SSLC MODEL EXAMINATION

KEY FOR MATHS

PIMS EDUCATIONAL ACADEMY
Regd. No. : 130/10

PART - I

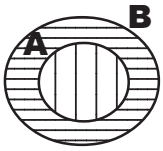
SECTION - A

15 x1 = 15 Marks

Q. No.	Key	Answer	Q. No.	Key	Answer
1.	a)	ϕ	8.	c)	-3 , 2
2.	d)	{ 3, 4 , 5 }	9.	b)	4 : 9
3.	d)	both A.P. and G. P.	10.	d)	60^0
4.	a)	has infinitely many solutions	11.	a)	1
5.	a)	$\frac{c + a}{2b}$	12.	b)	$\tan^2\theta$
6.	c)	Multiplicative inverse matrix of A	13.	b)	36π cm^3
7.	d)	4	14.	d)	27
			15.	b)	$\frac{11}{13}$

SECTION - B

16. $A \cup B = B$



- 2 marks

17. **The range of** = { 1, 4, 9, 16, 25 } **- 1 mark**

Type = one - one function **- 1 mark**

18. $\sum n^3 = \left[\frac{n\ (n+1)}{2}\right]^2$ **- 1 mark**

$1^3 + 2^3 + \ldots\ldots + 20^3 = \left[\frac{20 \times (20+1)}{2}\right]^2$

$= 44100$ **- 1 mark**

19. $\alpha + \beta = 4$

$\alpha\beta = \frac{9}{4}$ **- 1 mark**

The equation is $4x^2 - 16x + 9 = 0$ **- 1 mark**

20. $2x^2 - 5x + 2 = 0$ **- 1 mark**

The solution set $= \{\frac{1}{2}, 2\}$ **- 1 mark**

21. $a_{11} = \frac{1}{2}$ $9_{12} = 2$, $9_{21} = \frac{1}{2}$ **- 1 mark**

$9_{22} = 1$, $9_{31} = \frac{3}{2}$, $9_{32} = 0$

$$A = \begin{bmatrix} \frac{1}{2} & 2 \\ \frac{1}{2} & 1 \\ \frac{3}{2} & 0 \end{bmatrix}$$ **- 1 mark**

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22. $AB = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = I$ **- 1 mark**

$BA = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = I$ **- 1 mark**

(or)

$AB = BA = I$ **- 2 marks**

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23. $m = \sqrt{3}$, $c = \frac{1}{\sqrt{3}}$

$\mathbf{y = mx + c}$ **- 1 mark**

$3x - \sqrt{3}y + 1 = 0$ **- 1 mark**

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24. x intercept , $a = \frac{2}{5}$

y intercept , $b = \frac{-3}{4}$

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

Equation is

$15x - 8y - 6 = 0$ **- 1 mark**

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25. **Correct statement** **- 2 marks**

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

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

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

Note : alternate method can be used

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27. $\sin 30 = \frac{h}{200}$ **- 1 mark**

$h = 100$ m **- 1 mark**

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28. $r = 7$ cm , $h = 20$ cm

CSA of cylinder $= 2\pi rh$ **- 1 mark**

CSA = 880 Sq. cm **- 1 mark**

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

$\sigma = \sqrt{\frac{10^2 - 1}{12}} \approx 2.87$ **- 1 mark**

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30. **a)** The ratio of the volume of the cylinders **- 1 mark**

$= \pi r_1^2 h_1 : \pi r_2^2 h_2$

$= 20 : 27$ **- 1 mark**

(OR)

b) $n(s) = 35$

$n(A) = 35 - 7 = 28$ **- 1 mark**

$P(A) = \frac{n(A)}{n(S)} = \frac{28}{35} = \frac{4}{5}$

- 1 mark

SECTION - C

31. $n(\cap) = 170$ $n(T) = 115$

$n(R) = 110$ $n(M) = 130$ **- 1 mark**

$n(T \cap M) = 85$, $n(T \cap R) = 75$

$n(R \cap M) = 95$, $n(T \cap R \cap M) = 70$

(i) Number of clients using only radio = 10 **- 1 mark**

(ii) Number of clients using only TV = 25 **- 1 mark**

(iii) Number of clients using only magizines but not radio = 15 **- 2 marks**

Note : Alternate method can also be used.

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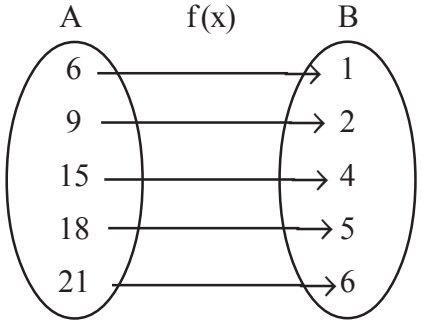
32. $f(6) = 1$, $f(9) = 2$, $f(15) = 4$,

$f(18) = 5$, $f(21) = 6$ **- 1 mark**

(i) Arrow Diagram



- 1 mark

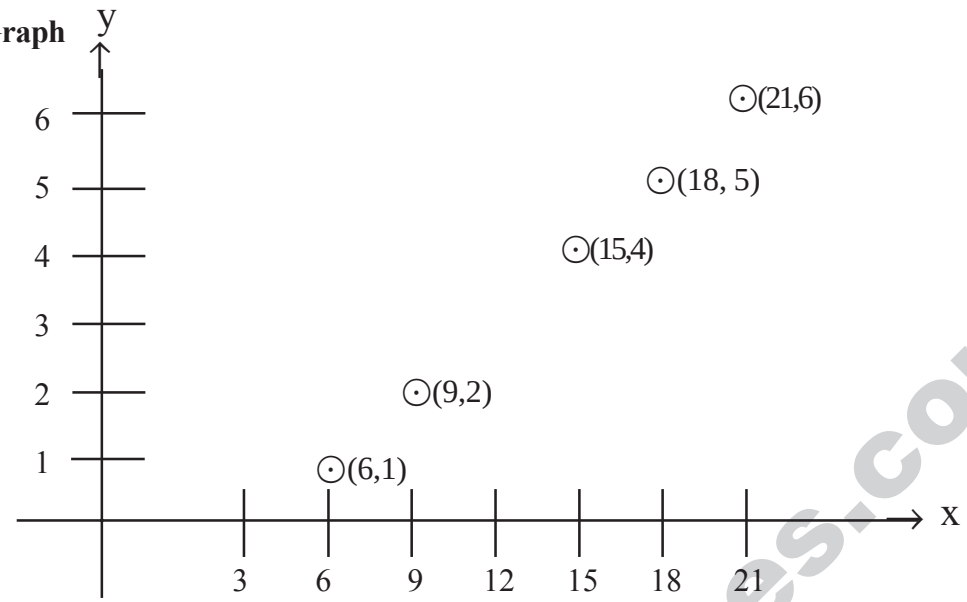
(ii) **Set of ordered pair** f = { (6 , 1) (9 , 2) (15 , 4) (18 , 5) (21 , 6) } **- 1 mark**

(iii) **Table**

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

-1 mark

(iv) **Graph**



- 1 mark

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33. Let three numbers be $\frac{a}{r}$, a , ar

Product = 216

a = 6 **- 2 marks**

Sum of their products in pairs = 156

$3r^2 - 10r + 3 = 0$

$r = 3$ (or) $\frac{1}{3}$ **- 2 marks**

The terms are

2 , 6 , 18 (or) 18 , 6 , 2 **- 1 mark**

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34. $f(x) = x^4 + 3x^3 + 5x^2 + 26x + 56$

$g(x) = x^4 + 2x^3 - 4x^2 - x + 28$

GCD $= x^2 + 5x + 7$

$LCM = \frac{f(x) \times g(x)}{GCD}$ **- 2 marks**

$\frac{2x^3 + 15x^2 + 2x - 35}{x + 7} = 2x^2 + x - 5$ **- 1 mark**

LCM $= (2x^2 + x - 5)(x^3 + 8x^2 + 4x - 21)$ **- 2 marks**

35. $3x^2 - x + 1$

$3x^2$ | $9x^4 - 6x^3 + 7x^2 - 2x + 1$

$9x^4$ **- 2 marks**

$6x^2 - x$ | $-6x^3 + 7x^2$

$-6x^3 + x^2$ **- 1 mark**

$6x^2 - 2x + 1$ | $6x^2 - 2x + 1$

$6x^2 - 2x + 1$ **- 1 mark**

0

$\sqrt{9x^4 - 6x^3 + 7x^2 - 2x + 1} = |3x^2 - x + 1|$ **- 1 mark**

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36. $\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+2}$ **- 1 mark**

$$\frac{1}{x+1} = 2\left[\frac{2}{x+4} - \frac{1}{x+2}\right]$$

$$= 2\left[\frac{x}{(x+2)(x+4)}\right]$$

$\Rightarrow x^2 - 4x - 8 = 0$ **- 1 mark**

$\Rightarrow x = \frac{4 \pm \sqrt{48}}{2}$ **- 2 marks**

Solution set $= \{2 + 2\sqrt{3}, 2 - 2\sqrt{3}\}$ **- 1 mark**

Note : Different method can be adopted

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37. $AB = \begin{bmatrix} -2 & -6 & 12 \\ 4 & 12 & -24 \\ 5 & 15 & -30 \end{bmatrix}$ **- 2 marks**

$(AB)^T = \begin{bmatrix} -2 & 4 & 5 \\ -6 & 12 & 15 \\ 12 & -24 & -30 \end{bmatrix}$ **- 1 mark**

$B^T A^T = \begin{bmatrix} -2 & 4 & 5 \\ -6 & 12 & 15 \\ 12 & -24 & -30 \end{bmatrix}$ **- 1 mark**

$(AB)^T = B^T A^T$ **- 1 mark**

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38. Let the vertices be

A (-3 , -9) B (5, -8) , C (3, 9) and (-1 , 6)

Area $= \frac{1}{2}$ { -3 5 3 -1 -3 / -9 -8 9 6 -9 } **- 2 marks**

$= \frac{1}{2}$ { (24 + 45 + 18 + 9) - (- 45 - 24 - 9 -18) } **- 2 marks**

$= \frac{1}{2}$ x 192

= 96 Sq. units **- 1 mark**

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39. mid point = (1, 3) **- 1 mark**

Equation of straight line joining

(3, 4) and (-1, 2) is x - 2y + 5 = 0 **- 1 mark**

Equation of the line (perpendicular)

$\Rightarrow$ 2x + y + K = 0 **- 1 mark**

It passes (1, 3)

K = -5

Required straight line is 2x + y - 5 = 0

Note : Different method can be adopted **- 1 mark**

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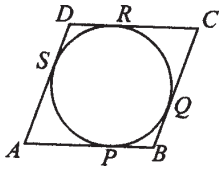
40. AP = AS , BP = BQ
① ②

CR = CQ , DR = DS **- 1 mark**
③ ④



Adding ① , ② , ③ and ④ **- 1 mark**

AP + BP + CR + DR = AS + BQ + CQ + DS **- 1 mark**

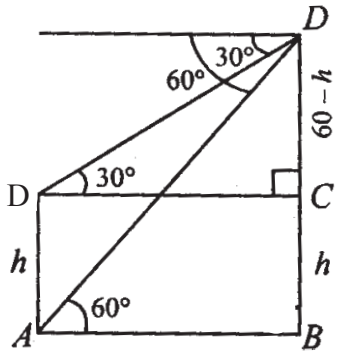
AB + CD = AD + BC

AB = AD **- 1 mark**

We get AB = BC = CD = AD

$\therefore$ ABCD is a rhombus **- 1 mark**

41.



- 1 mark

AB $= \frac{60}{\sqrt{3}}$ **- 1 mark**

AB = (60 - h) $\sqrt{3}$ **- 2 marks**

h = 40 m **- 1 mark**

The height of the building is 40m

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42. $r : l = 3 : 5$ **- 1 mark**

$r = \frac{3}{5} l$

CSA , $r\pi l = 60\pi$

$l = 10$ cm **- 1 mark**

$r = 6$ cm **- 1 mark**

$TSA = \pi r (l + r)$ **- 1 mark**

$TSA = 301 \frac{5}{7} cm^2$ (or) any equivalent answer **- 1 mark**

43.

x	$d = x - 24$	d^2
20	-4	16
18	-6	36
32	8	64
24	0	0
26	2	4
$\sum x = 120$		$\sum d^2 = 120$

- 2 marks

$\overline{x} = 24$

$\sigma = 4.9$ **- 1 mark**

$CV = \frac{\sigma}{x} \times 100$ **- 1 mark**

$CV \approx 20.42$ **- 1 mark**

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44. $n(S) = 8$ **- 1 mark**

$P(A) = \frac{3}{8}$ **- 1 mark**

$P(B) = \frac{7}{8}$ **- 1 mark**

$P(B) = \frac{3}{8}$ **- 1 mark**

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

$P(A \cap B) = \frac{7}{8}$ **- 1 mark**

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45. a) Volume of the cuboid platform = volume of the cylinderical well

$lbh_1 = \pi r^2 h$ **- 2 marks**

$20 \times 14 \times h_1 = \frac{22}{7} \times 7 \times 7 \times 20$ **- 1 mark**

$h_1 = 11$ **- 2 marks**

b) $\frac{S_m}{S_n} = \frac{m^2}{n^2}$ **- 1 mark**

$\frac{2a + (m-1)d}{2a + (n-1)d} = \frac{m}{n}$ **- 1 mark**

$\Rightarrow 2a = d$ **- 1 mark**

$\frac{t_m}{t_n} = \frac{a + (m-1)d}{a + (n-1)d}$ **- 1 mark**

$\frac{t_m}{t_n} = \frac{2m - 1}{2n - 1}$ **- 1 mark**

SECTION - D

46) (a) Rough Diagram **- 2 marks**
Drawing BC **- 1 mark**
Drawing circle **- 5 marks**
Drawing triangle **- 2 marks**

(OR)

(b) Rough Diagram **- 2 marks**
Draw PQ **- 1 mark**
Triangle **- 3 marks**
Perpendicular bisector **- 1 mark**
Circle **- 2 marks**
4th side **- 1 mark**

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47) a)

x	-3	-2	-1	0	1	2	3
y	18	8	2	0	2	8	18

- 2 marks

Tabular column (Any 5 points)
Solving the equation **- 1 mark**
Scale **- 1 mark**
x - axis, y - axis **- 1 mark**
Plotting the points **- 3 marks**

x	-1	0	1	2
y	7	6	5	4

Tabular column - second **- 1 mark**
Solution set = { - 2 , 1.5 } **- 1 mark**

(OR)

(b) Scale **- 1 mark**
x - axis , y - axis **- 1 mark**
Plotting the points and drawing the line **- 6 marks**
(i) 24 hrs **- 1 mark**
(ii) 3 k.m. / hr **- 1 mark**
