SHRI VIDHYABHARATHI MAT. HR.SEC.SCHOOL

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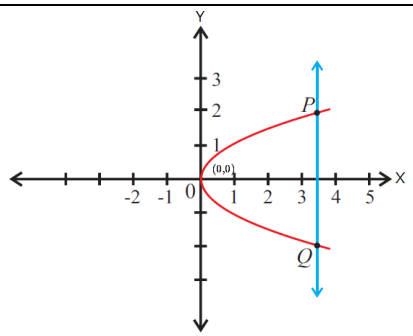
COMMON HALF YEARLY EXAMINATION - 2018

SSLC - MATHEMATICS - ANSWER KEY

SECTION – I (Marks 15)

Choose the correct answers: 15 x 1 =15		
Q. No.	**Option**	**Answer**
1	b	$A \setminus B = A \cap B$
2	d	1
3	b	$\frac{1}{3}$
4	a	has infinitely many solutions
5	c	$-\frac{8}{5} < k < \frac{8}{5}$
6	d	not defined
7	b	(0,0)
8	c	$y = -7$
9	b	4.5 cm
10	b	16 cm
11	c	1
12	c	$\sin^2\theta + \cos^2\theta$
13	b	$2\pi ab$
14	c	$(n-1)\bar{x}$
15	b	0.16

SECTION – II [MARKS : 20]

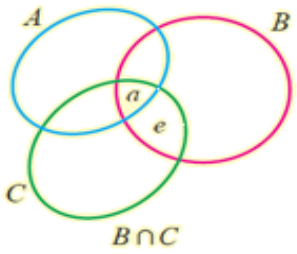
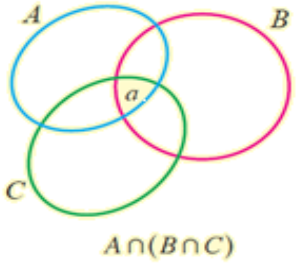
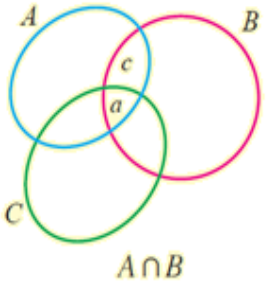
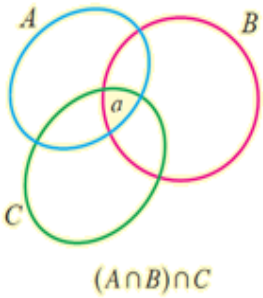
I. Answer 10 Questions . **II. Select any 9 questions from the first 14 questions.** **Question No : 30 is compulsory.**		**10 x 2 = 20**	
16	**Cardinality of a finite set:** The number of elements in the finite set A is called the cardinality of a finite set. It is denoted by n(A).	2	2 Marks
17	 ❖ A vertical line cuts the graph at two points P and Q. ❖ Therefore , the given graph does not represent the function.	1 1	2 Marks
18	If n is odd, $b_{13} = 195$ If n is even, $b_{16} = 256$	1 1	2 Marks
19	$x = \frac{117}{37}$ $y = -\frac{7}{37}$ $\therefore$ **Solution is** $\left(\frac{117}{37}, -\frac{7}{37}\right)$	1 1	2 Marks
20	$\alpha + \beta = 6; \alpha\beta = 2$ $x^2 - 6x + 2 = 0$	1 1	2 Marks
21	**Transpose of matrix :** The interchanging rows and columns of the matrix A is called the transpose of matrix. It is denoted by A^T.	2	2 Marks

22	$AB = \begin{pmatrix} 12-4 & 3-14 \\ 20+2 & 5+7 \end{pmatrix}$ $AB = \begin{pmatrix} 8 & -11 \\ 22 & 12 \end{pmatrix}$	1 1	2 Marks
23	$Area\ of\ \Delta ABC = \frac{1}{2}\begin{Bmatrix} 0 & 3 & 0 & 0 \\ 0 & 0 & 2 & 0 \end{Bmatrix}$ *sq.* units $Area\ of\ \Delta ABC = \frac{1}{2}\{6\} = 3$ *sq.* units	1 1	2 Marks
24	PA x PB = PC x PD (or) 8 x 2 = 4 x PD **PD = 4 cm**	1 1	2 Marks
25	$\sin 30° = \frac{h}{200}$ $\therefore$ h = 100 m	1 1	2 Marks
26	$LHS = \frac{1}{\cos^2\theta} + \frac{1}{\sin^2\theta} = \frac{\sin^2\theta + \cos^2\theta}{\cos^2\theta \sin^2\theta}$ $= \frac{1}{\cos^2\theta \sin^2\theta} =$ RHS	1 1	2 Marks
27	Volume of Hollow Sphere = $\frac{4}{3}\pi(R^3 - r^3)$ (or) $\frac{4}{3}\left(\frac{22}{7}\right)(12^3 - 10^3)$ **Volume of Hollow Sphere =** $3050\frac{2}{3} cm^3$	1 1	2 Marks
28	$\sigma = \sqrt{\frac{n^2-1}{12}}$ $\boldsymbol{\sigma \simeq 3.74}$	1 1	2 Marks
29	S = {1,2,3,4,……., 100} ; n(S) = 100 n(A) = 10 ; **P(A) =** $\frac{1}{10}$	1 1	2 Marks

30 (a)	$y = mx + c$ (or) $y = x + \frac{2}{5}$ Re*quired* Equation is $5x - 5y + 2 = 0$	1 1	2 Marks
	(or)		
30 (b)	*CSA* of Cylinder = $2\pi rh$ Sq. Units (or) $2\left(\frac{22}{7}\right)(7)(20)$ $CSA = 880\ cm^2$	1 1	2 Marks

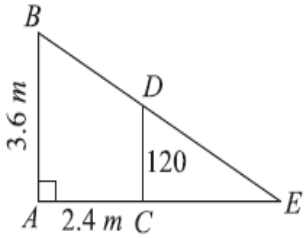
SECTION – III [MARKS : 45]

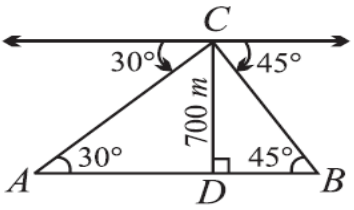
I. Answer 9 Questions.
II. Select any 8 questions from the first 14 questions. **9 x 5 = 45**
Question No : 45 is compulsory.

31	f (3) = 7 ; f (–1) = 3 ; f (6) = 9 ; f (1) = 3 $\frac{f(3)+f(-1)}{2f(6)-f(1)} = \frac{10}{15} = \frac{2}{3}$	4 1	5 Marks
32	 $B \cap C$  $A \cap (B \cap C)$ ------ (1)  $A \cap B$  $(A \cap B) \cap C$ ------ (2) From (1) and (2) , we get $A \cap (B \cap C) = (A \cap B) \cap C$	2 2 1	5 Marks

33	$16^2+17^2+18^2+.....+25^2$ $=(1^2+2^2+3^2+.....+25^2)-(1^2+2^2+3^2+.....+15^2)$ $=\frac{(25)(26)(51)}{6}-\frac{(15)(16)(31)}{6}$ $=5525-1240$ $16^2+17^2+18^2+.....+25^2$ **= 4285**	1 2 1 1	5 Marks
34	*Total Amount* $A=P(1+i)^n$ $A=500\left(1+\frac{10}{100}\right)^{10}$ $\mathbf{A}=₹\ 500\left(\frac{11}{10}\right)^{10}$	1 2 2	5 Marks
35	$a=3p^2;\ b=-2pq\ ;\ c=q^2$ $\Delta=b^2-4ac$ $=(-2pq)^2-4(3p^2)(q^2)$ $=-8p^2q^2$ $\Delta<0$, $\therefore$ The roots of the equation are not real.	1 1 1 1 1	5 Marks
36	x^2-2x+3 $x^2 \mid x^4-4x^3+10x^2-12x+9$ x^4 $2x^2-2x \mid -4x^3+10x^2$ $-4x^3+4x^2$ $2x^2-4x+3 \mid 6x^2-12x+9$ $6x^2-12x+9$ 0 $\sqrt{x^4-4x^3+10x^2-12x+9}=\lvert x^2-2x+3\rvert$.	1 1 1 2	5 Marks

37	x^3+2x^2-4x-8 divided by $2x^3+7x^2+4x-4$: quotient 2, remainder $3x^2+12x+12 = 3(x^2+4x+4)$ x^2+4x+4 divided by x^3+2x^2-4x-8: quotient $x-2$, remainder 0 $GCD(f(x), g(x)) = x(x^2+4x+4)$	2 2 1	5 Marks
38	$5X = \begin{bmatrix} 6 & -6 \\ -3 & 15 \end{bmatrix} - \begin{bmatrix} 4 & 6 \\ 8 & 0 \end{bmatrix}$ $X = \begin{bmatrix} \frac{2}{5} & \frac{-12}{5} \\ \frac{-11}{5} & 3 \end{bmatrix}$ $3Y = \begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix} - 2\begin{bmatrix} \frac{2}{5} & \frac{-12}{5} \\ \frac{-11}{5} & 3 \end{bmatrix}$ $3Y = \begin{bmatrix} \frac{6}{5} & \frac{39}{5} \\ \frac{42}{5} & -6 \end{bmatrix}$; $Y = \begin{bmatrix} \frac{2}{5} & \frac{13}{5} \\ \frac{14}{5} & -2 \end{bmatrix}$	1 1 1 2	5 Marks
39	Slope , m = $\frac{y_2-y_1}{x_2-x_1}$ Slope of AB = -12 ; $\therefore$ Slope of Altitude CF = $\frac{1}{12}$ $[\because CF \perp AB]$ Slope of BC = $\frac{5}{4}$; $\therefore$ Slope of Altitude AD = $-\frac{4}{5}$ $[\because AD \perp BC]$ Slope of AC = $-\frac{2}{9}$; $\therefore$ Slope of Altitude BE = $\frac{9}{2}$ $[\because BE \perp AC]$ **Slope of the Altitudes are** $\frac{1}{12}$, $-\frac{4}{5}$ and $\frac{9}{2}$	1 1 1 1 1	5 Marks

40	$\frac{x}{a}+\frac{y}{b}=1$ (or) $\frac{x}{a}+\frac{y}{5-a}=1$ $a^2-13a+30=0$ a = 3 (or) a = 10 Required Equations are $2x+3y-6=0$ and $x-2y-10=0$	1 1 1 2	5 Marks
41	 $\Delta ECD \sim \Delta EAB$ $\frac{EC}{EA}=\frac{CD}{AB}$ $\frac{EC}{2.4+EC}=\frac{1.2}{3.6}$ $EC=1.2$ m	1 1 1 1 1	5 Marks
42	Volume of three small spheres = Volume of solid sphere $\frac{4}{3}\pi(2)^3+\frac{4}{3}\pi(12)^3+\frac{4}{3}\pi(r_3)^3=\frac{4}{3}\pi(18)^3$ $8 + 1728 + r_3^3 = 5832$ $r_3^3 = 4096$ **r_3 = 16 cm**	1 1 1 1 1	5 Marks
43	*CSA* of Hollow Cylinder = 2πh(R+r) Sq. Units *CSA* of Hollow Cylinder = 2640 Sq. cm *TSA* of Hollow Cylinder = 2π(R+r)(R –r+h) Sq. Units *TSA* of Hollow Cylinder = $2\left(\frac{22}{7}\right)(30)(20)$ *TSA* of Hollow Cylinder = $3771\frac{3}{7}$ Sq. cm	1 1 1 1 1	5 Marks

44	$\bar{x} = \frac{\sum x}{n}$ $\sum x = 540$ $\sigma^2 = \frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2$ $\frac{\sum x^2}{30} - 324 = 9$ $\sum x^2 = 9990$	1 1 1 1 1	5 Marks
45(a)	 In ΔADC, $\tan 30° = \frac{700}{AD}$ $AD = 700\sqrt{3}$ m ---------- (1) In ΔBDC, $\tan 45° = \frac{700}{DB}$ $DB = 700$ m ---------- (2) **Width of the River = AD + DB = 1912.4 m**	1 2 1 1	5 Marks
45 (b)	(*i*) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $P(A \cup B) = 0.45$ (ii) P(only A or only *B*) $= P(A \cap \bar{B}) + P(\bar{A} \cap B)$ $= P(A) - P(A \cap B) + P(B) - P(A \cap B)$ P(only A or only *B*) = 0.30	1 1 1 1 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	2	10 Marks
		First Circle	2	
		Line segment OP	1	
		Perpendicular bisector	1	
		Second Circle	2	
		Two Tangent Lines	1	
		Length of Tangents = 8 cm	1	
		(Verification & Construction are not necessary)		
		(or)		
	(b)	Rough Diagram	2	10 Marks
		Draw Line Segment AB	1	
		Construction of Triangle ABC	3	
		Draw a perpendicular bisector	2	
		Draw the Circum circle	1	
		Complete the quadrilateral ABCD	1	

<table>
<tr><td>47</td><td>(a)</td><td>First Table (any 5 points)
<table><tr><td>X</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>Y</td><td>12</td><td>5</td><td>0</td><td>-3</td><td>-4</td><td>-3</td><td>0</td></tr></table>X-axis , Y-axis and Scale
Plotting the points and Drawing the parabola
The curve intersect the x-axis at (-1,0) and (3,0)
Solution Set = {-1,3}</td><td>4

2
2
1
1</td><td>10 Marks</td></tr>
<tr><td colspan="3">(or)</td><td></td></tr>
<tr><td>47</td><td>(b)</td><td><table><tr><td>X</td><td>1</td><td>3</td><td>5</td><td>7</td><td>8</td></tr><tr><td>Y</td><td>2</td><td>6</td><td>10</td><td>14</td><td>16</td></tr></table>X-axis , Y-axis and Scale
$y = kx \Rightarrow y = 2x$
Plotting the points and Drawing the straight line
Solutions: From the Graph,
(i) x = 4 then y = 8
(ii) y = 12 then x = 6</td><td>2
1
5

1
1</td><td>10 Marks</td></tr>
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