SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

ALGEBRA

Class 10 - Mathematics - I

Time Allowed: 2 hours **Maximum Marks: 40**

General Instructions:

1. All questions are compulsory.
2. Use of a calculator is not allowed.
3. The numbers to the right of the questions indicate full marks.
4. In case of MCQs Q. No. 1(A) only the first attempt will be evaluated and will be given credit.

1. **[8]**

(a) **Choose the correct alternative from given :**

i. If 3 is one of the root of the quadratic equation $kx^2 - 7x + 12 = 0$, then $k =$ _____. **[1]**

a) -3 b) -1

c) 3 d) 1

ii. To draw graph of $4x + 5y = 19$, what will be the value of y when $x = 1$: **[1]**

a) 3 b) 4

c) -3 d) 2

iii. First four terms of an A.P. are _____, whose first term is -2 and common difference is -2. **[1]**

a) $-2, -4, -6, -8$ b) $-2, 4, -8, 16$

c) $-2, -4, -8, -16$ d) $-2, 0, 2, 4$

iv. In the format of GSTIN, there are _____ alpha-numerals. **[1]**

a) 9 b) 16

c) 10 d) 15

(b) i. For simultaneous equations in variables x and y, if $D_x = 25, D_y = 40, D = 5$, then what is the value of x? **[1]**

ii. Find second and third term of an A.P. whose first term is -2 and common difference is -2. **[1]**

iii. On certain article if rate of CGST is 9%, then what is the rate of SGST? **[1]**

iv. If a die is rolled, what is the probability that number appearing on upper face is less than 2? **[0]**

a) $\frac{1}{6}$ b) $\frac{1}{2}$

c) 1 d) $\frac{1}{3}$

2. **[12]**

(a) **Complete the following activities and rewrite it (any two) :**

i. Decide whether the following sequence is an A.P. if so, find the 20^{th} term of the progression: **[2]**

$-12, -5, 2, 9, 16, 23, 30$,...

ii. Solve the following quadratic equation using factorisation method: $x^2 + x - 20 = 0$ **[2]**

iii. One die is rolled. Complete the following activity, to find the probability that the number on the upper face is prime. **[2]**

Activity:

S is the sample space.

$S = \{\square\}$

$\therefore n(S) = 6$

Event A: Getting a prime number on the upper face.

$A = \{\square\}$

$\therefore n(A) = 3$

$P(A) = \frac{n(A)}{\square}$ ...[Formula]

$\therefore P(A) = \square$

(b) **Solve the following subquestions (any four) :**

i. Complete the following activity to find the value of x. **[2]**

$$\begin{array}{r} 3x - y = 2 \\ 2x + y = 8 \\ \hline \square x = \square \end{array}$$

$\therefore x = \frac{\square}{5}$

$\therefore x = \square$

ii. Write the following equation in the form $ax^2 + bx + c = 0$, then write the values of a, b, c **[2]**

$2y = 10 - y^2$.

iii. Find the 23rd term of the following A.P.: $9, 4, -1, -6, -11, ...$ **[2]**

iv. For the following experiment write sample space **S** and number of sample points $n(S)$. Two digit numbers are formed using digits 2, 3 and 5 without repeating a digit. **[2]**

v. Complete the activity to prepare a table showing the co-ordinates which are necessary to draw a frequency polygon: **[2]**

Class	$18 - 19$	$19 - 20$	$20 - 21$	$\square$
Class Mark	18.5	19.5	$\square$	21.5
Frequency	4	$\square$	15	19
Co-ordinates of point	$\square$	$(19.5, 13)$	$(20.5, 15)$	$(21.5, 19)$

3. **[9]**

(a) **Complete the following activity and rewrite it (any one) :**

i. The following frequency distribution table shows the distances travelled by some rickshaws in a day. Observe the table and answer the following questions: **[3]**

Class (Daily distance travelled in km)	**Continuous Class**	**Frequency Number of rickshaws**	**Cumulative Frequency less than type**
$60 - 64$	$59.5 - 64.5$	10	10

$65-69$	$64.5-69.5$	34	$10+34=44$
$70-74$	$69.5-74.5$	58	$44+58=102$
$75-79$	$74.5-79.5$	82	$102+82=184$
$80-84$	$79.5-84.5$	10	$184+10=194$
$85-89$	$84.5-89.5$	6	$194+6=200$

i. Which is the modal class? Why?

ii. Which is the median class and why?

iii. Write the cumulative frequency (C.F.) of the class preceding the median class.

iv. What is the class interval (h) to calculate median?

ii. 50 shares of face value ₹ 10 were purchased for market value of ₹ 25. Company declared 30% dividend on the shares, then find: **[3]**

i. Sum invested

ii. Dividend received

iii. Rate of return.

(b) **Solve the following subquestions (any two) :**

i. Solve the following quadratic equation using formula: $x^2+10x+2=0$ **[3]**

ii. Solve the following simultaneous equations graphically: $x+y=5; x-y=1$ **[3]**

iii. Fill in the boxes with the help of given information: **[3]**

Tax invoice of services provided (sample)								
Food Junction, Khed-Shivapur, Pune Invoice No. 58 Invoice No. 58								
Mob. No.7588580000, email-ahar.khed@yahoo.com GSTIN : 27AAAAA5555B1ZA Invoice Date: 25 Feb, 2020								
SAC	Food items	Qty	Rate (in ₹)	Taxable amount	CGST		SGST	
9963	Coffee	1	20	20.00	2.5%	₹ 0.50	2.5%	☐
9963	Masala Tea	1	10	10.00	☐	₹ 0.25	2.5%	☐
9963	Masala Dosa	2	60	☐	2.5%	☐	2.5%	₹3.00
			Total	150.00		☐		₹ 3.75
						Grand Total	**= ₹ 157.50**	

iv. A card is drawn from a well shuffled pack of 52 playing cards. Complete the activity to find the probability of the event that the card drawn is a red card. **[3]**

Activity:

S is the sample space.

$n(S)=52$

Event A: Card drawn is a red card.

Total number of red cards

$= \square$ hearts $+ \square$ diamonds

$\therefore n(A) = \square$

$P(A) = \frac{\square}{n(S)}$

$\therefore P(A) = \frac{\square}{52}$

$\therefore P(A) = \square$

4. **Solve the following subquestions (any two) :** **[8]**

(a) The sum of the squares of five consecutive natural numbers is 1455. Find the numbers. **[4]**

(b) The following table shows the classification of percentage of marks of students and the number of students. Draw frequency polygon from the table without drawing histogram: **[4]**

Result (percentage)	**Number of Students**
$20 - 40$	25
$40 - 60$	65
$60 - 80$	80
$80 - 100$	15

(c) If p times the p^{th} term of an A.P. is equal to q times q^{th} term, then show that $(p+q)^{th}$ term of that A.P. is zero $(p \neq q)$. **[4]**

5. **Solve the following subquestions (any one) :** **[3]**

(a) Time allotted for the preparation of an examination by some students is shown in the table. Draw a histogram to show this information: **[3]**

Time (minutes)	**No. of Students**
$60 - 80$	14
$80 - 100$	20
$100 - 120$	24
$120 - 140$	22

(b) Two numbers differ by 3. The sum of the twice the smaller number and thrice the greater number is 19. Find the numbers. **[3]**