-1)6]$	
	$= 10\ [\ 10 + 19 \times 6\ ]$ ½	
	$= 10\ [\ 10 + 114\ ]$	
	$= 10 \times 124$	
	$S_{20} = 1240$ ½	2
	Note : If any other correct alternative method is followed to get correct answer, then give full marks.	
20.	Find the roots of the equation $x^2 - 5x + 2 = 0$ using 'quadratic formula'.	
	OR	
	Find the roots of the equation $x^2 - 11x + 28 = 0$ by factorisation method.	

Qn. Nos.	Value Points	Marks allotted
	Ans. :	
	$a = 1,\ b = -5,\ c = 2$ ½	
	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ ½	
	$= \frac{-(-5) \pm \sqrt{(-5)^2 - 4\,(1)\,(2)}}{2\,(1)}$	
	$= \frac{5 \pm \sqrt{25 - 8}}{2}$ ½	
	$x = \frac{5 \pm \sqrt{17}}{2}$ ½	2
	OR	
	$x^2 - 7x - 4x + 28 = 0$ ½	
	$x\,(x-7) - 4(x-7) = 0$ ½	
	$(x-7)\,(x-4) = 0$	
	$x - 7 = 0$ or $(x - 4) = 0$ ½	
	$x = 7$ or $x = 4$ ½	2
21.	Find the co-ordinates of the point which divides the line segment joining the points (4, – 3) and (8, 5) in the ratio 3 : 1 internally.	
	Ans. :	
	(4, – 3) (8, 5) 3 : 1 ½	
	x_1, y_1 x_2, y_2 $m_1 : m_2$	
	$P(x, y) = \left(\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2} \right)$ ½	
	$= \left(\frac{3(8) + 1(4)}{3+1}, \frac{3(5) + 1(-3)}{3+1} \right)$	
	$= \left(\frac{24+4}{4}, \frac{15-3}{4} \right)$	
	$= \left(\frac{28}{4}, \frac{12}{4} \right)$ ½	
	$P(x, y) = (7, 3)$ ½	2

Qn. Nos.	Value Points	Marks allotted
22.	The area of a triangle with vertices A (0, 2), B (3, 0) and C (x, 3) is $\frac{11}{2}$ sq.units. Find the value of 'x'. *Ans.* : A(0, 2) B(3, 0) C (x, 3) x_1, y_1 x_2, y_2 x_3, y_3 $A=\frac{1}{2}\left[x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)\right]$ ½ $\frac{11}{2}=\frac{1}{2}\left[0(0-3)+3(3-2)+x(2-0)\right]$ $11 = [\ 3\ (\ 1\ ) + x\ (\ 2\ )\ ]$ ½ $11 = 3 + 2x$ $2x = 11 - 3$ ½ $2x = 8$ $x = \frac{8}{2}$ $x = 4$ ½	2
23.	Trigonometric ratios related to the following figure are given below. Identify and write the correct ratios.  i) $\sin\theta = \frac{AC}{AB}$ ii) $\cos\theta = \frac{BC}{AC}$ iii) $\tan\theta = \frac{AB}{BC}$ iv) $\cot\theta = \frac{AB}{AC}$	

Qn. Nos.	Value Points	Marks allotted
	Ans. :	
	(ii) $\cos\theta = \frac{BC}{AC}$ 1	
	(iii) $\tan\theta = \frac{AB}{BC}$ 1	2
24.	Draw a circle of radius 4 cm and construct a pair of tangents to the circle such that the angle between them is 50°.	
	Ans. :	
		
	Angle between radii = 180° – 50° = 130° ½	
	Drawing a circle of radius 4 cm ½	
	Drawing arcs ½	
	Drawing tangents to the circle ½	2
IV.	**Answer the following questions :** **9 × 3 = 27**	
25.	The cost of 2 pencils and 3 pens is Rs. 40 and the cost of 3 pencils and 2 pens is Rs. 45. Find the cost of one pencil and one pen.	
	OR	
	A fraction becomes $\frac{3}{4}$ if 1 is added to both the numerator and the denominator. If 1 is subtracted from both the numerator and the denominator, the fraction becomes $\frac{1}{2}$. Find the fraction.	

Qn. Nos.	Value Points	Marks allotted
	Ans. : Let the cost of 1 pencil = Rs. x Let the cost of 1 pen = Rs. y $2x+3y=40$ ..... (1) ½ $3x+2y=45$ ..... (2) ½ Multiply (1) by (3) & (2) by (2) $6x+9y=120$ $6x+4y=90$ subtract (–) (–) (–) $5y = 30$ ½ $y=\frac{30}{5}$ $y = 6$ ½ substitute $y = 6$ in (1) $2x + 3 (6) = 40$ ½ $2x + 18 = 40$ $2x = 40 - 18$ $2x = 22$ $x=\frac{22}{2}$ $x = 11$ ½ Cost of 1 pencil = Rs. 11 Cost of 1 pen = Rs. 6	3
	OR	
	Let the fraction = $\frac{x}{y}$ By data $\frac{x+1}{y+1}=\frac{3}{4}$ ½ $4x+4=3y+3$ $4x-3y=-1$ ..... (1) ½ $\frac{x-1}{y-1}=\frac{1}{2}$ $2x - 2 = y - 1$ $2x - y = 1$ ..... (2) ½ Multiply Equation (1) by 1 & Equation (2) by 3 $4x-3y =-1$ $6x-3y = 3$ subtract (–) (+) (–) $-2x = -4$	

Qn. Nos.	Value Points	Marks allotted
	$x=\frac{-4}{-2}=2$ ½ substitute $x = 2$ in (2) $2(2) - y = 1$ ½ $4 - y = 1$ $y = 4 - 1 = 3$ Required fraction = $\frac{x}{y}=\frac{2}{3}$ ½	3
26.	The sum of the squares of two positive integers is 400. If twice of one integer is 8 more than the other integer, then find the integers. *Ans.* : Let the two positive integers be x and y. $x^2+y^2=400$ ..... (1) ½ By data, $2x = y + 8$ $y = 2x - 8$ ..... (2) ½ Substitute (2) in (1) $x^2+(2x-8)^2=400$ ½ $x^2+(2x)^2+(8)^2-2(2x)(8)=400$ $x^2+4x^2+64-32x=400$ $5x^2-32x-336=0$ $5x^2-60x+28x-336=0$ $-1680x^2$ ½ $5x(x-12)+28(x-12)=0$ $(x - 12)(5x + 28) = 0$ $-60x + 28x$ $x - 12 = 0$ or $5x + 28 = 0$ $x = 12$ or $x=-\frac{28}{5}$ ½ Since x is a positive integer, $x = 12$ Another integer, $y = 2x - 8$ $= 2(12) - 8$ $= 24 - 8$ $y = 16$ ½ Required integers are 12 and 16.	3

Qn. Nos.	Value Points	Marks allotted
27.	Prove that : $\frac{\sec\theta+\tan\theta-1}{\tan\theta-\sec\theta+1} = \frac{1+\sin\theta}{\cos\theta}$	
	OR	
	Evaluate : $\left(\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin 30^\circ + \sin 90^\circ}\right)$	
	Ans. :	
	LHS = $\frac{\sec\theta+\tan\theta-1}{\tan\theta-\sec\theta+1}$	
	substitute $1=\sec^2\theta-\tan^2\theta$ ½	
	$=\frac{\sec\theta+\tan\theta-(\sec^2\theta-\tan^2\theta)}{\tan\theta-\sec\theta+1}$	
	$=\frac{(\sec\theta+\tan\theta)-[(\sec\theta+\tan\theta)(\sec\theta-\tan\theta)]}{\tan\theta-\sec\theta+1}$ ½	
	$=\frac{(\sec\theta+\tan\theta)[1-(\sec\theta-\tan\theta)]}{\tan\theta-\sec\theta+1}$ ½	
	$=\frac{(\sec\theta+\tan\theta)(1-\sec\theta+\tan\theta)}{(\tan\theta-\sec\theta+1)}$	
	$=\sec\theta+\tan\theta$ ½	
	$=\frac{1}{\cos\theta}+\frac{\sin\theta}{\cos\theta}$ ½	
	$=\frac{1+\sin\theta}{\cos\theta}$ = RHS ½	
	Note : If alternate method is used to prove, then give full marks.	3
	OR	
	$\frac{5\cos^2 60^\circ+4\sec^2 30^\circ-\tan^2 45^\circ}{\sin 30^\circ+\sin 90^\circ}$	
	$=\frac{5\left(\frac{1}{2}\right)^2+4\left(\frac{2}{\sqrt{3}}\right)^2-(1)^2}{\frac{1}{2}+1}$ 1	
	$=\frac{5\left(\frac{1}{4}\right)+4\left(\frac{4}{3}\right)-1}{\frac{1+2}{2}}$ ½	

Qn. Nos.	Value Points	Marks allotted
	$= \dfrac{\frac{5}{4}+\frac{16}{3}-1}{\frac{3}{2}}$	
	$= \dfrac{\frac{15+64-12}{12}}{\frac{3}{2}}$ ½	
	$= \dfrac{\frac{67}{12}}{\frac{3}{2}}$ ½	
	$= \frac{67}{12}\times\frac{2}{3}$	
	$= \frac{67}{18}$ ½	3
28.	Find the mean for the following data by 'Direct method' :	

Class-interval	*Frequency*
10 – 20	4
20 – 30	6
30 – 40	5
40 – 50	4
50 – 60	1

OR

Find the median for the following data :

Class-interval	*Frequency*
50 – 60	5
60 – 70	8
70 – 80	10
80 – 90	4
90 – 100	3

Ans. :

Qn. Nos.	Value Points	Marks allotted

Class interval	frequency (f_i)	Mid point x_i	$x_i f_i$
10-20	4	15	60
20-30	6	25	150
30-40	5	35	175
40-50	4	45	180
50-60	1	55	55
	$\sum f_i = 20$		$\sum f_i x_i = 620$

2

Mean = $\overline{X} = \frac{\sum f_i x_i}{\sum f_i}$ ½

$= \frac{620}{20}$

Mean = 31 ½ 3

OR

Class interval	frequency (f_i)	Cumulative frequency (C_f)
50-60	5	5
60-70	8	13
70-80	10	23
80-90	4	27
90-100	3	30
	$n = 30$	

1

$\frac{n}{2} = \frac{30}{2} = 15$, L = 70, C_f = 13, f = 10, h = 10 ½

Median = $l + \left[\frac{\frac{n}{2} - C_f}{f}\right] \times h$ ½

$= 70 + \left[\frac{15 - 13}{10}\right] \times 10$ ½

$= 70 + \frac{2}{10} \times 10$

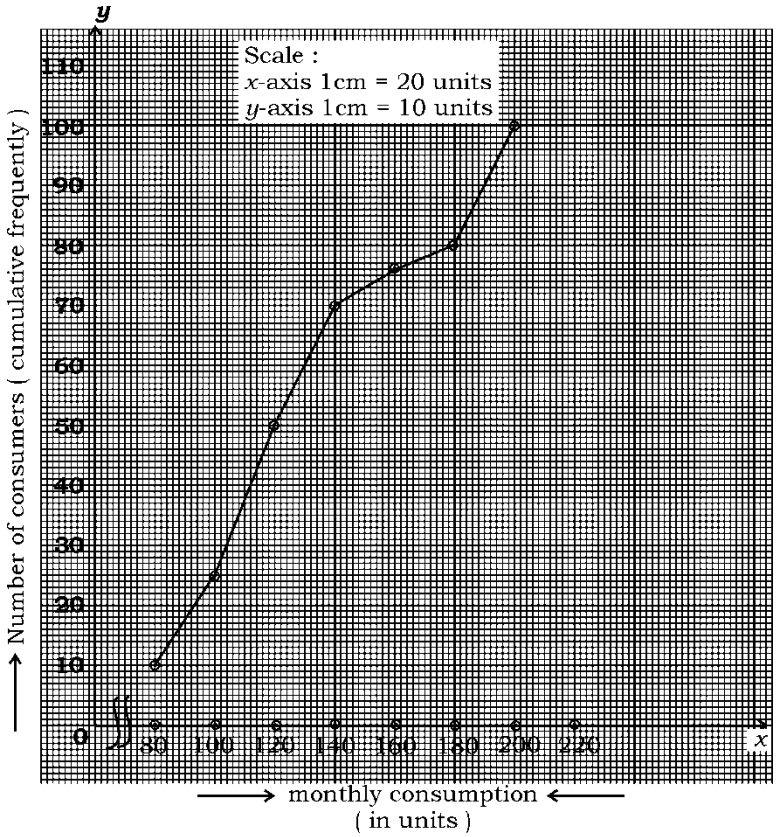
= 70 + 2

Median = 72 ½ 3

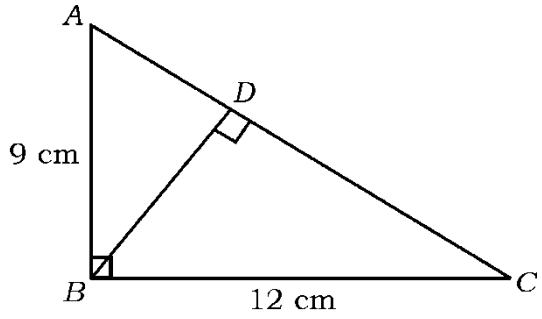
Qn. Nos.	Value Points	Marks allotted
29.	The following data gives the monthly consumption of electricity of 100 consumers of a locality. Draw a "less than type ogive" for the given data :	

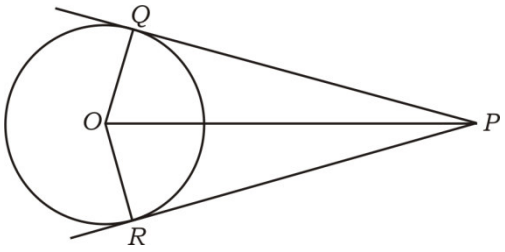
Monthly consumption (in units)	*Number of consumers (cumulative frequency)*
Less than 80	10
Less than 100	25
Less than 120	50
Less than 140	70
Less than 160	75
Less than 180	80
Less than 200	100

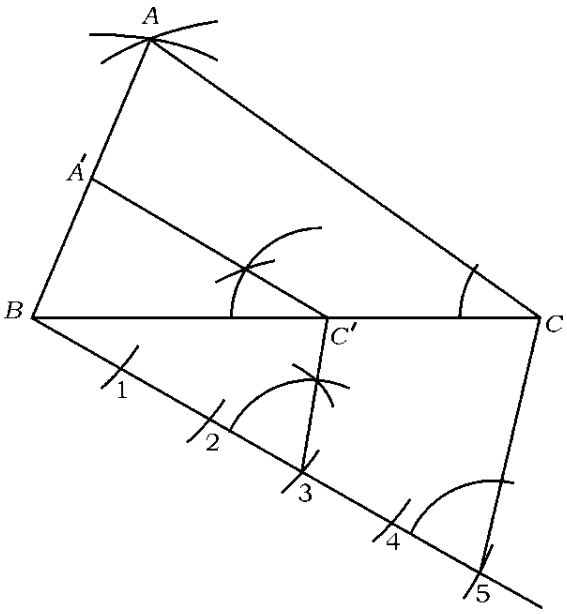
Ans. :



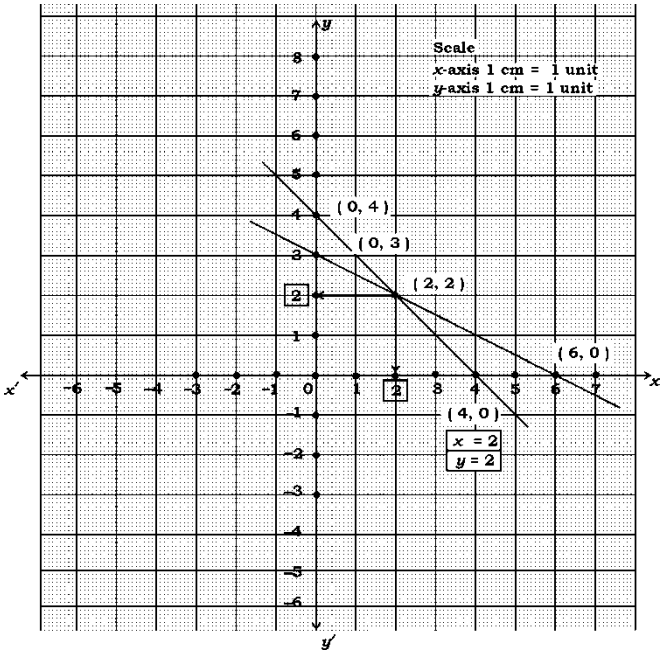
Drawing axes and scale	1	
Plotting point	1	
Drawing Ogive curve	1	3

Qn. Nos.	Value Points		Marks allotted
30.	In the given figure, $\angle ABC = 90°$ and $BD \perp AC$. Prove that $\Delta ABD \sim \Delta BCD$. If $AB = 9$ cm and $BC = 12$ cm, then find AD. 		
	Ans. :		
	In the figure let $\angle BAD = x°$ then		
	$\angle ABD = 90° - x$, $\angle ACB = 90° - x$		
	In ΔABD and ΔBCD,		
	$\angle ADB = \angle BDC = 90°$	½	
	$\angle ABD = \angle ACB = 90° - x$	½	
	$\therefore \Delta ABD \sim \Delta BCD$ [*AA* similarity criterion]		
	In ΔABC, $AC^2 = AB^2 + BC^2$	½	
	$= 9^2 + 12^2$		
	$= 81 + 144$		
	$= 225$		
	$AC = \sqrt{225}$		
	$AC = 15$ cm	½	
	Now $AB^2 = AC \cdot AD$	½	
	$9^2 = 15 \cdot AD$		
	$81 = 15 \cdot AD$		
	$AD = \frac{81}{15}$ cm		
	$AD = 5{\cdot}4$ cm	½	3

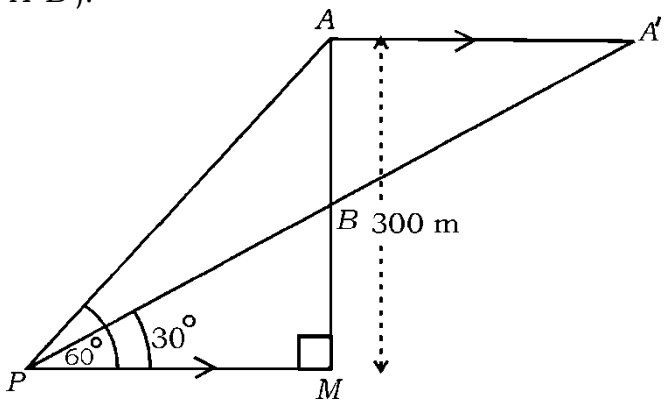
Qn. Nos.	Value Points	Marks allotted
31.	Prove that "The lengths of tangents drawn from an external point to a circle are equal". *Ans.* :  ½ Data : O is the centre of the circle. PQ and PR are the tangents drawn from external point P. ½ To prove : $PQ = PR$ ½ Construction : Join OP, OQ and OR. ½ Proof : In the figure, in ΔOQP and ΔORP, $\angle OQP = \angle ORP = 90°$ [$OQ \perp PQ$, $OR \perp PR$] ½ $OQ = OR$ [radii of the same circle] $OP = OP$ [Common side] $\Delta OQP \cong \Delta ORP$ [RHS congruence rule] ½ $\therefore PQ = PR$ [CPCT] Note : If the theorem is proved as given in the textbook, then give full marks.	3

Qn. Nos.	Value Points	Marks allotted
32.	Construct a triangle with sides 6·5 cm, 7·5 cm and 8 cm and then construct another triangle whose sides are $\frac{3}{5}$ of the corresponding sides of the first triangle. *Ans.* :  Constructing given triangle 1 Constructing acute angle and drawing arcs ½ Drawing parallel lines 1 Getting required triangle ½	3
33.	A metal cuboid of dimensions 100 cm × 80 cm × 64 cm is melted and recast into a cube. Find the surface area of the cube so formed. **OR** A metallic cone of base radius 5 cm and height 20 cm is melted and recast into a sphere. Find the radius of the sphere so formed.	

Qn. Nos.	Value Points		Marks allotted
	Ans. :		
	Volume of cuboid = $l \times b \times h$	½	
	$= 100 \times 80 \times 64$		
	$= 512000 \text{ cm}^3$	½	
	Volume of cube = Volume of cuboid		
	$a^3 = 512000$	½	
	$a = \sqrt[3]{512000}$		
	$a = 80$ cm	½	
	Surface area of cube = $6a^2$	½	
	$= 6(80)^2$		
	$= 6 \times (6400)$		
	$= 38400 \text{ cm}^3$	½	3
	OR		
	$r = 5$ cm, $h = 20$ cm		
	$V = \frac{1}{3}\pi r^2 h$	½	
	$= \frac{1}{3}\pi \times 5^2 \times 20$		
	$= \frac{1}{3}\pi \times 25 \times 20$	½	
	$V = \frac{500\pi}{3} \text{ cm}^3$	½	
	Volume of sphere = Volume of cone		
	$\frac{4}{3}\pi r^3 = \frac{500\pi}{3}$	½	
	$4r^3 = 500$		
	$r^3 = \frac{500}{4}$	½	
	$r^3 = 125$		
	$r = \sqrt[3]{125}$		
	$r = 5$ cm	½	3

Qn. Nos.	Value Points	Marks allotted
V.	**Answer the following questions :** **4 × 4 = 16**	
34.	Find the solution of the given pair of linear equations by graphical method : $x + 2y = 6$ $x + y = 4$ *Ans.* : $x + 2y = 6$ <table><tr><td>x</td><td>0</td><td>6</td></tr><tr><td>y</td><td>3</td><td>0</td></tr></table> $x + y = 4$ <table><tr><td>x</td><td>0</td><td>4</td></tr><tr><td>y</td><td>4</td><td>0</td></tr></table>  Constructing tables 1 + 1 Plotting points and drawing lines 1 Writing the values of x and y 1	4
35.	Two kites *'A'* and *'B'* are flying one below the other above the horizontal ground as shown in the figure. Kite *'A'* is flying 300 m above the ground. The angles of elevation of kites *'A'* and *'B'* as observed from a point *'P'* on the ground are 60° and 30° respectively. Find the distance between the two kites (AB). After sometime when the	

Qn. Nos.	Value Points	Marks allotted
	thread of kite *'A'* is released, it moves horizontal to the ground and reaches the point *'A′'* in the sky. If *P, B, A′* are in the same line, then find the distance between the kites ($A'B$).	



Ans. :

In ΔPMA, $\tan 60° = \frac{AM}{PM}$ ½

$$\sqrt{3} = \frac{300}{PM}$$

$$PM = \frac{300}{\sqrt{3}}$$ ½

In ΔPMB, $\tan 30° = \frac{BM}{PM}$ ½

$$\frac{1}{\sqrt{3}} = \frac{BM}{\frac{300}{\sqrt{3}}}$$

$$\sqrt{3} \,.\, \sqrt{3} \,.\, BM = 300$$

$$3\ BM = 300$$

$$BM = \frac{300}{3} = 100 \text{ m}$$ ½

$AB = AM - BM = 300 - 100 = 200$ m ½

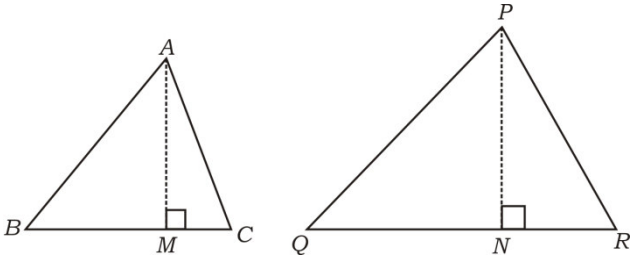
In $\Delta ABA'$, $\angle AA'B = \angle BPM = 30°$ ($AA' \parallel PM$) ½

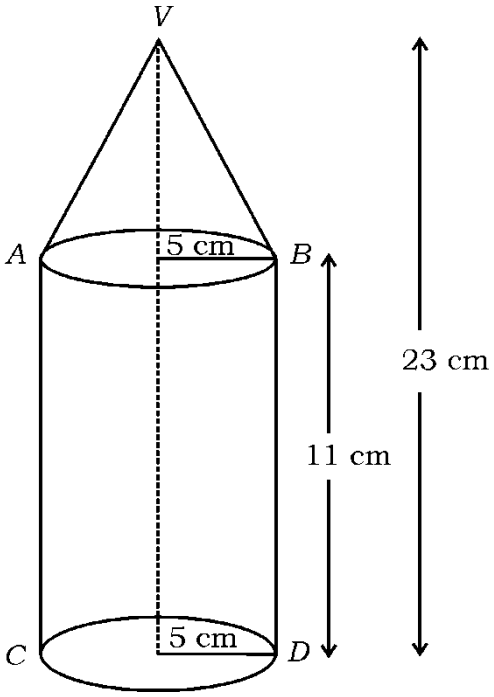
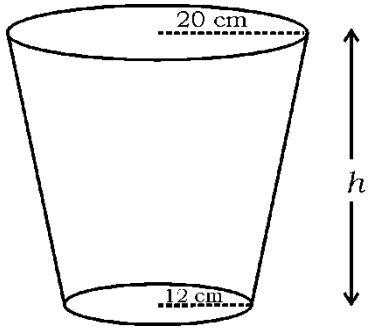
$\sin 30° = \frac{AB}{A'B}$ ½

$$\frac{1}{2} = \frac{200}{A'B}$$

$$A'B = 200 \times 2$$

$A'B = 400$ m ½ 4

Qn. Nos.	Value Points	Marks allotted
36.	Prove that "The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides".	
	Ans. :	
		½
	Data : $\Delta ABC \sim \Delta PQR$	
	$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$	½
	To prove : $\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{BC^2}{QR^2}$	½
	Construction : Draw $AM \perp BC$ and $PN \perp QR$	½
	Proof : $\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{\frac{1}{2} \times BC \times AM}{\frac{1}{2} \times QR \times PN}$	
	$\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{BC}{QR} \times \frac{AM}{PN}$ ..... (1)	½
	In ΔABM and ΔPQN	
	$\angle B = \angle Q$ (By data, $\Delta ABC \sim \Delta PQR$)	
	$\angle M = \angle N = 90°$ (construction)	
	$\frac{AB}{PQ} = \frac{AM}{PN}$	½
	But $\frac{AB}{PQ} = \frac{BC}{QR}$	
	$\therefore \frac{AM}{PN} = \frac{BC}{QR}$ ..... (2)	½
	Substitute (2) in (1)	
	$\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{BC}{QR} \times \frac{BC}{QR}$	
	$\therefore \frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{BC^2}{QR^2}$	½
		4

Qn. Nos.	Value Points	Marks allotted
37.	A solid is in the shape of a cone placed on the cylinder as shown in the figure. The radius of both cylinder and cone are equal to 5 cm. If the height of the cylinder is 11 cm and the total height of the solid is 23 cm, then find the curved surface area and volume of the solid. [Take $\pi = \frac{22}{7}$]  **OR** A container is in the form of a frustum of a cone as shown in the figure. The radii of its circular bases are 20 cm and 12 cm. If the volume of the frustum of a cone is 12320 cm^3, then find its curved surface area. [Take $\pi = \frac{22}{7}$]  	

Qn. Nos.	Value Points	Marks allotted
	Ans. :	
	Height of cone = $h_{cone} = (23 - 11) = 12$ cm	
	radius of cone = r = 5 cm	
	slant height of cone = $l = \sqrt{r^2 + h^2}$ ½	
	$= \sqrt{5^2 + 12^2}$	
	$= \sqrt{25 + 144}$	
	$= \sqrt{169}$	
	l = 13 cm ½	
	CSA of given solid = CSA of cone + CSA of cylinder	
	$= \pi rl + 2\pi rh$ ½	
	$= \pi r\ (l + 2h)$	
	$= \frac{22}{7} \times 5\ (13 + 2 \times 11)$ ½	
	$= \frac{22}{7} \times 5 \times 35$	
	$= 550\ \text{cm}^2$ ½	
	Volume of given solid = Volume of cone + Volume of cylinder = $\frac{1}{3}\pi r^2 h_{cone} + \pi r^2 h_{cy}$ ½	
	$= \pi r^2 \left[\frac{1}{3} \times h_{cone} + h_{cy} \right]$	
	$= \frac{22}{7} \times 5^2 \left[\frac{1}{3} \times 12 + 11 \right]$ ½	
	$= \frac{550}{7} \times 15$	
	$= \frac{8250}{7}\ \text{cm}^3$	
	OR 1178·57 cm^3 ½	
	Note : Any other alternative method is used to get the correct answer, then give full marks.	4
	OR	

Qn. Nos.	Value Points	Marks allotted
	$V = \frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$ ½	
	$12320 = \frac{1}{3} \times \frac{22}{7} \times h(20^2 + 12^2 + 20 \times 12)$	
	$12320 = \frac{22}{21} \times h\,(784)$ ½	
	$h = \frac{12320 \times 21}{784 \times 22}$ ½	
	$h = 15$ cm ½	
	$l = \sqrt{h^2 + (r_1 - r_2)^2}$ ½	
	$= \sqrt{15^2 + (20-12)^2}$	
	$= \sqrt{225 + 64}$	
	$l = \sqrt{289}$	
	$l = 17$ cm ½	
	CSA = $\pi(r_1 + r_2)\,l$ ½	
	$= \frac{22}{7}(20+12) \times 17$	
	$= \frac{22}{7} \times 32 \times 17$	
	$= \frac{11968}{7}$ cm^2 or 1709·71 cm^2 ½	4
VI.	**Answer the following question : 1 × 5 = 5**	
38.	An Arithmetic progression contains 30 terms. The 17^{th} term of the progression is 4 more than thrice its fifth term. If the 10^{th} term is 31, then find the last three terms of the progression and also find the arithmetic progression.	
	Ans. :	
	$a_{17} = 3a_5 + 4$ ½	
	$a + 16d = 3(a + 4d) + 4$ ½	
	$a + 16d = 3a + 12d + 4$	

Qn. Nos.	Value Points	Marks allotted
	or $3a+12d+4=a+16d$	
	$3a-a=16d-12d-4$ ½	
	$2a=4d-4$	
	$\div 2 \Rightarrow a=2d-2$ ..... (i) ½	
	By data, $a_{10}=31$	
	$a + 9d = 31$	
	$2d - 2 + 9d = 31$ [from (i)] ½	
	$11d - 2 = 31$	
	$11d = 31 + 2$ ½	
	$11d = 33$	
	$d=\frac{33}{11}$ ½	
	$d = 3$ ½	
	$a = 2 \times 3 - 2 = 4$	
	30th term = $a + 29d = 4 + 29 \times 3 = 91$	
	29th term = 91 – 3 = 88 ½	
	28th term = 88 – 3 = 85 ½	5
	The progression is 4, 4 + 3, 7 + 3, ...	
	4, 7, 10	
	Note : Any other alternative method is followed to get correct answer, then give full marks.	