PIMS EDUCATIONAL ACADEMY
Regd. No. : 130/10

SSLC MODEL EXAMINATION

KEY FOR MATHS

PART - I

SECTION - A

15 x1 = 15 Marks

Q. No.	Key	Answer	Q. No.	Key	Answer
1.	d)	not a function	8.	a)	0
2.	c)	$\frac{1}{30}$	9.	b)	3 . 2
3.	a)	8	10.	d)	4 cm
4.	b)	$x^2 - 4x + 3$	11.	c)	1
5.	d)	$x^2 - 5x + 6 = 0$	12.	a)	30 m
6.	a)	2 , 0	13.	b)	¾ cm
7.	a)	6	14.	a)	3 . 5
			15.	c)	$\frac{1}{6}$

SECTION - B

16. $B \cap C = \{ a , e \}$, $A \cap B = \{ a , c \}$ **- 1 mark**

$A \cap (B \cap C) = (A \cap B) \cap C = \{ a \}$ **- 1 mark**

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17. The range of $f = \{ -½ , -1, 1, ½ \}$ **- 1 mark**

It is not a function from A to A **- 1 mark**

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18. $\sum n = \frac{n(n+1)}{2}$ **- 1 mark**

$2 + 4 + 6 + ... 100 = 2 (1 + 2 + 3 + ... + 50)$

$= \frac{2 (50) (50 + 1)}{2}$

$= 2550$ **- 1 mark**

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19. $\frac{x^r - 2x}{x + 2} \times \frac{3x + 6}{x - 2} = \frac{x(x-2)}{x+2} \times \frac{3 (x + 2)}{x - 2}$ **- 1 mark**

$= 3x$ **- 1 mark**

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20. $\sqrt{(x + 1)^6 + \frac{1}{(x + 1)^6} + 2} = \sqrt{\left((x + 1)^3 + \frac{1}{(x + 1)^3} \right)^2}$ **- 1 mark**

$= \left| (x + 1)^3 + \frac{1}{(x + 1)^3} \right|$ **- 1 mark**

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21. $A^T = \begin{bmatrix} 8 & 1 \\ 5 & -3 \\ 2 & 4 \end{bmatrix}$ **- 1 mark**

$(A^T)^T = \begin{bmatrix} 8 & 5 & 2 \\ 1 & -3 & 4 \end{bmatrix}$ **- 1 mark**

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22. $x = 2$ **- 1 mark**

$y = -4,\ z = -1$ **- 1 mark**

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23. $m = 1,\quad c = \frac{2}{5}$

$y = mx + c$ **- 1 mark**

The required equation is

$5x - 5y + 2 = 0$ **- 1 mark**

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24. $m_1 = -\frac{1}{2},\ m_2 = -\frac{1}{2}$ **- 1 mark**

$m_1 = m_2$ **- 1 mark**

The given two straight lines are parallel

Note : alternate method can be used

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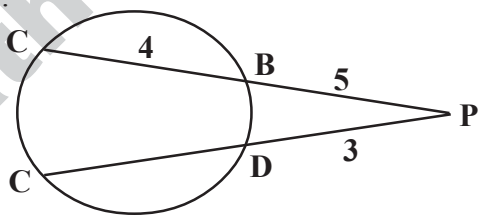
25. Since the chords AB and CD meets externally at P.



PA x PB = PC x PD **- 1 mark**

9 x 5 = (3 + CD) 3

CD = 12 cm **- 1 mark**

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26. $\frac{1 + \sec\theta}{\sec} = 1 + \cos\theta = (1 + \cos\theta) \times \frac{1 - \cos\theta}{(1 - \cos\theta)}$ **- 1 mark**

$= \frac{\sin^2\theta}{1 - \cos\theta}$ **- 1 mark**

Note : alternate method can be used

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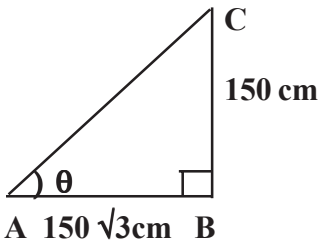
27. AB = $150\sqrt{3}$ cm **- 1 mark**

BC = 150 cm



$\tan\theta = \frac{BC}{AB} = \frac{1}{\sqrt{3}}$

$\theta = 30$

The angle of elevation of the top of the lamp - post is 30^0 **- 1 mark**

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28. $3\pi r^2 = 675\pi$ Sq. cm

$r^2 = 225$

CSA of the solid Hemisphere $= 2\pi r^2$ **- 1 mark**

$= 2\pi \times 225$

$= 450\pi$ sq.cm **- 1 mark**

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29. $n(s) = 36$
$n(A) = 4$ **- 1 mark**

$P(A) = \frac{n(A)}{n(s)} = \frac{4}{36} = \frac{1}{9}$ **- 1 mark**

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30. **a)** $R = L - S$ **- 1 mark**

$2.26 = 7.44 - S$

$S = 7.44 - 2.26 = 5.18$ **- 1 mark**

(OR)

b) given that $h = 12$ cm **- 1 mark|**

$2\pi r = 44$

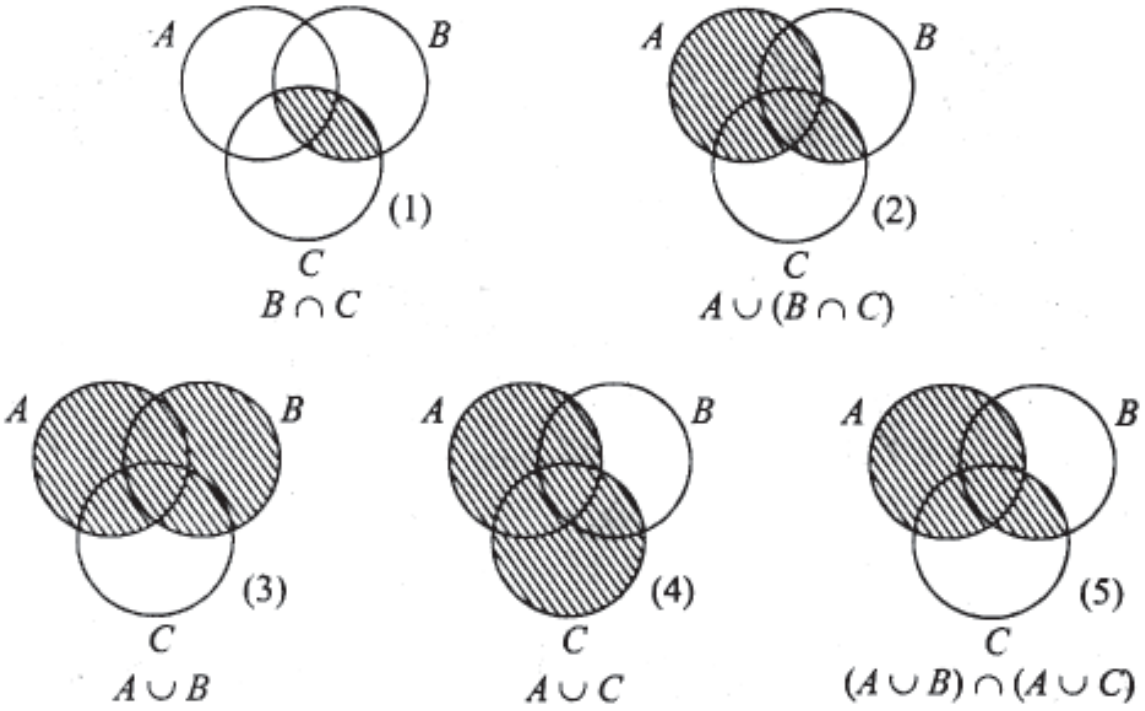
$r = 7$ cm

Volume $= \frac{1}{3}\pi r^2 h$

Volume $= 616$ cm^3 **- 1 mark**

SECTION - C

31. Each Diagram carries **- 1 mark** **- 5 marks**



32. $y = f(x) = 3 - 2x$, $\forall x \in A$

$f(5) = -7,\ f(6) = -9,\ f(7) = -11$ **- 1 mark**

$f(8) = -13$

(i) $f = \{ (5, -7) , (6, -9) , (7, -11), (8, -13) \}$ **- 1 mark**

(ii) Co-domain $= \{ -11, 4, 7, -10, -7, -9, -13 \}$ **- 1 mark**

(iii) Range $= \{ -7, -9, -11, -13 \}$ **- 1 mark**

(iv) Distinct elements have distinct images under f. Thus f is one - one **- 1 mark**

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33. $S_n = 0.4 + 0.94 + 0.994 + \ldots\ldots\ldots$ to n terms

$S_n = (1 - 06) + (0 - 0.06) + (1 - 0.006) + \ldots$ to n terms **- 1 mark**

$= (1 + 1 + 1 \ldots\ldots$ to n terms) - $(0.6 + 0.06 + 0.006 + \ldots\ldots$ to n terms] **- 1 mark**

$= n - 6\left[\frac{1}{10} + \frac{1}{10^2} + \frac{1}{10^3} + \ldots\ldots\ldots\ldots \text{ n terms}) \right]$ **- 1 mark**

$= n - 6 \left[\frac{\frac{1}{10}\left(1 - \frac{1}{10} \right)^n}{1 - \frac{1}{10}} \right]$ **(or)**

$= n - \frac{2}{3}\left[1 - \left(\frac{1}{10} \right)^n \right]$ **- 2 marks**

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34. $x^3 - 10x^2 - x + 10$

1	1	-10	-1	10
	0	1	-9	-10
	1	-9	-10	0

- 2 marks

$(x - 1)$ is a factor (any first factor)

$x^2 - 9x - 10 = (x - 10) (x + 1)$ **- 2 marks**

$x^3 - 10x^2 - x + 10 = (x - 1) (x + 1) (x - 10)$

(or)

Factors are $(x - 1) (x + 1) (x - 10)$ **- 1 mark**

35.

$x^2 - 5x + 6$

x^2 | $x^4 - 10x^3 + 37x^2 - 60x + 36$

x^4 **- 2 marks**

$2x^2 - 5x$ | $-10x^3 + 37x^2$

$-10x^3 + 25x^2$ **- 1 mark**

$2x^2 - 10x + 6$ | $12x^2 - 60x + 36$

$12x^2 - 60x + 36$ **- 1 mark**

0

$\sqrt{x^4 - 10x^3 + 37x^2 - 60x + 36} = |(x^2 - 5x + 6)|$ **- 1 mark**

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36. $A = 1 + m^2 \quad B = 2mc \quad C = c^2 - a^2$ **- 1 mark**

$\Delta = B^2 - 4AC = 0$ **- 1 mark**

$(2mc)^2 - 4(1 + m^2)(c^2 - a^2) = 0$ **- 2 marks**

$C^2 = a^2(1 + m^2)$ **- 1 mark**

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37. $B + C = \begin{bmatrix} -1 & 6 \\ 1 & 10 \end{bmatrix}$ **- 1 mark**

$A(B + C) = \begin{bmatrix} 3 & 2 \\ -1 & 4 \end{bmatrix}\begin{bmatrix} -1 & 6 \\ 1 & 10 \end{bmatrix} = \begin{bmatrix} -1 & 38 \\ 5 & 34 \end{bmatrix}$ **- 1 mark**

$AB = \begin{bmatrix} 6 & 29 \\ 26 & 23 \end{bmatrix}$ **- 1 mark**

$AC = \begin{bmatrix} -7 & 9 \\ -21 & 11 \end{bmatrix}$ **- 1 mark**

$AB + AC = \begin{bmatrix} -1 & 38 \\ 5 & 34 \end{bmatrix}$ **- 1 mark**

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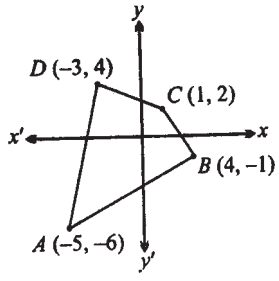
38. Let the vertices bo

A (-5 , -6) B (4, -1) , C (1, 2) and D (-3 , 4)



$\frac{1}{2}\{(-5)(4) + (1)(-3) + (-5)(-6) - (-6)(1) - (-1)(2) - (4)(-5)\}$ **- 2 marks**

Area of the quadrilateral ABCD

$= \frac{1}{2}[(5 + 8 + 4 + 18) - (-24 - 1 - 6 - 20)]$ **- 2 marks**

$= \frac{1}{2}(86)$

$= 43$ Sq. units **- 1 mark**

39. given $a + b = 5$, $b = 5 - a$ **- 1 mark**

$$\frac{x}{a} + \frac{y}{a} = 1 \Rightarrow \frac{x}{a} + \frac{y}{5-a} = 1$$

It passes (6 , -2)

$a = 3$ or $a = 10$ **- 2 marks**

When $a = 3$, $2x + 3y - 6 = 0$ **- 1 mark**

When $a = 10$, $x - 2y - 10 = 0$ **- 1 mark**

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40. Pythogoras theorem

Statement **- 1 mark**

Diagram **- 1 mark**

Proof **- 3 marks**

Note : No diagram, mark should not be awarded

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41. $\cot = \frac{n}{\tan\theta}$ and $\text{cosec} = \frac{n}{\sin\theta}$

We know that $\text{cosec}^2\alpha - \cot^2\alpha = 1$

$$\frac{m^2}{\sin^2\theta} - \frac{n^2}{\tan^2\theta} = 1$$

$$m^2 - n^2\cos^2\theta = \sin^2\theta$$

$$\frac{m^2-1}{n^2-1} = \cos^2\theta$$

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42. Cylinder Sphere

$r = 2$ cm $r = 3$cm

$h = 45$ cm

Required no of sphere $= \frac{\pi r^2 h}{\frac{4}{3}\pi r^3}$ **- 2 marks**

$= \frac{\pi \times 2 \times 2 \times 45}{\frac{4}{3} \times \pi \times 3 \times 3}$ **- 2 marks**

$= 5$ **- 1 mark**

43.

x	d = x - A	d^2
50	-5	25
52	-3	9
53	-2	4
55	0	0
58	3	9
62	7	49
63	8	64
	$\sum d = 8$	$\sum d^2 = 160$

- 2 marks

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

$= \sqrt{\frac{160}{7} - \left(\frac{8}{7}\right)^2}$ **- 1 mark**

$= \sqrt{\frac{1056}{49}}$

$\sigma \approx 4.64$ **- 1 mark**

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44. Given $P(A) = \frac{4}{5}$ $P(B) = \frac{2}{3}$, $P(C) = \frac{3}{7}$

$P(A \cap B) = \frac{8}{15}$, $P(B \cap C) = \frac{2}{7}$, $P(A \cap C) \frac{12}{35}$

and $P(A \cap B \cap C) = \frac{8}{35}$ **- 1 mark**

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

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

$= \frac{4}{5} + \frac{2}{3} + \frac{3}{7} - \frac{8}{15} - \frac{2}{7} - \frac{12}{35} + \frac{8}{35}$ **- 1 mark**

$= \frac{101}{105}$ **- 2 marks**

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45. a) $5^2 + 7^2 + 9^2 + \ldots\ldots + 39^2$

$= (1^2 + 2^2 + 3^2 + \ldots + 39)^2 - (2^2 + 4^2 + 6^2 \ldots + 38)^2 - (1^2 + 2^2)$ **- 1 mark**

$\Sigma n^2 = \frac{n(n+1)(2n+1)}{6}$ **- 1 mark**

$= \sum_{1}^{39} K^2 - 2^2 [1^2 + 2^2 + 3^2 + \ldots + 19^2] - 10$ **- 1 mark**

$= \frac{39(39+1)(78+1)}{6} - 4\left[\frac{19(19+1)(38+1)}{6}\right] - 10$ **- 1 mark**

$= 20540 - 9880 - 10$

$= 10650$ **(OR)** **- 1 mark**

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b) CSA of cylinder $= \frac{2}{3}$ x TSA **- 1 mark**

$2\pi rh = \frac{2}{3} \times 231 = 154 \text{ cm}^2$ **- 1 mark**

TSA, $2\pi r(h + r) = 231$

$2\pi r = 77$ **- 1 mark**

$r = \frac{7}{2}$ cm **- 1 mark**

$2\pi rh = 154$

$h = 7$ cm **- 1 mark**

SECTION - D

46) (a) Rough Diagram **- 2 marks**

First circle **- 2 marks**

Line Segment OP **- 1 mark**

Perpendicular bisector **- 1 mark**

Second Circle **- 2 marks**

Two tangent lines **- 1 mark**

Measuring the Length **- 1 mark**

(OR)

(b) Rough Diagram **- 2 marks**

Draw PQ **- 1 mark**

Perpenticular bisectors **- 2 marks**

Draw a circumcircle **- 4 marks**

4th side **- 1 marks**

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47) a)

x	-3	-2	-1	0	1	2	3
y	0	-3	-4	-3	0	5	12

Tabular column - First **- 2 marks**

(Any 5 points)

Solving the equation **- 1 mark**

Scale **- 1 mark**

x - axis, y - axis **- 1 mark**

Plotting the points **- 3 marks**

x	-2	-1	0	1	2
y	-3	0	3	6	9

Tabular column - second **- 1 mark**

Solution set = { -2 , 3 } **- 1 mark**

(OR)

b)

x	1	2	3	4
y	40	80	120	160

- 2 marks

Scale , x - axis , y - axis **- 2 marks**

Plotting the points and drawing the line **- 4 marks**

Y = 40 x **- 1 mark**

distance travelled in 3 hours = 120 Km **- 1 mark**