

**KEY FOR MATHEMATICS****SECTION – I**

15 x 1 = 15 marks

Q. No	Key	Answer	Q. No	Key	Answer
1.	c	{1, -1}	9.	b	5.74 cm
2.	a	an A.P.	10.	a	70°
3.	a	8	11.	a	cos θ
4.	c	-3	12.	d	75 m
5.	c	$cx^2 + bx + a = 0$	13.	d	$8\pi \text{ cm}^2$
6.	a	-2, 7	14.	c	t
7.	d	4	15.	a	$\frac{1}{5}$
8.	d	(0, 0)			

SECTION-II

10 x 2 = 20 marks

16. $A \cap B = \{2, 3, m, n, o\}$
(or)
 $B \cap A = \{2, 3, m, n, o\}$
 $A \cap B = B \cap A$ - 1 mark
- 1 mark

17. Pre-images of 2 are 12 and 14 - 1 mark
Pre-images of 3 are 13 and 15 - 1 mark

18. $a = 13, d = 13$ and $l = 91$
 $n = \frac{l-a}{d} + 1$ - 1 mark
 $n = 7$ - 1 mark

19. L C M = $11 \times 2 \times 2 \times 3 \times 2 \times a^4 b^4 c^4$ - 1 mark
= $264 a^4 b^4 c^4$ - 1 mark

20. $a = 3, b = -2\sqrt{6}, c = 2$
 $\Delta = b^2 - 4ac = 0$ - 1 mark
The roots are real and equal - 1 mark

21. $x = 3$
 $y = 9$
 $z = 4$ - 2 marks

22. $10 - x + 3 = 20$ - 1 mark
 $x = -7$ - 1 mark

23. $m_1 = \frac{3}{5}, m_2 = \frac{-15}{9}$ or $\frac{-5}{3}$ - 1 mark
 $m_1 \times m_2 = -1$ - 1 mark

24. The area of $\Delta ABC = \frac{1}{2} [2 \times 4 \times 6 \times 2]$ - 1 mark
= 0 - 1 mark

Note: alternate method can be used

25. $\angle BAT = \angle PTB = 72^\circ$ - 1 mark

$\angle ATB + \angle BAT + \angle ABT = 180^\circ$

$43^\circ + 72^\circ + \angle ABT = 180^\circ$

$\angle ABT = 65^\circ$ - 1 mark

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

27. Radius $r = \frac{14}{2} = 7$ cm

Height, $h = 14$ cm

$V = \frac{1}{3}\pi r^2 h$ - 1 mark

$V = \frac{2156}{3}$ (or) 718.67 cm² - 1 mark

28. $CV = 57, \sigma = 6.84$

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

$\bar{x} = 12$ - 1 mark

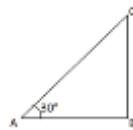
29. $n(S) = 20, n(A) = 8$ - 1 mark

$P(A) = \frac{n(A)}{n(S)} = \frac{8}{20}$ or $\frac{2}{5}$ - 1 mark

30. (a) $\sin\theta = \frac{opp}{hyp}$

$\sin 30^\circ = \frac{BC}{AC}$

Length of the ramp $AC = 1.8$ m



- 1 mark

- 1 mark

(b) Given $r_1 : r_2 = 3 : 2$

$h_1 : h_2 = 5 : 3$

The ratio of the CSA = $2\pi r_1 h_1 : 2\pi r_2 h_2$ - 1 mark

= $5 : 2$ - 1 mark

SECTION-III

31. $B \cup C = \{1, 2, 3, 5, 7, 9, 10, 12, 13\}$

$A \setminus (B \cup C) = \{11, 15\}$ - 1 mark

$A \setminus B = \{3, 6, 9, 11, 13, 15\}$

$A \setminus C = \{1, 5, 7, 11, 15\}$ - 1 mark

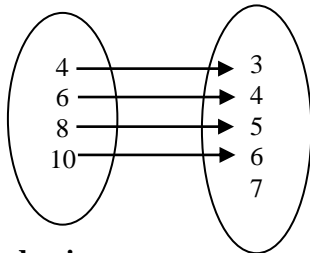
$(A \setminus B) \cap (A \setminus C) = \{11, 15\}$

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

$$\begin{aligned}
 B \cap C &= \phi \\
 A \setminus (B \cap C) &= \{1, 3, 5, 7, 9, 11, 13, 15\} & -1 \text{ mark} \\
 (A \setminus B) \cup (A \setminus C) &= \{1, 3, 5, 7, 9, 11, 13, 15\} \\
 A \setminus (B \cap C) &= (A \setminus B) \cup (A \setminus C) & -1 \text{ mark}
 \end{aligned}$$

32. $f(4) = 3, f(6) = 4, f(8) = 5, f(10) = 6$ -2 marks

(i) An arrow diagram -1 mark



(ii) Set of ordered pairs: -1 mark

$$F = \{(4, 3), (6, 4), (8, 5), (10, 6)\}$$

(iii) Table: -1 mark

x	4	6	8	10
$f(x)$	3	4	5	6

33. $\frac{a}{r} + a + ar = \frac{13}{12}$ -1 mark

$a = -1$ -1 mark

$r = \frac{-4}{3}, \frac{-3}{4}$ -1 mark

When $r = \frac{-4}{3}$ & $a = -1 \Rightarrow \frac{3}{4}, -1, \frac{4}{3}$ -1 mark

When $r = \frac{-3}{4}$ & $a = -1 \Rightarrow \frac{4}{3}, -1, \frac{3}{4}$ -1 mark

34. $\Sigma n^3 = \left(\frac{n(n+1)}{2}\right)^2$ -1 mark

$\left[\frac{k(k+1)}{2}\right]^2 = 8281$ -1 mark

$\frac{k(k+1)}{2} = 91$ -2 marks

$1+2+3+\dots+k = 91$ -1 mark

35. $\frac{2x-1}{x^2+2x+4} \times \frac{x^4-8x}{2x^2+5x-3} \times \frac{x+2}{x^2-2x}$ -3 marks

$$= \frac{2x-1}{x^2+2x+4} \times \frac{x(x-2)(x^2+2x+4)}{(2x-1)(x+3)} \times \frac{x+3}{x(x-2)}$$

$= 1$ -2 marks

36. $4x^2 - 3x + 2$ -1 mark

$4x^2 \begin{array}{|l} 16x^4 - 24x^3 + 25x^2 - 12x + 4 \\ 16x^4 \end{array}$ -2 marks

$8x^2 - 3x \begin{array}{|l} -24x^3 + 25x^2 \\ -24x^3 + 9x^2 \end{array}$ -1 mark

$$8x^2 - 6x + 2 \left| \begin{array}{r} 16x^2 - 12x + 4 \\ 16x^2 - 12x + 4 \\ \hline 0 \end{array} \right.$$

Thus $\sqrt{16x^4 - 24x^3 + 25x^2 - 12x + 4} = |4x^2 - 3x + 2|$

-1 mark

37. $\alpha + \beta = \frac{4}{3}, \quad \alpha\beta = \frac{1}{3}$

- 1 mark

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

-1 mark

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

$$= \frac{28}{9}$$

-1 mark

$$\left(\frac{\alpha}{\beta}\right)^2 \left(\frac{\beta^2}{\alpha}\right) = \alpha\beta = \frac{1}{3}$$

-1 mark

Required equation

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

-1 mark

(or)

$$9x^2 - 28x + 3 = 0$$

38. $(x - 1) \begin{pmatrix} x \\ -2x - 15 \end{pmatrix} = 0$

-1 mark

$$(x)(x) + (1)(-2x - 15) = 0$$

-1 mark

$$x^2 - 2x - 15 = 0$$

-1 mark

$$(x + 3)(x - 5) = 0$$

-1 mark

$$x = -3, 5$$

-1 mark

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

- 1 Mark

$$= \frac{1}{2} \begin{vmatrix} 1 & -3 & -5 & 4 \\ 2 & 4 & -6 & k \end{vmatrix}$$

- 1 Mark

$$\frac{1}{2} [(4 + 18 - 5k + 8) - (-6 - 20 - 24 + k)] = 43$$

-1 Mark

$$\frac{1}{2} [(30 - 5k) - (-50 + k)] = 43$$

-1 Mark

$$\begin{aligned} -6k &= 6 \\ k &= -1 \end{aligned}$$

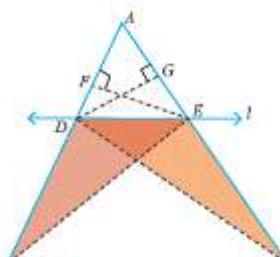
-1 mark

40. Thales Theorem

Statement

-1 mark

4 (



Diagram

-1 mark

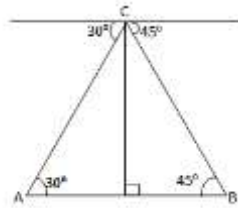
Given, to prove, construction

Proof

-3 mark

Note: No diagram, no marks

41. $\tan 45^\circ = \frac{CD}{DB}$



$DB = CD = 700\text{m}$

-1 mark

$\tan 30 = \frac{CD}{AD}$

-1 mark

$AD = 700\sqrt{3} \text{ m}$

-1 mark

$AB = 700\sqrt{3} + 700$

-1 mark

$AB = 1912.4 \text{ m}$

-1 mark

42. $\frac{2}{3}\pi r^3 = 1152\pi$

-1 mark

$r^3 = 1152 \times \frac{3}{2} = 1728$

-1 mark

$r = 12\text{cm}$

-1 mark

$CSA = 2\pi r^2$

-1 mark

$= 288\pi \text{ cm}^2$

-1 mark

43. $\bar{x} = 18$

-1 mark

x	d=x-18	d ²
12	-6	36
15	-3	9
18	0	0
20	2	4
25	7	49
	$\Sigma d = 0$	$\Sigma d^2 = 98$

-1 mark

$\sigma = 4.427$

-1 mark

$CV = \frac{\sigma}{\bar{x}} \times 100$

-1 mark

$CV = 24.6$

-1 mark

44. $n(S) = 100, n(S_1) = 30, n(M) = 40, n(M \cap S_1) = 10$

-1 mark

$P(M) = \frac{40}{100}, P(S_1) = \frac{30}{100}, P(M \cap S_1) = \frac{10}{100}$

-1 mark

$P(M \cup S_1) = P(M) + P(S_1) - P(M \cap S_1)$

-1 mark

$$= \frac{40}{100} + \frac{30}{100} - \frac{10}{100} \quad -1 \text{ mark}$$

$$= \frac{60}{100} \text{ (or) } \frac{3}{5} \quad -1 \text{ mark}$$

45. (a) Midpoint of BC, D(1,4) -1 mark

Equation of AD, $\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$ -1 mark

$$\frac{y - 1}{4 - 1} = \frac{x - 1}{1 - 2} \quad -1 \text{ mark}$$

Required equation $3x + y - 7 = 20$ -2 marks

(b) $r = \frac{7}{100}m$ -1 mark

$h = \frac{21}{100}m$ -1 mark

$$\frac{22}{7} \times \left(\frac{7}{100}\right)^2 \times T \times 15000 = 50 \times 44 \times \frac{21}{100} \quad -2 \text{ marks}$$

$T = 2 \text{ hrs}$ -1 mark

SECTION – IV

46. (a)
- Drawing rough diagram -1 mark
 - Draw a circle with 3 cm radius -2 marks
 - Line Segment OP -1 mark
 - Drawing the perpendicular bisector -1 mark
 - Drawing the second circle -2 marks
 - Drawing the two tangents -2 marks
 - Wright length of the tangent -1 mark

46. (b)
- Drawing rough diagram -2 marks
 - Draw PQ -1 mark
 - Perpendicular bisector -2 marks
 - Drawing a circum-circle -4 marks
 - 4th Side -1 mark

47. (a) Points represented by $y = (2x + 1)(x - 3)$, $y = 2x^2 - 5x - 3$

Table : $\{(-1, 4), (0, -3), (1, -6), (2, -5), (3, 0), (4, 9)\}$	-3 marks
Scale, x-axis, y-axis	-2 marks
Points represented	-1 mark
Drawing the graph	-3 marks
Solution set = $\{-0.5, 3\}$	-1 mark

(b) $y = \frac{20}{x}$

x	1	2	4	5	10	20
y	20	10	5	4	2	1

(This type of variation is called indirect variations)	-3 marks
Scale, x-axis, y-axis	-2 marks
Drawing the graph	-3 marks
when $x = 5, y = 4$	-1 mark
when $y = 10; x = 2$	-1 mark



**Entrance Coaching Programme
for
JEE, AIPMT, JIPMER & AIIMS
Class starts on 26-03-2016**

Salient Features of Our Training:-

- Comprehensive **Study Material.**
- Maximum number of Teaching / Training sessions (6hrs per day) and **session wise spot tests.**
- Training in an efficient way of answering - involving speed, accuracy and **intelligent shortcuts.**
- Topicwise unit tests, **Four Revision** tests and **Two model** tests.
- Supply of Key and **Solutions to all questions.**
- All Model tests followed by **Discussion Sessions.**

OUR COACHING CENTRES:

1. Puducherry - Professional Institute for Meritorious Students
29 & 31, Vallalar Salai, 2nd Floor, Kamaraj Nagar, Puducherry-11.
2. Cuddalore - Krishnasamy Memorial Matric Hr. Sec. School

- 3. Neyveli - CNN, Block 5, Vivekananda Salai, Neyveli.
- 4. Villupuram - Nityanandha Hr. Sec. School
- 5. Thiruvannamalai- Mount St. Joseph Matric. Hr. Sec. School
- 6. Chidambaram - Nirmala Matric. Hr. Sec. School
- 7. Kallakurichi - A K T Academy Matric. Hr. Sec. School

Cell: 99945 13453

www.mathstimes.com