

Subject – Algebra

Std: 10th SSC.

Model Answer

Set: – I

	Instruction				
	i) All questions are compulsory.				
	ii) Use of calculator is not allowed.				
Q.1A	Solve Any Four of the following				
1)	$\frac{a}{a} = \frac{7}{2}$				
	b 2 a+b 7+2				
	$\therefore \frac{1}{a-b} = \frac{1}{7-2}$ [By componendo-dividendo]				
	$\therefore \frac{a+b}{a-b} = \frac{9}{5}$				
2)	$(9\sqrt{3} + 8\sqrt{5}) - (4\sqrt{5} - 3\sqrt{3}) = a\sqrt{3} + b\sqrt{5}$				
	$\therefore 9\sqrt{3} + 8\sqrt{5} - 4\sqrt{5} + 3\sqrt{3} = a\sqrt{3} + b\sqrt{5}$				
	$\therefore 12\sqrt{3} + 4\sqrt{5} = a\sqrt{3} + b\sqrt{5}$				
	Comparing both the sides, we get				
	A = 12 and $b = 4$				
3)	Mr. Kulkarni's age = 36 years = 36 years				
	< 60 years				
	Mr. Kulkarni's taxable income = Rs. $3,27,000$				
	>Rs. 2,50,000				
	∴ Mr. Kulkarni will have to pay income tax.				
4)	Given data in ascending order : 59, 68, 70, 74, 75, 80				
	Here, the 4 th number is at the middle position, which is 74.				
5)	\therefore The median of the given data is 74.				
5)	$A = \{2, 4, 6, 8, \dots, \dots, m\}$				
6)	$P(x) = mx^{2} - 2x + 3$				
	$\begin{array}{c} \therefore p(-1) = m(-1)^{-} - 2(-1) + 3 \\ \vdots 7 = m + 2 + 3 \\ \end{array} \qquad \qquad$				
	p(-1) = 1 p(-1) = 7				
0.1B	Solve Any TWO of the following:				
1)	i) False				
-/	Since, all the elements of A are not present in D.				
	ii) True				
	Since, all the elements of C are present in A.				
2)	Let the price of a chair be Rs. 'x' and that of a table be Rs. 'y'. According to the first condition,				
	3x + 2y = 4500				
	According to the second condition,				
	5x + 3y = 7000				
3)	Sum of all observations = Mean \times Total number of observations				
	5 th number = Sum of five numbers – Sum of four numbers (5 x 50) (4×46)				
	$= (5 \times 50) - (4 \times 46)$ = 250 - 184				
	-2.00 - 104 - 66				
	\rightarrow The 5 th number is 66				
0.2A	Choose the correct alternative:				
1)	Δ				
2)	B				
<i>2</i>)					

3)	С						
4)	В						
Q.2B	Solve Any TWO of the following						
1)	Taxable value of 1 tin = Rs. 2800						
	\therefore Taxable value of 2 tins = 2 × 2800 = Rs. 5600						
	Rate of $GST = 28\%$						
	\therefore Rate of CGST = Rate of SGST = 14%						
	CGST = 14% of taxable value						
	$=\frac{14}{100} \times 5600$						
	\therefore CGST = Rs. 784						
	\therefore SGST = CGST = Rs. 784						
	∴ The amount of CGST and SGST charged in the tax invoice is Rs. 784 each.						
2)	Solution 1 to 150 all odd numbers are 1, 3, 5, 7,149. which is an A.P.						
	Here $a = 1, d = 2, \text{ if } t_n = 149 \therefore n = ?$						
	$\mathbf{t_n} = \mathbf{a} + (\mathbf{n} - 1)\mathbf{d}$						
	149 = 1 + (n - 1) 2						
	149 = 1 + 2n - 2n						
	$\therefore n = 75$						
3)	Here the first term $a = 3$ and the common difference $= d = 6$						
	$S_n = \frac{1}{2} [2a + (n-1)a]$						
	$=\frac{n}{2}[2+(n-1)\times 6]$						
	$=\frac{\ddot{n}}{6}[6+6n-6]$						
	$-\frac{n}{2} \times 6n$						
	$-\frac{1}{2} \times 0 \Pi$						
	$S_n = 3n^2$						
	$S_{10} = 3 \times 10^2$						
	$S_{10} = 3 \times 100$ - 200						
	= 500						
O.3A	Complete any TWO of the following activities:						
1)	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$						
-/	$\frac{1}{v}$ $\frac{2}{0}$ $\frac{1}{-2}$ $\frac{2}{2}$						
	(\mathbf{x}, \mathbf{y}) (2, 0) (-1, -2) (5, 2)						
	x 2 -4 5						
	y 2 0 3						
	(x, y) (2, 2) (-4, 0) (5, 3)						
2)	Fill in the blanks.						
	Value of Nature of roots						
	discriminant						
	50 Real and unequal						
	-30 ► Not real						
	Keal and equal						
	-4 Not real						
	5						
3)	When two coins are tossed simultaneously.						
- /							

	All possible outcomes are							
	\therefore total number of all possible outcomes = a) Getting both the heads means = HH							
	$\therefore P(\text{getting both heads} = \boxed{\frac{1}{4}}$							
	b) Getting at least 1 head means = HT, TH. HH							
	$\therefore P(\text{getting at least 1 head}) = \boxed{\frac{3}{4}}$							
Q.3B	Solve Any TWO of the following							
1)	Here, $FV = Rs. 5$, Premium = Rs. 20,							
	Sum invested = $Rs. 20,000$							
	\therefore MV = FV + Premium							
	= 5 + 20 : MV - Po 25							
	$\sim 101 \text{ V} = \text{KS}$. 25 Now sum invested = Number of shares X MV							
	\therefore Number of shares $-\frac{\text{Sum invested}}{\text{Sum invested}}$							
	$\frac{W}{20,000} = \frac{W}{2000}$							
	$=\frac{1}{25}=800$							
2)	∴ Smt. Deshpande will get 800 shares for Rs. 20,000.							
2)	$S = \{HHH, HHT, HTH, THH, HTT, THT, TTH, TTT\}$							
	\therefore n(S) = 8							
	i) Let A be the event of getting head on the middle coin.							
	$\therefore A = \{HHH, HHT, THH, THT\}$							
	$ \therefore \mathbf{n}(\mathbf{A}) = 4 $							
	$\therefore P(A) = \frac{C}{n(S)} = \frac{1}{8} = \frac{1}{2}$							
	ii) Let B the event of getting exactly one tail.							
	$\therefore B = \{HHT, HTH, THH\}$							
	$ \therefore \mathbf{n}(\mathbf{B}) = 5 $							
	$\therefore P(B) = \frac{1}{n(S)} = \frac{1}{8}$							
3)	The given simultaneous equations are							
	3x - 4y = 10(1) 4x + 3y = 5 (ii)							
	Equations (i) and (ii) are in $ax + by = c$ form.							
	$\therefore D = \begin{vmatrix} 3 & -4 \\ 4 & 3 \end{vmatrix} = (3 \times 3) - (-4 \times 4) = 9 - (-16) = 9 + 16 = 25 \neq 0$							
	$D_{x} = \begin{vmatrix} 10 & -4 \\ 5 & 3 \end{vmatrix} = (10 \times 3) - (-4 \times 5) = 30 - (-20) = 30 + 20 = 50$							
	$D_{y} = \begin{vmatrix} 3 & 10 \\ 4 & 5 \end{vmatrix} = (3 \times 5) - (10 \times 4) = 15 - 40 = -25$							
	\therefore By Cramer's rule, we get							
	$x = \frac{A}{D}$ and $y = \frac{A}{D}$							
	$\therefore x = \frac{30}{25} \text{ and } y = \frac{-25}{25}$							
	$\therefore x = 2 \text{ and } y = -1$							
0.4	\therefore (x, y) = (2, -1) is the solution of the given simultaneous equations.							
1)	Solve Any THREE of the following $t = -52$ t = 128 [Given]							
1)	$c_{19} - 52, c_{38} - 120$ [Olven] Since, $t_n = a + (n - 1)d$							
L								

	$\therefore t_{19} = a + (19 - 1)d$
	$\therefore 52 = a + 18d$
	1.e. $a + 18d = 52$ (1)
	Also, $t_{38} = a + (38 - 1)d$
	$\therefore 128 = a + 37d$
	i.e. $a + 37d = 128$ (ii)
	Adding equations (i) and (ii), we get
	a + 18d = 52
	$\frac{a + 37d = 128}{2}$
	2a + 55d = 180(111)
	Now, $S_n = \frac{n}{2} [2a + (n-1)d]$
	\therefore S ₅₆ = $\frac{56}{2}$ [2a + (56 - 1)d]
	= 28(2a + 55d)
	$= 28 \times 180$ [From (iii)]
	\therefore S ₅₆ = 5040
	∴ The sum of first 56 terms is 5040.
2)	The probability that the ball is dropped in the basket by John $-\frac{4}{-} = 0.80$
,	The probability that the ball is dropped in the basice by John $= \frac{1}{5} = 0.02$
	The probability that the ball is dropped in the basket by $Vasim = 0.83$
	The probability that the ball is dropped in the basket by Akash = $58\% = \frac{36}{100} = 0.58$
	\therefore Vasim has the greatest probability of success.
3)	Let us denote the cost of 1 pencil by Rs. x and one eraser by Rs. y. Then the algebraic representation
,	is given by the following equations
	2x + 3y = 9(i)
	4x + 6y = 18(ii)
	To obtain the equivalent geometric representation, we find two points on the line representing each
	equation
	\mathbf{x} 0 4.5
	$x = \frac{9-2x}{3}$ 0
	$\left \frac{y - \frac{y}{3}}{3} \right ^2$
	$\mathbf{x} = 0 = 3$
	$y = \frac{18 - 4x}{6}$ 3 1
	2 3 (0, 3)
	2+ (3, 1)
	X
	Here both the lines coincide. This is so because both the equations are equivalent. i.e. one can be
	derived from the other.
4)	Tax invoice of Services Provided
Í	Novelty Store, Bhivandi, Thane Invoice No. 48
	Mo. No. 7588588000 Invoice date 11 May 2018
	GSTIN · 27AAAAA555BIZA
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	HSN	Iteam	Qty		Rate	Taxal	ble (GST	Total
	3924	Pencil box	x 100		Rs. 20	Amou Rs. 20	int F 000 1	Rate 2%	GST Rs. 240
	9503	Jigsaw	50		Rs. 100	Rs. 50	000 1	.2%	Rs. 600
		Puzzies			Tatal	- 700	0		Rs 840
					Total	- 700	Gra	and Total =	Rs. 7840
Q.5	Solve Any O	NE of the fo	ollowing				011		
1)	There are three novels say N_1 , N_2 , N_3 , And three science fictions say F_1 , F_2 , F_3 is a shelf. Three books					f. Three books			
,	are picked up at random. Let the sample space = S								
	$\therefore S\{N_1 N_2 N_3,$	$N_1 N_2 F_1$, N	$N_1 N_2 F_2$	N ₁ N ₂ F ₃ ,	N ₁ N ₃ F ₁ ,	$N_1 N_3 F_2$	$N_1 N_3 F_3$, N ₂ N ₃ F ₁ , N	$N_2 N_3 F_2, N_2$
	$N_3 F_3, N_1 F_1 F_2, N_1 F_2 F_3, N_1 F_1 F_3, N_2 F_1 F_2, N_2 F_2 F_3, N_2 F_1 F_3, N_3 F_1 F_2, N_3 F_2 F_3, N_3 F_1 F_3, F$					$N_3 F_1 F_3, F_1$			
	\therefore Number of	samnle noi	nts = n((S) = 20					
	a) Let 'A' be t	he event th	at the th	ree book	s picked u	o at rando	om are all	l novels.	
	$\therefore A = \{N_2 N_2 N_2\} \therefore n(A) = 01$								
		∴ P(A	$=\frac{01}{10}=$	0.05					
	b) Let 'B' be the event that the 3 books nicked up at random are all not novels								
	\therefore B = {N ₁ N ₂ F ₁ , N ₁ N ₂ F ₂ , N ₁ N ₂ F ₂ , N ₁ N ₂ F ₁ , N ₁ N ₂ F ₂ , N ₁ N ₂ F ₂ , N ₂ N ₂ F ₁ , N ₂ N ₂ F ₂ , N ₂ N ₂ P ₂ , N ₂ , N ₂ P ₂ , N ₂ P ₂ , N ₂ , N ₂ P ₂ , N ₂ , N ₂ ,						2, N ₂ N ₃		
	$F_{3,}$ N ₁	$F_1 F_2, N_1 F_2$	$F_1 F_{3,} N_1$	$F_2 F_{3,} N_2$	$F_1 F_{2,} N_2 F_1$	$_{1}F_{3}N_{3}F_{3}$	$_1 F_2, N_3 F$	F_1 F_3 , N_3 F_2 F_2	$F_3, F_1 F_2$
	F ₃ }								
	\therefore n(B) =	: 19							
	P(B) =	$\frac{19}{20}$ or 0.95							
	c) Let 'C' be th	he event th	at the th	ree books	s picked uj	o at rando	m all thr	ee are not n	ovels
	$\therefore C = \{F_1 F_2 F_3\} \qquad \therefore n(C) = \frac{n(C)}{n(S)}$								
			∴ P(C) =	$=\frac{1}{20}=0.02$	5				
	∴ all novels	s = P(A) =	$\frac{1}{20}$						
	all are not novels = $P(B) = \frac{19}{22}$								
	all three a	are not nove	els = P(C)	$(2) = \frac{1}{20}$					
2)	Total number	of students	= 180	20					
	$\therefore 10 + x + 25 + 2x + 55 + 30 = 180$								
	$\therefore 3x + 120 = 120$								
	\therefore 3x = 60								
	$\therefore \mathbf{x} = 20$	0 10	10 20	20 20	20 40	40 50	50 (0	7	
	Marks	10 - 10	$\frac{10-20}{20}$	20 - 30	30 - 40	40 - 50	50 - 60	-	
	students	10	20	23	40	55	50		
	stuutitis								



$\therefore x^2 + 3x - 2x - 6 = 84$
$\therefore x^2 + x - 6 - 84 = 0$
$\therefore x^2 + x - 90 = 0$
$\therefore x^2 + 10x - 9x - 90 = 0$
$\therefore x(x+10) - 9(x+10) = 0$
\therefore (x + 10) (x - 9) = 0
$\therefore x + 10 = 0 \text{ or } x - 9 = 0$
$\therefore x = -10 \text{ or } x = 9$
But, age cannot be negative.
$\therefore \mathbf{x} = 9$
∴ Present age of Pragati is 9 years.

*This question paper is for practice purpose only.

