PIMS EDUCATIONAL ACADEMY Regd. No. : 130/10

MODEL SSLC EXAMINATION

KEY FOR MATHS

PART - I

SECTION - A

15 x1 = 15 Marks

Q. No.	Key	Answer	Q. No.	Key	Answer
1.	d	6 and 5	9.	a	70^0
2.	d	both A.P and G.P.	10.	b	2
3.	a	210	11.	a	1
4.	d	a^{k+5}	12.	d	0
5.	b	-1	13.	c	$\frac{3}{2}\pi h^2$ sq.units
6.	b	-7	14.	a	3.5
7.	c	$\frac{2}{7}$	15.	a	1
8.	b	(-2, 2)			

SECTION - B

10 x 2 = 20 Marks

16. $(B \cap C) = \{ 2, 4, 6 \}$ **- 1 mark**

$A \cup (B \cap C) = \{ 2, 4, 6, 7, 8, 9\}$ **- 1 mark**

17. Range of f = { 1, 4, 9, 16, 25 } **- 1 mark**

Type : One to one **- 1 mark**

18. $t_n = a + (n-1)d$ **- 1 mark**

$t_{17} = 4 + (17 - 1)\,5 = 84$ **- 1 mark**

19. $\frac{x^3}{x-2} + \frac{8}{2-x} = \frac{x^3 - 8}{(x-2)}$ **- 1 mark**

$= \frac{x^3 - 2^3}{x-2}$

$= \frac{(x-2)(x^2+2x+4)}{(x-2)}$

$= x^2 + 2x + 4$ **- 1 mark**

20. $A = \begin{bmatrix} 1 & -2 \\ -16 & 6 \end{bmatrix}$ **- 1 mark**

Additive inverse of $A = -A = \begin{bmatrix} -1 & +2 \\ +16 & -6 \end{bmatrix}$ **- 1 mark**

21. $A = \begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \end{pmatrix}$ **- 1 mark**

$a_{11} = 1 \quad a_{12} = 4 \quad a_{13} = 7$

$a_{21} = 1 \quad a_{22} = 2 \quad a_{23} = 5$

$\therefore A = \begin{bmatrix} 1 & 4 & 7 \\ 1 & 2 & 5 \end{bmatrix}$ **- 1 mark**

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22. $a = \frac{2}{3}$, $b = \frac{3}{4}$

using intercept form,

Equation $\frac{x}{a} + \frac{y}{b} = 1$ **- 1 mark**

$\frac{x}{\frac{2}{3}} + \frac{y}{\frac{3}{4}} = 1$

$9x + 8y - 6 = 0$ **- 1 mark**

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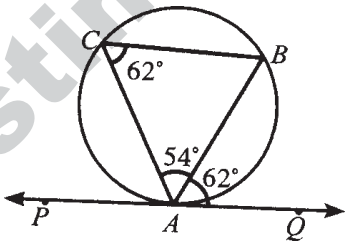
23. $\angle BAQ = \angle ACB = 62$ (Tangent chord theorem) **- 1 mark**



$\angle BAC + \angle ACB + \angle ABC = 180^0$

$\angle ABC = 180^0 - (\angle BAC + \angle ACB)$

$= 180^0 - (54^0 + 62^0)$

$= 64^0$ **- 1 mark**

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24. $\frac{\sin\theta}{\text{cosec}\,\theta} + \frac{\cos\theta}{\sec\theta} = \frac{\sin\theta}{\left(\frac{1}{\sin\theta}\right)} + \frac{\cos\theta}{\left(\frac{1}{\cos\theta}\right)}$ **- 1 mark**

$= \sin^2\theta + \cos^2\theta = 1$ **- 1 mark**

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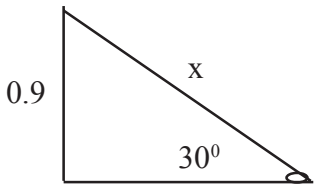
25. $\sin 30^0 = \frac{0.9}{x}$ **- 1 mark**

$\frac{1}{2} = \frac{0.9}{x}$



$x = 1.8$ m **- 1 mark**

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26. $h = \sqrt{l^2 - r^2} = \sqrt{29^2 - 20^2} = \sqrt{841 - 400} = \sqrt{441} = 21$ cm **- 1 mark**

$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 20 \times 20 \times 21 = 8800\ cm^3$ **- 1 mark**

27. $3\pi r^2 = 675\pi$

$r^2 = 225$ **- 1 mark**

CSA $= 2\pi r^2 = 2\pi \times 225 = 450\pi$ sq. cm **- 1 mark**

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28. $\sigma = \sqrt{\frac{n^2-1}{12}}$ **- 1 mark**

$\sigma = \sqrt{\frac{13^2-1}{12}} = \sqrt{\frac{169-1}{12}} = \sqrt{\frac{168}{12}} = \sqrt{14} = 3.74$ **- 1 mark**

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29. $n(s) = 50$

$P(A) = \frac{12}{50}$

$P(B) = \frac{8}{50}$ **- 1 mark**

$P(A \cap B) = \frac{4}{50}$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{12}{50} + \frac{8}{50} - \frac{4}{50} = \frac{16}{50} = \frac{8}{25}$ **- 1 mark**

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30. **a)** $(x + 1)$ is factor $P(-1) = 0$

$p(-1) = (-1)^3 + m(-1)^2 + 19(-1) + 12 = 0$ **- 1 mark**

$m = 8$ **- 1 mark**

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b) Slope of AB $= -\frac{1}{2}$ Slope of AB = slope of BC **- 1 mark**

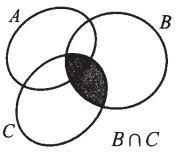
Slope of BC $= -\frac{1}{2}$ $\therefore$ Collinear **- 1 mark**

Note : Different method can be adopted

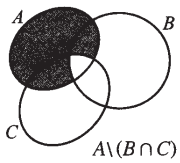
SECTION - C

9x 5 = 45

31.



(1)



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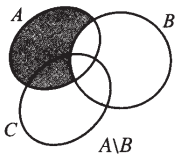

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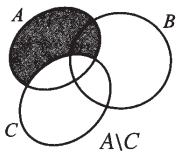

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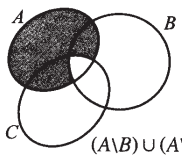


(5)

Venn Diagram

$B \cap C$ **- 1 mark**

$A \setminus (B \cap C)$ **- 1 mark**

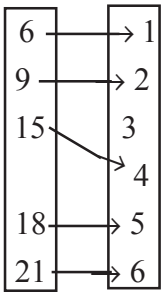
$A \setminus B$ **- 1 mark**

$A \setminus C$ **- 1 mark**

$(A \setminus B) \cup (A \setminus C)$ **- 1 mark**

32. f (6) = 1 f (9) = 2 f (15) = 4 f (18) = 5 f (21) = 6 **- 1 mark**

(i)Arrow Diagram



- 1 mark

(ii) ordered pairs (6,1) (9,2) (15, 4) (18, 5) (21, 6) **- 1 mark**

(iii) Table form :

x	6	9	15	18	21
f(x)	1	2	4	5	6

- 1 mark

(iv) graph

- 1 mark

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33. $t_n = ar^{n-1}$ **- 1 mark**

$t_4 = ar^3 = 54$

$t_7 = ar^6 = 1458$ **- 1 mark**

$\Rightarrow r^3 = 27$, $r = 3$, $a = 2$ **- 2 marks**

G.P. is 2, 6, 18, ... **- 1 mark**

34.

-1	2	-3	-3	+2
	0	-2	+5	-2
	2	-5	+2	0

P (-1) = 0 $\therefore$ (x + 1) is a factor **- 2 marks**

$Q = 2x^2 - 5x + 2$

$Q = (2x - 1)(x - 2)$ **- 2 marks**

$\therefore 2x^3 - 3x^2 - 3x^2 + 2 = (x + 1)(x - 2)(2x - 1)$ **- 1 mark**

35.

$2x^2 - 3x + 7$

$2x^2$ | $4x^4 - 12x^3 + 37x^2 + ax + b$

(-) **- 1 mark**

$4x^4$

$-12x^3 + 37x^2$ **- 1 mark**

$4x^2 - 3x$ | $-12x^3 + 9x^2$

$28x^2 + ax + b$ **- 1 mark**

$4x2 - 6x + 3$ | $28x^2 - 42x + 49$

0

a = -42 b = 49 **- 2 marks**

36. $\alpha + \beta = \frac{4}{3}$, $\alpha\beta = \frac{1}{3}$ **- 1 mark**

Sum

$$\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{\alpha^3+\beta^3}{\alpha\beta} = \frac{(\alpha+\beta)^3 - 3\alpha\beta(\alpha+\beta)}{\alpha\beta}$$

$$= \frac{\left(\frac{4}{3}\right)^2 - 3 \times \frac{1}{3}\left(\frac{4}{3}\right)}{\frac{1}{3}} = \frac{28}{9}$$ **- 2 marks**

Product

$$\frac{\alpha^2}{\beta} \times \frac{\beta^2}{\alpha} = \alpha\beta = \frac{1}{3}$$ **- 1 mark**

Req. eqn. $= x^2 - \frac{28}{9}x + \frac{1}{3} = 0$

(or) $9x^2 - 28x + 3 = 0$ **- 1 mark**

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37. $A^2 = \begin{bmatrix} -1 & -4 \\ 8 & 7 \end{bmatrix}$ **- 1 mark**

$-4A = \begin{bmatrix} -4 & +4 \\ -8 & -12 \end{bmatrix}$ (or) $4A = \begin{bmatrix} +4 & -4 \\ +8 & +12 \end{bmatrix}$ **- 1 mark**

$5I_2 = \begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$ **- 1 mark**

$A^2 - 4A + 5I_2 = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ **- 2 marks**

38.

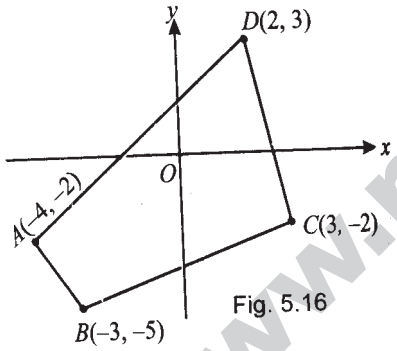

Fig. 5.16

Area of quadrilateral .

$= \frac{1}{2}[x_1y_2 + x_2y_3 + x_3y_4 + x_4y_1) - (x_2y_1 + x_3y_2 + x_4y_3 + x_1y_4)]$ **- 2 marks**

$= \frac{1}{2}[(20 + 6 + 9 - 4) - (6 - 15 - 4 - 12)]$ **- 1 mark**

$= \frac{1}{2}[31 + 25] = 28$ sq. units **- 2 marks**

Note : Different method can be adopted

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39. Slope of AC $= \frac{5+4}{-1-2} = \frac{9}{-3} = -3$ **- 1 mark**

Slope of BD $= \frac{1}{3}$ **- 1 mark**

Slope $= \frac{1}{3}$, point (3, 3) mathstimes.com

$y - y_1 = m(x - x_1)$ **- 1 mark**

$y - 3 = \frac{1}{3}(x - 3)$ **- 1 mark**

$x - 3y + 6 = 0$ **- 1 mark**

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40. Diagram **- 1 mark**

Given, To Prove , Construction **- 1 mark**

Proof **- 3 marks**

Note : One may prove without diagram mark should not be awarded

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41. $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} \times \sqrt{\frac{1-\sin\theta}{1-\sin\theta}}$ **- 1 mark**

$= \sqrt{\frac{(1-\sin\theta)^2}{1^2-\sin^2\theta}}$ **- 1 mark**

$= \frac{1-\sin\theta}{\cos\theta}$ **- 1 mark**

$= \frac{1}{\cos\theta} - \frac{\sin\theta}{\cos\theta}$ **- 1 mark**

$= \sec\theta - \tan\theta$ **- 1 mark**

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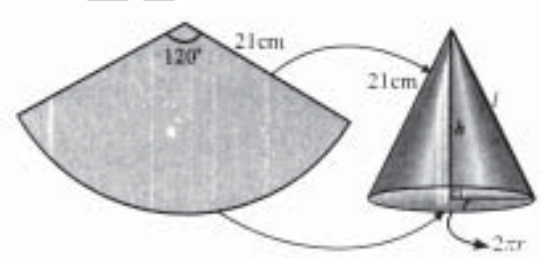
42. $\theta = 120$, R = 21 cm

$2\pi r = \frac{\theta}{360} \times 2\pi r$ **- 1 mark**



$\Rightarrow$ r = 7 cm **- 1 mark**

l = R = 21 cm **- 1 mark**

C.S.A. $= \pi rl$ **- 1 mark**

$= \frac{22}{7} \times 7 \times 21$

= 462 Sq. cm. **- 1 mark**

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43. $\bar{x} = \frac{\Sigma x}{N} = \frac{60}{6} = 10$ **- 1 mark**

x	$d = x - \bar{x}$	d^2
10	0	0
20	10	100
15	5	25
8	-2	4
3	-7	49
4	- 6	36
		214

- 1 mark

$\sigma = \sqrt{\frac{\Sigma d^2}{n}}$ **- 1 mark**

$= \sqrt{\frac{214}{6}}$ **- 1 mark**

$= 5.97$ **- 1 mark**

Note : Different method can be adopted

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44. $P(A) = 0.25$ $P(B) = 0.35$ $P(A \cap B) = 0.15$

i) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ **- 1 mark**

$= 0.25 + 0.35 - 0.15$

$= 0.60 - 0.15$

$= 0.45$ **- 1 mark**

ii) Probability of get only one of the awards

$= P(A \cap \overline{B}) + P(\overline{A} \cap B)$ **- 1 mark**

$= [P(A) - P(A \cap B)] + [(P(B) - P(A \cap B)]$ **- 1 mark**

$= (0.25 - 0.15) + (0.35 - 0.15)$

$= 0.10 + 0.20$

$= 0.30$ **- 1 mark**

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45. **a)** $\sum_{1}^{n} n^2 = \frac{n(n+1)(2n+1)}{6}$ **- 1 mark**

$\sum_{20}^{40} n^2 = \sum_{1}^{40} n^2 - \sum_{1}^{19} n^2$

$= \frac{40x41x81}{6} - \frac{19x20x39}{6}$ **- 2 marks**

$= 22140 - 2470$ **- 1 mark**

$= 19670$ **- 1 mark**

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b) Vol. of Cylinder $= \pi r^2 h = \pi \times 8 \times 8 \times 12 = 768\pi$ **- 2 marks**

Vol of cone $= 1/3\ \pi r^2 h = 1/3\ \pi \times 6 \times 6 \times 16 = 192\ \pi$ **- 2 marks**

No. of cones $= \frac{768\pi}{192\pi} = 4$ cones **- 1 mark**

SECTION - D

2 X 10 = 20

46.	Rough Diagram	**- 1 mark**
	To draw a circle of radius 3 cm	**- 1 mark**
	To mark a point P	**- 1 mark**
	Draw the perpendicular bisector	**- 3 marks**
	required tangents	**- 3 marks**
	verification	**- 1 mark**
	(or)	
	Rough Diagram	**- 1 mark**
	To draw BC	**- 1 mark**
	Draw the circle	**- 5 marks**
	To mark a point A	**- 2 marks**
	Required triangle	**- 1 mark**
47.	Graph : x - axis , y - axis	**- 1 mark**
	Scale	**- 1 mark**
	Table (atleast 6 points)	**- 3 marks**
	To draw a parabola	**- 3 marks**
	To draw a line $y = x + 7$	**- 1 mark**
	Solution set { -3, 5 }	**- 1 mark**
	(or)	
47.	Graph : x - axis , y - axis	**- 2 marks**
	Scale	**- 1 mark**
	To plot 5 points	**- 5 marks**
	$y = 4$, $x = 2$	**- 1 mark**
	To draw Rectangular Hyperbola	**- 1 mark**