मंगलाताई भागवत फाऊंडेशन

Mathematics - Part I

Std : X

Time-2 Hrs **Marks 40**

Notes :

i) All questions are compulsory.
ii) Use of calculator is not allowed.
iii) Total marks are shown on the right side of the questions.
iv) Draw diagram wherever necessary.
v) Do not erase the marks of construction.
vi) First choice will be evaluated for MCQ.

Q.1. A) Choose the correct alternative. **(4)**

1) In the A.P. 2, -2, -6, -10, ……. common difference (d) is _____.

(a) - 4 (b) 2 (c) - 2 (d) (4)

2) For the quadratic equation $x^2 + 10x - 7 = 0$ the values of a, b, c are _____.

(a) a = -1, b = 10, c = 7 (b) a = 1, b = -10, c = - 7

(c) a = 1, b = 10, c = -7 (d) a = 1, b = 10, c = 7

3) The tax levied by Central Government for trading within a state is _____.

a) IGST b) CGST

c) SGST d) UTGST

4) If a die is rolled, what is the probability that number appearing on upper face is less than 2 ?

a) $\frac{1}{3}$ b) $\frac{1}{2}$ c) 1 d) $\frac{1}{6}$

Q.1. B) Solve the following questions. **(4)**

1) If a = -3, d = 2 of an A.P., then find the A.P.

2) If $\begin{vmatrix} 4 & 5 \\ m & 3 \end{vmatrix}$ = 22 then find the value of m.

3) Find the values of a, b and c from the given quadratic equation

$x^2 + 8x + 15 = 0$

4) If $\Sigma xifi$ = 218, Σfi = 50, then find the mean.

Q.2. A) Complete the following activities. (Any two) **(4)**

1) Complete the following table using given information.

Sr.No.	Individual	GST	CGST	SGST
1.	Manufacturer	Rs. 480	☐	☐
2.	Wholesaler	☐	Rs. 48.5	☐

2) The following table shows the daily supply of electricity to different places in a town. To show the information by a pie diagram, measures of central angles of sectors are to be decided.
Complete the following activity to find the measures.

Places	Supply of electricity (Thousand Units)	Measures of central angle.
Roads	4	$\frac{4}{30} \times 360^0 = 48^0$
Factories	12	$\frac{\square}{\square} \times 360^0 = 144^0$
Shops	6	$\frac{6}{30} \times 360^0 =$ ☐
Houses	8	$\frac{\square}{\square} \times 360^0 =$ ☐
Total	30	360^0

3) Two coins are tossed simultaneously, Complete the following activity of writing the sample space.(s) and expected outcomes of the events.

i) Event A :- to get at least one head.

ii) Event B : to get no head.

Activity : If two coins are tossed simultaneously

S = { ☐ , HT, TH, ☐ }

i) Event A : to get at least one head

A = { HH, ☐ , TH }

ii) Event B : to get no head

B = { ☐ }

B) Solve the following Questions. (Any four) **(8)**

1) Find the 19th term of the A.P. 7,13,19, 25, …….
2) Obtain a quadratic equation whose roots are -3 & -7.
3) Two numbers differ by 3. The sum of the greater number and twice the smaller number is 15. Find the smaller number.
4) Find the mean from the given information.
   Σfi = 150, $\Sigma fiui$ = - 65, A = 3500, g = 1000.
5) Smt. Malhotra purchased solar panels for the taxable value of 85,000. She sold them for Rs. 90,000. The rate of GST is 5%, Find the ITC of Smt. Malhotra. What is the amount of GST payable by her ?

Q.3. A) Complete the following activity. (Any one) **(3)**

1) To solve the simultaneous equations by determinant method, fill in the blanks.

   $y + 2x - 19 = 0;\ 2x - 3y + 3 = 0$

   Activity : Write the given equations in the form $ax + by = c$

   $2x + y = 19$

   $2x - 3y = -3$

   D = $\begin{vmatrix} 2 & 1 \\ 2 & -3 \end{vmatrix}$ = $\square$

   Dx = $\begin{vmatrix} 19 & 1 \\ -3 & -3 \end{vmatrix}$ = $\square$

   Dy = $\begin{vmatrix} 2 & 19 \\ 2 & -3 \end{vmatrix}$ = $\square$

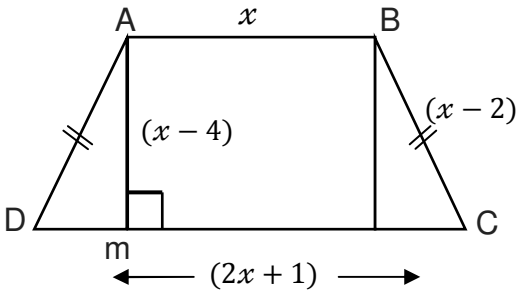
   By Cramer's Rule,

   $x = \frac{Dx}{D}$, $y = \frac{Dy}{D}$

   $x = \frac{\square}{\square}$; $y = \frac{\square}{8}$

   $x = \frac{27}{4}$; $y = \frac{11}{2}$

2) In the adjoining Fig. □ABCD is a trapezium AB || CD and its area is 33 cm^2. From the information given in the figure. Find the lengths of all sides of the □ABCD. Fill in the empty boxes to get the solution.



Solution :

□ABCD is a trapezium.

AB || CD

A (□ABCD) = $\frac{1}{2}$ x (AB + CD) x ☐

33 = $\frac{1}{2}$ x ($x + 2x + 1$) x ☐

$3x^2$ ☐ + = 0

(3x + 10) = 0 or ☐ = 0

$x = \frac{-10}{3}$ or x = ☐

But length is never negative.

$x \neq \frac{-10}{3}$ ∴ x = ☐

AB = ☐, CD = ☐, AD = BC = ☐

Q.4 A) Solve the following questions. (Any Two) (6)

1) Amit saves certain amount every month in a specific way. In the first month he saves Rs. 200; in the second month Rs. 250; in the 3rd month Rs. 300; and so on. How much will be his total savings in 17 months?

2) Solve the following simultaneous equations graphically. $x + y = 0$; $2x - y = 9$

3) The total value (with GST) of a remote controlled toy car is Rs. 1770, Rate of GST is 18% on toys. Find the taxable value, CGST & SGST for this toy car.

4) Out of 200 students from a school, 135 like Kabbaddi and the remaining students do not like the game. If one student is selected at random from all the students; find the probability that the student selected does not like kabbaddi.

B) Solve the following questions. (Any two) **(8)**

1) The following frequency distribution table shows marks obtained by 180 students in mathematics examination.

Marks	**0-10**	**10-20**	**20-30**	**30-40**	**40-50**
Number of Students	25	x	30	$2x$	65

Find the value of x. Also draw a histogram representing the above information.

2) Two taps together can fill a tank completely in $3\frac{1}{13}$ minutes. The smaller taps takes minutes more than the bigger tap to fill the tank. How much time does each tap takes to fill the tank completely ?

3) A bag contains 12 balls out of which x are blacks balls. Find probability of getting a black ball if one ball is drawn. If 6 more black balls are added in the bag, the probability of getting a black ball will be double. Find x.

Q.5 Solve the following questions. (Any One) **(3)**

1) The co-ordinates of the point of intersection of lines $ax + by = 9$, & $bx + ay = 5$, are (3, -1) find the value of a & b.

2) The following frequency distribution table shows the distances travelled by some rickshaws in a day. Observe the table and answer the following questions.

Class (Daily distance travelled in km.)	**Continuous Classes**	**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? Why?
iii) Write the cumulative frequency of the class preceding the median class.
iv) What is the class interval to calculate median?

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