SHRI VIDHYABHARATHI MAT. HR.SEC.SCHOOL

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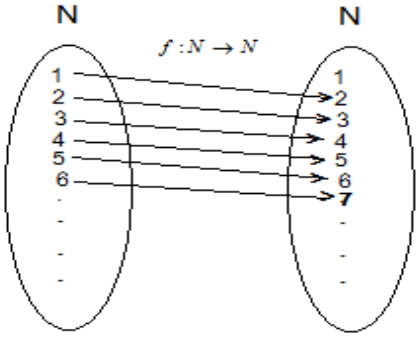
MATHEMATICS **TENTATIVE ANSWER KEY** **Marks : 100**

SECTION – I (Marks 15)

Choose the correct answers:		15 x 1 =15
Q. No.	**Option**	**Answer**
1	d	a subset of set of all even positive integers
2	d	0
3	c	a^n
4	d	more than 3
5	a	$\frac{c+a}{2b}$
6	d	For any two matrices , the addition of matrices exists
7	a	4 : 3
8	d	3
9	b	4 : 9
10	d	6 cm
11	a	$\cos\theta$
12	b	$\operatorname{cosec}^2\theta - \cot^2\theta$
13	a	20 cm
14	d	10
15	a	$\frac{7}{10}$

SECTION – II [MARKS : 20]

I. Answer 10 Questions . **II. Select any 9 questions from the first 14 questions.** **Question No : 30 is compulsory.**		**10 x 2 = 20**	
16	**SET:** A set is a collection of well- defined objects. Example : A ={a,e,i,o,u}	2	2 Marks
17	$a_{18} = 378$ $a_{25} = \frac{25}{313}$	1 1	2 Marks
18	$x = 0$ $y = 5$ Solution is (0,5)	1 1	2 Marks
19	$\alpha + \beta = 4;\ \alpha\beta = \frac{9}{4}$ *Equation* is $4x^2 - 16x + 9 = 0$	1 1	2 Marks
20	**Diagonal Matrix :** A square matrix in which all the elements above and below the leading diagonal are equal to zero, is called a diagonal matrix. Example : $\begin{bmatrix} 7 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & 5 \end{bmatrix}$	2	2 Marks
21	$\begin{pmatrix} 6 \\ -3 \end{pmatrix} \begin{pmatrix} 2 & -7 \end{pmatrix} = \begin{pmatrix} 12 & -42 \\ -6 & 21 \end{pmatrix}$	2	2 Marks
22	$\frac{y - y_1}{y_2 - y_1} \quad \frac{x - x_1}{x_2 - x_1}$ (or) $\frac{y - 1}{-4 - 1} \quad \frac{x - 1}{2 + 1}$ Equation is $5x + 3y + 2 = 0$	1 1	2 Marks
23	$LHS \Rightarrow \frac{\sin\theta}{1/\sin\theta} + \frac{\cos\theta}{1/\cos\theta}$ $\Rightarrow \sin^2\theta + \cos^2\theta = 1 \Rightarrow RHS$	1 1	2 Marks

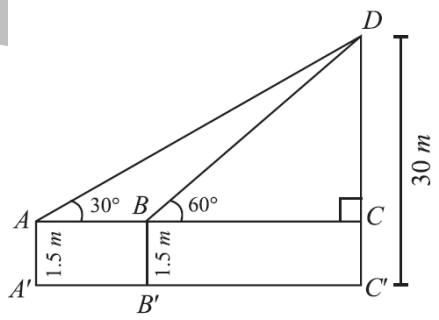
24	$TSA = 2\pi r(h+r)$ sq.units (or) $2\times\frac{22}{7}\times 7\times(20+7)$ TSA of Cylinder $= 1188$ cm^2	1 1	2 Marks
25	$\frac{1}{3}\pi r^2 h = 216\pi$ cm^3 (or) $\frac{1}{3}\times\pi\times 9^2\times h = 216\pi$ cm^3 Height = 8 cm	1 1	2 Marks
26	New S.D = $2\sqrt{5}$ New Variance = 20	1 1	2 Marks
27	$n(S) = 36$ & $p(A) = \frac{n(A)}{n(S)}$ $p(A) = \frac{4}{36}$ (or) $\frac{1}{9}$	1 1	2 Marks
28	$PA\times PB = PC\times PD$ (or) $9\times 5 = (x+3)\times 3$ $CD = 12$ cm	1 1	2 Marks
29	$\sin 30° = \frac{x}{40}$ $\Rightarrow$ x = 20 cm Shortest distance = 20+20 = 40 cm	1 1	2 Marks
30 (a)	$f(n) = n+1$ $f(1) = 2;\ f(2) = 3;\ f(3) = 4;\ldots$  Thus, the element 1 in N has no pre-image in N. Therefore, the function f is not onto.	1 1	2 Marks

	(or)		
30 (b)	The Equation of the straight line perpendicular to x=5 (parallel to y-axis) is y = k. Required equation is y = 8	1 1	2 Marks

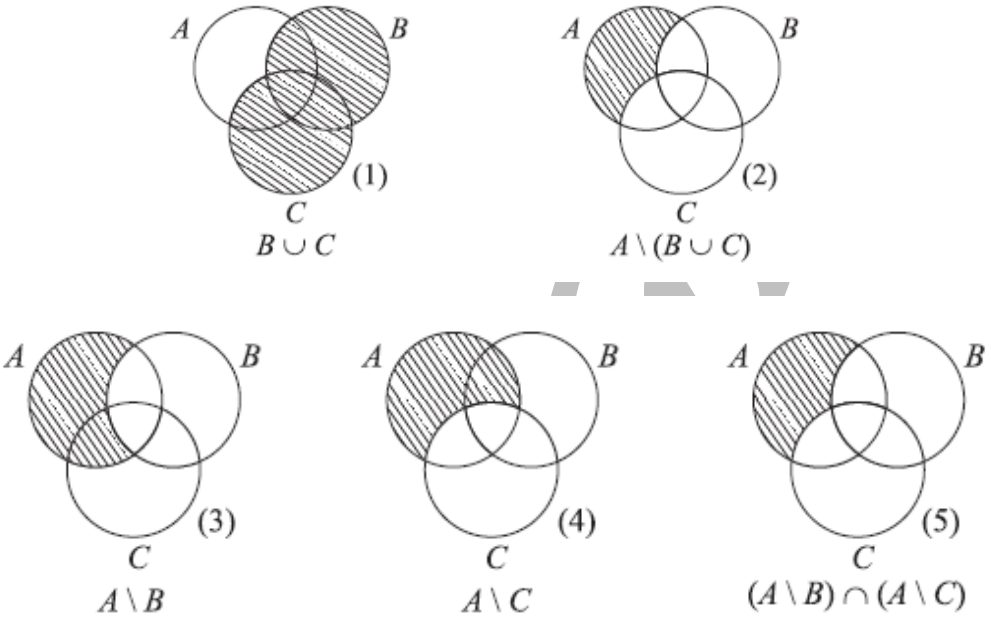
SECTION – III [MARKS : 45]

I. Answer 9 Questions. **II. Select any 8 questions from the first 14 questions.** **Question No : 45 is compulsory.**		**9 x 5 = 45**	
31	$f(-3)=2$ $f(4)=3$ $f(-6)=25$ $f(1)=6$ $\frac{4f(-3)+2f(4)}{f(-6)-3f(1)}=2$	1 1 1 1 1	5 Marks
32	$5^2+7^2+.....+39^2$ $=(1^2+2^2+.....+39^2)-(2^2+4^2+.....+38^2)-(1^2+3^2)$ $=(1^2+2^2+.....+39^2)-4(1^2+2^2+.....+19^2)-(1+9)$ $=\frac{39\times40\times79}{6}-4\times\frac{19\times20\times39}{6}-10$ $=20540-9880-10$ $=10650$	1 1 1 1 1	5 Marks

33	$ar^3 = \frac{2}{3};\ \ ar^6 = \frac{16}{81}$ $r^3 = \frac{8}{27} \Rightarrow \ \ r = \frac{2}{3}$ $\therefore\ a = \frac{9}{4}$ GP is a, ar, ar^2, ar^3, . . . *GP* is $\frac{9}{4}, \frac{3}{2}, 1, \frac{2}{3}, \ldots$	1 1 1 1 1	5 Marks
34	*Here,* A = 1 ; B = 2(a+b) ; C = $2(a^2+b^2)$ $\Delta = B^2 - 4AC$ $= 4[a^2 + 2ab + b^2] - 8[a^2+b^2]$ $= -\ 4\ [a^2 - 2ab + b^2]$ $= -\ 4\ (a-b)^2 < 0$ $\ \therefore$ Roots are not real.	1 1 1 1 1	5 Marks
35	$LCM = \frac{f(x) \times g(x)}{GCD}$ $1 \quad -2 \quad 8$ $1 \quad 5 \quad 7 \ \vert\ 1 \quad 3 \quad 5 \quad 26 \quad 56$ $1 \quad 5 \quad 7$ $-2 \quad -2 \quad 26$ $-2 \quad -10 \quad -14$ $8 \quad 40 \quad 56$ $8 \quad 40 \quad 56$ 0 $LCM = \frac{(x^2+5x+7)(x^2-2x+8) \times (x^4+2x^3-4x^2-x+28)}{(x^2+5x+7)}$ $LCM = (x^2-2x+8)(x^4+2x^3-4x^2-x+28)$	1 2 1 1	5 Marks
36	$(x \quad 1)\begin{pmatrix} x \\ -2x-15 \end{pmatrix} = (0)$ $(x^2 - 2x - 15) = (0)$	1 1	5 Marks

	$x^2 - 2x - 15 = 0$ $(x-5)(x+3) = 0$ $x = 5\ ;\ x = -3$	1 1 1	
37	Midpoint of AB = $\left(\frac{4+0}{2}, \frac{0+6}{2}\right) = (2,3)$ Distance , d = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ units $AC = \sqrt{13}$ units $BC = \sqrt{13}$ units $OC = \sqrt{13}$ units	1 1 1 1 1	5 Marks
38	$\Delta ADE \sim \Delta ABC$ $\frac{\text{area of } \Delta ADE}{\text{area of } \Delta ABC} = \left(\frac{1}{3}\right)^2$ $\frac{\text{area of } \Delta ADE}{72} = \frac{1}{9}$ area of $\Delta ADE = 8\ \text{cm}^2$ area of quadrilateral DBCE = 64 cm^2	1 1 1 1 1	5 Marks
39	 $\tan 60° = \frac{28.5\ m}{BC} \Rightarrow$ BC = $9.5\sqrt{3}m$ $\tan 30° = \frac{28.5\ m}{AC} \Rightarrow$ AC = $28.5\sqrt{3}m$ $AB = AC - BC = 19\sqrt{3}m$	1 1 1 2	5 Marks

40	CSA of Cylinder = $2\pi rh$ Sq.units CSA of road roller = 31680 cm^2 Area covered by the roller in 500 revolutions = 15840000 cm^2 Area covered by the roller in 500 revolutions = 1584 m^2 Cost of levelling the play ground = ₹1188	1 1 1 1 1	5 Marks
41	$\bar{x} = 7$ $\sum\left(x^2 - 18x + 81\right) = 82$ $\sum x^2 = 307$ $\sum\left(x - \bar{x}\right)^2 = \sum x^2 - 14\sum x + 49$ $\sum\left(x - \bar{x}\right)^2 = 62$	1 1 1 1 1	5 Marks
42	$p(A \cup B \cup C) = p(A) + p(B) + p(C) - p(A \cap B) - p(B \cap C) - p(A \cap C) + p(A \cap B \cap C)$ $p(A \cup B \cup C) = \frac{84+70+45-56-30-36+24}{105}$ $p(A \cup B \cup C) = \frac{223-122}{105}$ $p(A \cup B \cup C) = \frac{101}{105}$	1 2 1 1	5 Marks
43	Midpoint of BC = D$(-1,-4)$ Midpoint of AC = E(1,4) Midpoint of AB = F$(4,-1)$ Slope of the Median AD = $\frac{11}{7}$ Slope of the Median BE = -13 Slope of the Median CF = $-\frac{1}{4}$	2 1 1 1	5 Marks

44	Volume of the solid Cylinder = Volume of the Hollow Cylinder $\pi r^2 h_1 = \pi h_2 (R^2 - r_1^2)$ $r_1^2 = 256$ $r_1 = 16$ cm	1 1 2 1	5 Marks
45(a)	 From (2) and (5), $A\setminus(B \cup C)=(A\setminus B) \cap (A\setminus C)$ is proved.	2 3	5 Marks
45 (b)	$p(3) = 21$ $(3)^3 + 2(3)^2 + k(3) + 3 = 21$ $\therefore\ k = -9$ Let $q(x) = x^3 + 2x^2 - 9x - 18$ $q(-2) = 0$; $q(-3) = 0$; $q(3) = 0$; Zero's of q(x) are -2, -3 and 3.	1 1 2 1	5 Marks

SECTION – IV [MARKS : 20]

Note : Answer both the questions choosing either of the alternatives.				**2 x 10 = 20**
46	(a)	Rough Diagram First Circle Draw the chord PQ Construct $\angle QPT = \angle PRQ$ Draw Tangent Line	3 2 1 3 1	10 Marks
		(or)		
	(b)	Rough Diagram Line Segment AB Construct ΔABC Draw Perpendicular bisectors Draw the Circumcircle of ΔABC Fourth vertex	2 1 2 2 2 1	10 Marks
47	(a)	First Table (any 5 points) X: -3, -2, -1, 0, 1, 2, 3 Y: -27, -12, -3, 0, -3, -12, -27 X-axis , Y-axis and Scale Plotting the points and Drawing the parabola	5 2 3	10 Marks

		(or)		
47	(b)	<table><tr><td>Time (Hrs) X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>Distance (km) Y</td><td>40</td><td>80</td><td>120</td><td>160</td><td>200</td><td>240</td></tr></table> (Any five points) X-axis , Y-axis and Scale Plotting the points and Drawing the straight line **Solutions:** From the Graph, Distance travelled in 3 hours = 120 km	4 2 3 1	10 Marks

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