DIRECTORATE OF GOVERNMENT EXAMINATIONS, CHENNAI - 6
S.S.L.C PUBLIC EXAMS- MARCH / APRIL-2024
KEY ANSWER FOR MATHEMATICS
MARKING SCHEME- KEY ANSWERS

GENERAL INSTRUCTIONS

1. If a student has given any answer which is different from one given in this marking scheme, but arrives with correct answer, should be given full credit with appropriate distribution.

2. In section I, award 1 mark for the correct option code and the corresponding answer. If one of them (Option or Answer) is wrong then award **ZERO** mark only.

3. In section II, section III & section IV if the solution is correct then award full mark directly. The stage mark is essential only if the part of the solution is incorrect.

4. If a particular stage is wrong and if the student writes the appropriate formula then suitable mark which is attached with that stage should be awarded for the formula. Mark should not be deducted for not writing the formula, if the student arrives at the correct answer.

PART I

Maximum Marks:100

Answer all the questions 14x1=14

Q No	Option code	KEY ANSWERS	MARKS ALLOTTED
1.	(c)	3	1
2.	(a)	7	1
3.	(d)	2520	1
4.	(c)	31m	1
5.	(b)	$16x^2$	1
6.	(a)	Straight line	1
7.	(a)	1.4 cm	1
8.	(b)	Two	1
9.	(b)	25 sq.units	1
10.	(a)	$\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$	1
11.	(a)	40 π sq.units	1
12.	(d)	3 : 1 : 2	1
13.	(c)	1.05	1
14.	(b)	1	1

PART-II

Answer any Ten Questions.

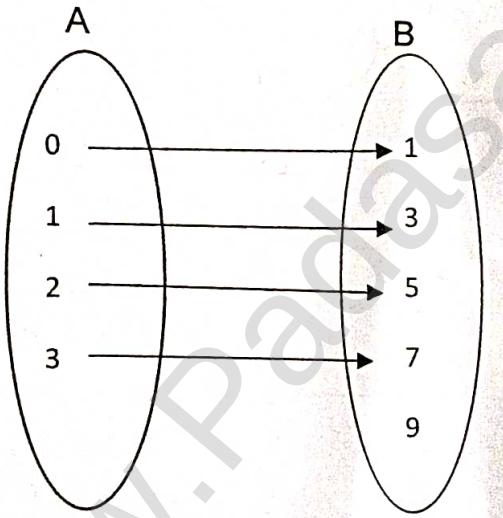
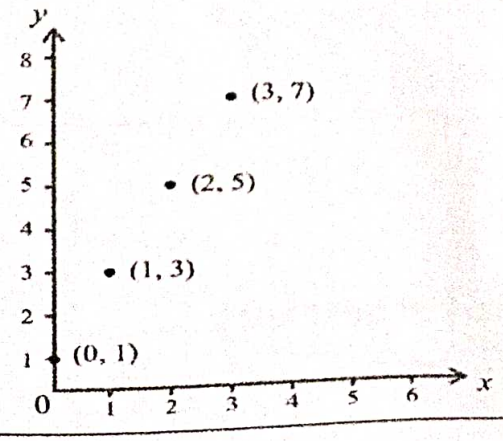
Q.NO : 28 Compulsory Question 10 ×2 =20

Q.No	Answers	Step marks	Total marks
15.	A = { 3, 5 } B = { 2, 4 }	1 1	2
16.	$fog(x) = 6x + 3k - 2$ $gof(x) = 6x - 4 + k$ k= -1	1 1	2
17.	$800 = 2^5 \times 5^2$ $a = 2, b = 5\ (or)\ a = 5, b = 2$	1 1	2
18.	$\frac{3x^3z}{5y^3}$		2
19.	Sum of roots $= \frac{-b}{a} = -8$ Product of roots $= \frac{c}{a} = -65$ **[If answer is not correct, One mark should be awarded for formulas]**	1 1	2
20.	$AC^2 = AB^2 + BC^2 (or)$ $AC^2 = 18^2 + 24^2\ (or)$ $AC = \sqrt{18^2 + 24^2}$ AC = 30 m	1 1	2
21.	2a +b = 3 a = 2, b = -1	1 1	2
22.	$y - y_1 = m(x - x_1)\ \ (or)$ $y - 2 = \frac{-5}{4}(x + 1)$ 5x + 4y -3 = 0	1 1	2

23.	$\sqrt{\frac{1+cos\theta}{1-cos\theta}} = \sqrt{\frac{1+cos\theta}{1-cos\theta} \times \frac{1+cos\theta}{1+cos\theta}}$ $\frac{1+cos\theta}{sin\theta}$ (or) $\frac{1}{sin\theta} + \frac{cos\theta}{sin\theta}$ $(or) cosec\theta + cot\theta$	1 1	2
24.	Base Area $=\pi r^2 = 1386 m^2$ TSA $= 4158 m^2$	1 1	2
25.	Base Area $=\pi r^2 = 250\ m^2$ Volume $= 500\ m^3$	1 1	2
26.	Range = L – S = 49 $co.efficient\ of\ Range = \frac{L-S}{L+S} = \frac{49}{85}$ (or) 0.576 **[If answer is not correct, One mark should be Awarded for formulas]**	1 1	2
27.	$S = \{$ Sun – Mon, Mon – Tue, Tue – Wed, Wed – Thu, Thu – Fri, Fri – Sat, Sat – Sun $\}$ (or) n (S) = 7 P(A) $=\frac{2}{7}$	1 1	2
28.	$a = bq + r,\ 0 \le r < \lvert b \rvert$ H.C.F =1 **[Two marks should be awarded if answered in different methods]**	1 1	2

Answer any Ten Questions **PART-III**

Q.No : 42 Compulsory question **10 × 5=50**

Q.No	Answers	Step marks	Total marks
29.	$A = \{2,3\}, B = \{0,1\}, C = \{1,2\}$ $B \cup C = \{0,1,2\}$	1	5
	$A \times (B \cup C) = \{(2,0), (2,1). (2,2), (3,0), (3,1), (3,2)\}$	1	
	$A \times B = \{(2,0), (2,1), (3,0), (3,1)\}$	1	
	$A \times C = \{(2,1), (2,2), (3,1), (3,2)\}$	1	
	$(A \times B) \cup (A \times C) = \{(2,0), (2,1). (2,2), (3,0), (3,1), (3,2)\}$	1	
30.	$f(0) = 1, f(1) = 3, f(2) = 5, f(3) = 7$	1	5
	i) Arrow diagram  	1	
	ii) Table x: 0, 1, 2, 3 $f(x)$: 1, 3, 5, 7	1	
	iii) Set of Ordered pairs $f = \{(0,1), (1,3), (2,5), (3,7)\}$	1	
	iv) Graph  	1	

31.

$$\sum n^3 = \left(\frac{n(n+1)}{2}\right)^2$$ — 1

$$9^3 + 10^3 + \cdots + 21^3$$

$$= (1^3 + 2^3 + \cdots + 21^3) - (1^3 + 2^3 + \cdots + 8^3)$$ — 1

$$= \left(\frac{21 \times 22}{2}\right)^2 - \left(\frac{8 \times 9}{2}\right)^2$$ — 1

$$= 231^2 - 36^2$$ — 1

$$= 52065$$ — 1

5

32.

$$8x^2 - x + 1$$

$8x^2$	$64x^4 - 16x^3 + 17x^2 - 2x + 1$
	$64x^4$
	(-)
$16x^2 - x$	$-16x^3 + 17x^2$
	$-16x^3 + x^2$
	(+) (-)
$16x^2 - 2x + 1$	$16x^2 - 2x + 1$
	$16x^2 - 2x + 1$
	(-) (+) (-)
	0

1 — 2 — 1

Square root $= |8x^2 - x + 1|$ — 1

5

33.

$$A^2 = \begin{pmatrix} 8 & 5 \\ -5 & 3 \end{pmatrix}$$ — 2

$$5A = \begin{pmatrix} 15 & 5 \\ -5 & 10 \end{pmatrix} (or) \; -5A = \begin{pmatrix} -15 & -5 \\ 5 & -10 \end{pmatrix}$$ — 1

$$7I_2 = \begin{pmatrix} 7 & 0 \\ 0 & 7 \end{pmatrix}$$ — 1

$$A^2 - 5A + 7I_2 = \begin{pmatrix} 8 & 5 \\ -5 & 3 \end{pmatrix} - \begin{pmatrix} 15 & 5 \\ -5 & 10 \end{pmatrix} + \begin{pmatrix} 7 & 0 \\ 0 & 7 \end{pmatrix}$$

$$= \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} = 0$$ — 1

5

34.

Statement — 1
Diagram — 1
Given, To prove, Construction — 1
Proof — 2

5

[Note : If there is no figure, then mark should be allotted for statement only]

35.

For vertices to be taken in order

$$A = \frac{1}{2}\begin{vmatrix} x_1 & x_2 & x_3 & x_4 & x_1 \\ y_1 & y_2 & y_3 & y_4 & y_1 \end{vmatrix}$$

(or)

$$= \frac{1}{2}\begin{bmatrix} (x_1y_2 + x_2y_3 + x_3y_4 + x_4y_1) \\ -(x_2y_1 + x_3y_2 + x_4y_3 + x_1y_4) \end{bmatrix}$$

$$= \frac{1}{2}\begin{vmatrix} -9 & -8 & 1 & 2 & -9 \\ -2 & -4 & -3 & 2 & -2 \end{vmatrix}$$

$$= \frac{1}{2}|36 + 24 + 2 - 4 - 16 + 4 + 6 + 18|$$

$$= \frac{1}{2} \times 70$$

= 35 sq.units.

1 1 1 1 1 — 5

36.

Mid point of AB = (1 , -1) — 1

The slope of AB = $\frac{-3}{5}$ — 1

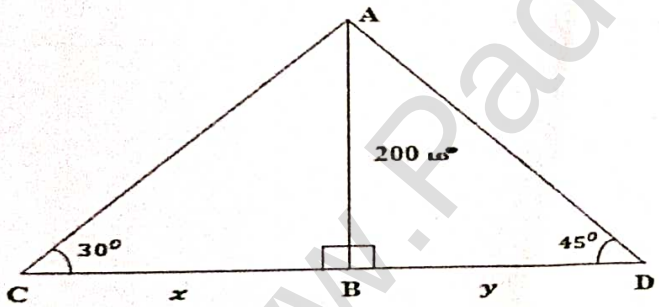
The slope of perpendicular line = $\frac{5}{3}$ — 1

Equation : $y - y_1 = m(x - x_1)$ — 1

$5x - 3y - 8 = 0$ — 1

5

37.



1

$$\tan 30^\circ = \frac{AB}{BC}$$

$$\frac{1}{\sqrt{3}} = \frac{200}{x}$$

$$x = 200\sqrt{3}\ m$$

1

$$tan45^\circ = \frac{AB}{BD}$$

$$1 = \frac{200}{y}$$

y = 200 m

$$CD = 200\sqrt{3} + 200 = 346.4 + 200$$

= 546.4 m

1 1 1

5

38.	$V = \frac{1}{3}\pi h[R^2 + Rr + r^2]$ $= \frac{1}{3} \times \frac{22}{7} \times 45[28^2 + (28 \times 7) + 7^2]$ $= \frac{1}{3} \times \frac{22}{7} \times 45\,[784 + 196 + 49]$ $= \frac{1}{3} \times \frac{22}{7} \times 1029 \times 45$ $= 48510\ cm^3$	1 1 1 1 1	5
39.	Volume of cylinder $= \pi R^2 H$ $= \pi$x 6x6x15 (or) 540π Volume of ice cream cone $= \frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3$ $= 45\pi$ No of ice cream cones $=$ Volume of cylinder / Volume of an ice cream cone $= \frac{\pi \text{ x } 6\text{x}6\text{x}15}{45\pi}$ (or) $\frac{540\,\pi}{45\pi}$ No of ice cream cones= 12	1 1 1 1 1	5
40.	$\bar{x}$ =30 Table S.D (σ) = 4.32 $C.V = \frac{\sigma}{\bar{x}} \times 100$ C.V = 14.4%	1 1 1 1 1	5
41.	$n(S)$ = 36 P(A) $= \frac{18}{36}$ P(B) $= \frac{5}{36}$ $P(A \cap B) = \frac{3}{36}$ $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $= \frac{20}{36}$ (or) $\frac{5}{9}$	1 1 1 1 1	5

42.	$S_n = 7 + 77 + 777 + \cdots n\ terms$		
	$= 7(1+11+111+\ldots \text{ n terms})$	1	
	$=\frac{7}{9}(9 + 99 + 999 + \cdots n\ terms)$	1	
	$=\frac{7}{9}[(10-1) + (100-1) + (1000-1) + \cdots n\ terms)]$		
	$= \frac{7}{9}[(10 + 100 + 1000 + \ldots \text{ n terms}) - n)]$	1	5
	$S_n = \frac{a(r^n - 1)}{r - 1}$	1	
	here a = 10, r = 10		
	$= \frac{7}{9}\left(\frac{10(10^n - 1)}{10 - 1} - n\right)$		
	$= \frac{7}{9}\left(\frac{10(10^n-1)}{9} - n\right)$ (or) $\left(\frac{70(10^n-1)}{81} - \frac{7n}{9}\right)$	1	

Part –IV

Answer all the questions 2X8=16

Q.No	Answers	Step marks	Total marks
43 (a).	Rough diagram	1	8
	Drawing line segment	1	
	Drawing circle	3	
	Marking altitude	1	
	Construction of △ PQR	2	
	(OR)		
(b)	Rough diagram	1	
	Drawing the first circle	2	
	Drawing the line segment of 8 cm	1	
	Drawing the second circle	2	
	Drawing the two tangents	1	
	Length of a tangent = 7.3 cm (or) 7.4 cm (or) 7.5 cm	1	

44(a)

x axis, y axis — 1

Scale — 1

$y=2x^2-3x-5$ [Any 5 points] — 8

x	-3	-2	-1	0	1	2	3	4
y	22	9	0	-5	-6	-3	4	15

2

Plot the points and drawing the parabola — 1

$y= x+1$ [minimum 2 points]

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

1

Drawing of straight line — 1

Solution $x=\{-1,3\}$ — 1

(OR)

b)

x axis, y axis — 1

Scale — 1

xy =24 (Any five points)

x	1	2	3	4	6	8	12	24
y	24	12	8	6	4	3	2	1

2

Plot the points and drawing the Rectangular parabola — 2

if x=3 , y=8 — 1

if y=6, x = 4 — 1