SHRI KRISHNA ACADEMY

BOARD EXAM(10, +1, +2) NEET, AND JEE COACHING CENTRE
SBM SCHOOL CAMPUS, TRICHY MAIN ROAD, NAMAKKAL
CELL: 99655-31727, 94432-31727

COMMON HALF-YEARLY EXAMINATION - 2019

SSLC - MATHEMATICS - ANSWER KEY MARKS: 100

PART – I (Marks 14)

Choose the correct answers: 14 x 1 =14

Q. No.	Option	Answer
1	c	{4,9,25,49,121}
2	c	$\frac{2}{9x^2}$
3	b	2
4	b	an arithmetic progression
5	a (or) c	$\frac{x^2-7x+40}{(x^2-25)(x+1)}$
6	b	$\begin{bmatrix} 2 & 2 \\ 2 & -1 \end{bmatrix}$
7	c	4
8	b	25 sq. units
9	b	$x+y=3\ ;\ \ 3x+y=7$
10	d	1
11	b	4 cm
12	c	3π
13	b	100
14	b	$\frac{7}{10}$

PART – II [MARKS : 20]

Answer any TEN Questions [Question No. 28 is compulsory]. **Each questions carries 2 marks.**		**10x2=20**	
15	(i)Range = { 1, 8, 27, 64 } (ii)Distinct elements in A have distinct images in B. Hence, it is one-one function.	1 1	2 Marks
16	$a^b \times b^a = 5^2 \times 2^5$ $a=2, b=5 \ \ (or) \ \ a=5, b=2$	1 1	2 Marks
17	$a_n = \frac{1}{3}n + \frac{1}{6}$ $a_n = \frac{1}{3}n - \frac{1}{3} + \frac{1}{3} + \frac{1}{6}$ $a_n = \frac{1}{3}(n-1) + \frac{2+1}{6}$ $a_n = \frac{1}{3}(n-1) + \frac{1}{2}$ $a_n = \frac{1}{2} + (n-1)\frac{1}{3}$ $\therefore a_n$ *is form an A.P* **(or)** $a_n = \frac{1}{3}n + \frac{1}{6}$ $a_1 = \frac{1}{2}; a_2 = \frac{5}{6}; a_3 = \frac{7}{6}; a_4 = \frac{9}{6} \ldots\ldots$ $a_2 - a_1 = \frac{5}{6} - \frac{1}{2} = \frac{1}{3}; \ a_3 - a_2 = \frac{7}{6} - \frac{5}{6} = \frac{1}{3}$ $a_4 - a_3 = \frac{9}{6} - \frac{7}{6} = \frac{1}{3}$ $\therefore a_2 - a_1 = a_3 - a_2 = a_4 - a_3$ *The sequence form an A.P*	1 1	2 Marks
18	$n = \frac{l+1}{2} = \frac{56}{2} = 28$ $\sum(2n-1) = n^2 = 28^2 = 784$ **(or)** $a=1; d=2; l=55$ $n = \frac{l-a}{d} + 1 = 28$ $S_n = \frac{n}{n}[a+l] = 784$	1 1	2 Marks
19	$\alpha+\beta=-6; \alpha\beta=-4$ $(\alpha-\beta)^2 = (\alpha+\beta)^2 - 4\alpha\beta = 36+16 = 52$	1 1	2 Marks
20	$A^T = \begin{bmatrix} 5 & -\sqrt{17} & 8 \\ 2 & 0.7 & 3 \\ 2 & \frac{5}{2} & 1 \end{bmatrix}$ $\left(A^T\right)^T = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix} = A$	1 1	2 Marks

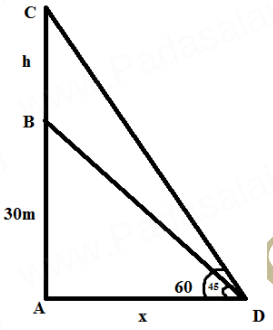
21	$\frac{y_2-y_1}{x_2-x_1}=-\frac{1}{2}\ \ (or)\ \ \frac{3-a}{9+2}=-\frac{1}{2}$ $a=\frac{17}{2}$	1 1	2 Marks
22	$Area\ of\ triangle=\frac{1}{2}\begin{bmatrix}1 & -4 & -3 & 1\\ -1 & 6 & -5 & -1\end{bmatrix}(or)\frac{1}{2}[(6+20+3)-(4-18-5)]$ $Area\ of\ triangle\ =\frac{1}{2}(48)=24\ Sq.\ units$	1 1	2 Marks
23	$\tan\theta=\frac{Opposite\ side}{adjacent\ side}=\frac{10\sqrt{3}}{30}=\frac{1}{\sqrt{3}}$ $Angle\ of\ elevation,\ \ \theta=30°$	1 1	2 Marks
24	$\frac{CSA_1}{CSA_2}=\frac{4\pi r_1^2}{4\pi r_2^2}$ $=\left(\frac{3}{4}\right)^2=\frac{9}{16}$ $CSA_1:CSA_2=9:16$	1 1	2 Marks
25	$\frac{1}{3}\pi r^2h=11088(or)\frac{1}{3}\times\frac{22}{7}\times r^2\times 24=11088$ $r^2=441\Rightarrow r=21cm$	1 1	2 Marks
26	$\pi r^2h=\frac{4}{3}\pi r^3\Rightarrow 10\times 10\times h=\frac{4}{3}\times 15\times 15\times 15$ $h=45cm$	1 1	2 Marks
27	$L=R+S$ $L=36.8+13.4=50.2$	1 1	2 Marks
28	$S=\{HH,HT,TH,TT\},\therefore n(S)=4$ $A=\{HT,TH\},n(A)=2$ $P(A)=\frac{2}{4}=\frac{1}{2}$	1 1	2 Marks

PART – III [MARKS : 50]

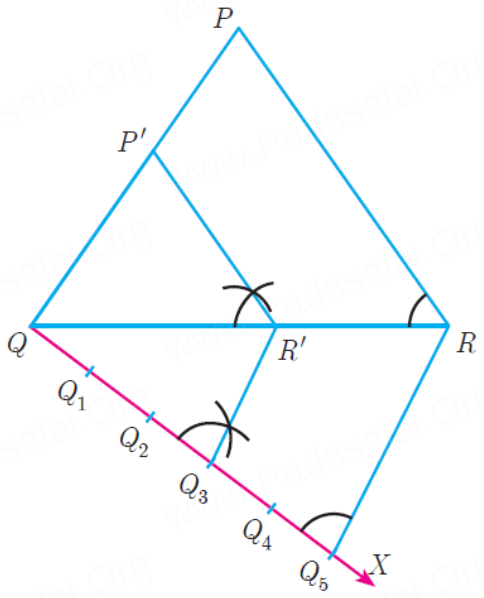
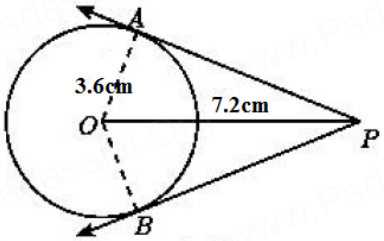
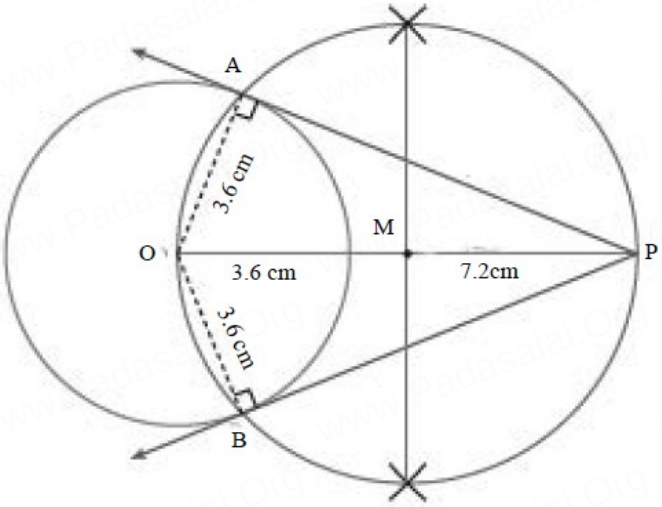
Answer any TEN Questions [Question No. 42 is compulsory]. **Each questions carries 5 marks.**			**10x5=50**
29	$A=\{x\in N \mid 1<x<4\}=\{2,3\}$ B=$\{x\in W \mid 0\le x<2\}=\{0,1\}$ C=$\{x\in N \mid x<3\}=\{1,2\}$ $B\cap C=\{0,1\}\cap\{1,2\}=\{1\}$ $A\times(B\cap C)=\{2,3\}\times\{1\}=\{(2,1),(3,1)\}$ ------->(1) $A\times B=\{(2,0),(2,1),(3,0),(3,1)\}$ $A\times C=\{(2,1)(2,2),(3,1),(3,2)\}$ $(A\times B)\cap(A\times C)=\{(2,0),(2,1),(3,0),(3,1)\cap(2,1)(2,2),(3,1),(3,2)\}$ $(A\times B)\cap(A\times C)=\{(2,1),(3,1)\}$ ------->(2) $From(1)and(2),\ A\times(B\cap C)=(A\times B)\cap(A\times C)$	1 1 1 1 1	5 Marks
30	$f(g(x))=18x-3k+2$ $g(f(x))=18x+12-k$ $Given: 18x-3k+2=18x+12-k$ $k=-5$	1 1 1 2	5 Marks
31	$ar^3=8;\ ar^7=\frac{128}{625}$ $\frac{ar^7}{ar^3}=\frac{128}{625\times8}$ $r^4=\frac{16}{625}\Rightarrow r=\frac{2}{5}$ $a=125$ $Required\ G.P\ is\ 125,50,20,8,.....$	1 1 1 1 1	5 Marks
32	$Total\ Area=10^2+11^2+12^2+.....+24^2$ $10^2+11^2+12^2+.....+24^2=(1^2+2^2+3^2+.....+24^2)-(1^2+2^2+3^2+.....+9^2)$ $=\frac{24\times25\times49}{6}-\frac{9\times10\times19}{6}$ $=4900-285$ $=4615$ $Required\ Area=4615\ cm^2$	1 1 1 1 1	5 Marks

33	$Add: (1)+(2) \Rightarrow 3x+2z=14 ----> (4)$ $Add: (1)\times 2+(3) \Rightarrow 3x+5z=26 ----> (5)$ $Subtract: (5)-(4) \Rightarrow z=4$ $From (4),\ x=2$ $From (1),\ y=-1$	1 1 1 1 1	5 Marks
34	$3\ \ 2\ \ 4$ $3 \mid 9\ \ 12\ \ 28\ \ a\ \ b$ 9 $6\ \ 2 \mid 12\ \ 28$ $12\ \ 4$ $6\ \ 4\ \ 4 \mid 24\ \ a\ \ b$ $24\ \ 16\ \ 16$ 0 $a=16;\quad b=16$	1 1 1 2	5 Marks
35	*Sample space,* $S=\{(1,1),(1,2),(1,3),(1,4),(1,5),(1,6),(2,1),(2,2),(2,3),(2,4),(2,5),(2,6),$ $(3,1),(3,2),(3,3),(3,4),(3,5),(3,6),(4,1),(4,2),(4,3),(4,4),(4,5),(4,6),$ $(5,1),(5,2),(5,3),(5,4),(5,5),(5,6),(6,1),(6,2),(6,3),(6,4),(6,5),(6,6)\}$ $n(S)=36$ $(i)Doublet:$ $A=\{(1,1),(2,2),(3,3),(4,4),(5,5),(6,6)\} \Rightarrow n(A)=6 \Rightarrow \therefore P(A)=\frac{6}{36}$ $(ii)Sum=4:$ $B=\{(1,3),(2,2),(3,1)\} \Rightarrow n(B)=6 \Rightarrow \therefore P(B)=\frac{3}{36}$ $(iii)A\cap B=\{(2,2)\} \Rightarrow n(A\cap B)=1 \Rightarrow \therefore P(A\cap B)=\frac{1}{36}$ $P(A\cup B)=P(A)+P(B)-P(A\cap B)=\frac{6}{36}+\frac{3}{36}-\frac{1}{36}=\frac{8}{36}$ $\therefore P(A\cup B)=\frac{2}{9}$	1 1 1 1 1	5 Marks

36	$A-B=\begin{pmatrix}1&2\\1&3\end{pmatrix}-\begin{pmatrix}4&0\\1&5\end{pmatrix}=\begin{pmatrix}1-4&2-0\\1-1&3-5\end{pmatrix}=\begin{pmatrix}-3&2\\0&-2\end{pmatrix}$ $(A-B)^T=\begin{pmatrix}-3&0\\2&-2\end{pmatrix}$ -----(1) $A^T=\begin{pmatrix}1&1\\2&3\end{pmatrix}$; $B^T=\begin{pmatrix}4&1\\0&5\end{pmatrix}$ $A^T-B^T=\begin{pmatrix}1&1\\2&3\end{pmatrix}-\begin{pmatrix}4&1\\0&5\end{pmatrix}=\begin{pmatrix}1-4&1-1\\2-0&3-5\end{pmatrix}=\begin{pmatrix}-3&0\\2&-2\end{pmatrix}$ -----(2) *From* (1) *and* (2), $(A-B)^T=A^T-B^T$.	1 1 2 1	5 Marks
37	**Statement:** In a right angle triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides. **Given:** *In* ΔABC, $\angle A=90°$ **To prove :** $AB^2+AC^2=BC^2$ **Construction:** *Draw* $AD\perp BC$ **Proof:** (i) ΔABC~ΔDBA (By AA Similarity) $\frac{BC}{AB}=\frac{AB}{BD}\Rightarrow AB^2=BC\times BD$ ----->(1) (ii) ΔABC~ΔDCA (By AA Similarity) $\frac{BC}{AC}=\frac{AC}{DC}\Rightarrow AC^2=BC\times DC$ ----->(2) Adding (1)and (2), $AB^2+AC^2=BD\times BC+BC\times DC=BC(BD+DC)$ $AB^2+AC^2=BC\times BC=BC^2$ *Hence, Pythagoras theorem is proved.* **Note : Without diagram give 1 mark only for statement.**	1 1 1 2	5 Marks
38	*Let AD is the* Altitude *Slope of* $BC=\frac{y_2-y_1}{x_2-x_1}=\frac{3+2}{12-10}=\frac{5}{2}$ *Slope of the altitude* $AD=-\frac{2}{5}$ *Point–Slope form* : $y-y_1=m(x-x_1)$ $y-0=-\frac{2}{5}(x+3)\Rightarrow 5(y-0)=-2(x+3)$ $5y=-2x-6\Rightarrow 2x+5y+6=0$ *Equation of altitude AD is* $2x+5y+6=0$	1 1 1 1 1	5 Marks

39	$\tan 60° = \frac{30+h}{x} \Rightarrow x = \frac{30+h}{\sqrt{3}} m ------> (1)$ $\tan 45° = \frac{30}{x} \Rightarrow x = 30m ----------> (2)$ $From (1) and (2), \frac{30+h}{\sqrt{3}} = 30$ $h = 30\sqrt{3} - 30 = 30(0.732) = 21.96m$ 	1 1 1 1 1	5 Marks
40	$Surface\ area\ of\ the\ doll = CSA\ of\ Hemisphere + CSA\ of\ Cone$ $Surface\ area\ of\ the\ doll = 2\pi r^2 + \pi rl = \pi r(2r+l)$ $Surface\ area\ of\ the\ doll = \frac{22}{7} \times 7 \times [2(7)+11]$ $Surface\ area\ of\ the\ doll = 22 \times 25$ $Surface\ area\ of\ the\ doll = 550 cm^2$	1 1 1 1 1	5 Marks
41	$\sum f = 20 \ ; \ \sum fd = 0 \ ; \ \sum fd^2 = 340$ $\sigma = \sqrt{\frac{\sum fd^2}{\sum f} - \left(\frac{\sum fd}{\sum f}\right)^2} \ (or) \sqrt{\frac{340}{20} - \left(\frac{0}{20}\right)^2}$ $\sigma = \sqrt{17} = 4.123$	2 2 1	5 Marks
42	$A = (a-b); B = (b-c); C = (c-a)$ $\Delta = 0 \Rightarrow B^2 - 4AC = 0 \ (or) \ (b-c)^2 - 4(a-b)(c-a) = 0$ $b^2 + c^2 - 2bc - 4ac + 4a^2 + 4bc - 4ab = 0$ $b^2 + c^2 + 2bc - 4ac - 4ab + 4a^2 = 0$ $(b+c)^2 - 2(2a)(b+c) + (2a)^2 = 0$ $(b+c-2a)^2 = 0$ $b+c-2a = 0 \Rightarrow 2a = b+c$	1 1 1 1 1	5 Marks

PART – IV [MARKS : 16]

Answer All the questions. Each questions carries 8 marks		2x8=16
43(a)		8 Marks
	(OR)	
43(b)	  **Length of Tangents = 6.2 cm**	8 Marks

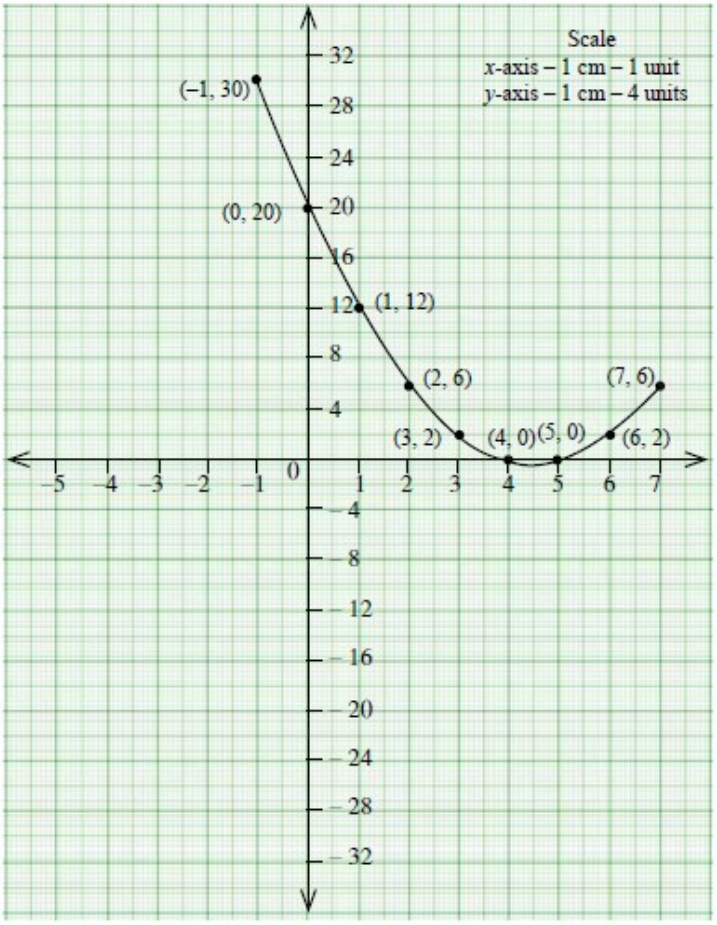
44(a)

First Table (any 5 points)

X	0	1	2	3	4	5	6
Y	20	12	6	2	0	0	2

X-axis , Y-axis and Scale

Draw parabola $y=x^2-9x+20$



The roots are real and unequal.
solution set is {4,5}

8 Marks

(OR)

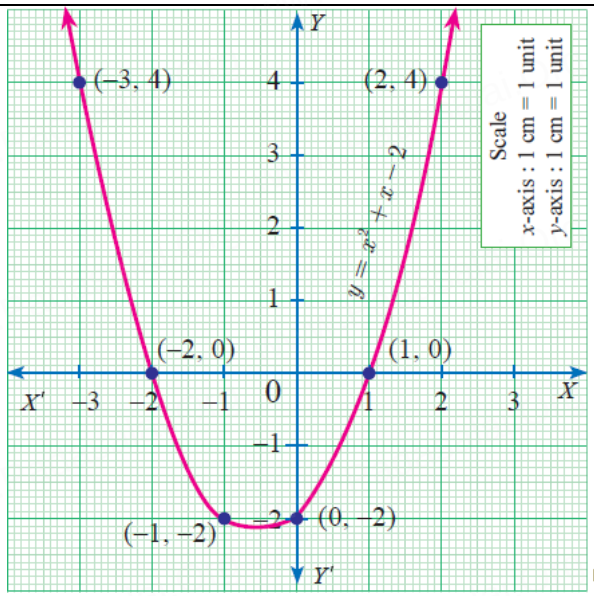
44(b)

First Table (any 5 points)

X	–4	–3	–2	–1	0	1	2
Y	10	4	0	–2	–2	0	4

X-axis , Y-axis and Scale

Draw parabola $y=x^2+x-2$



8 Marks

Solve the parabola and equation, we get y = 0

Point of Intersection : (−2,0),(1,0)

solution set is {−2,1}

MARK ANALYSIS (WITHOUT CHOICE)

PART	Questions	Total Questions	Book Back Questions	Interior Questions	Total Marks
I	1 Mark	14	10	4	14
II	2 Marks	14	10	4	28
III	5 Marks	14	11	3	70
IV	8 Marks	4	4	-	32
Total Marks			117	27	144
Percentage			81%	19%	100%