

Mumbai - 400 101, Mob. 9921261030.  
**GOKULDHAM HIGH SCHOOL AND JR. COLLEGE**

**SECONDARY SECTION**

**SECOND PRELIMINARY EXAMINATION (2018-2019)**

**SUBJECT: MATHEMATICS**

Std : X

Marks: 80

Date : 07/01/2019

Time : 2 ½ Hrs.

*Answers to this paper must be written on the paper provided separately.*

*You will not be allowed to write during the first 15 minutes.*

*This time is to be spent in reading the Question paper.*

*This paper consists of Section A and B of 40 marks each.*

*The time given at the head of this paper is the time allowed for writing the answers of both Section – A and Section – B.*

*Answer all the questions from Section – A and any four complete questions from Section – B.*

*All working including rough work must be clearly shown and must be done on the same sheet as the rest of the answers.*

*Omission of the essential working will result in the loss of marks.*

*The intended marks for questions or parts of question are given in the brackets [ ]*

*Mathematical tables are provided.*

**Section – A (40 marks)**

**[Attempt all questions from this Section.]**

**Question 1**

- a) Find the values of  $x$  and  $y$  if: [3]
- $$2 \begin{bmatrix} 3 & -4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y+5 \\ 0 & -1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$$
- b) Sanjay opened a Recurring Deposit Account in a bank and deposits ₹ 300 per month for two years. If he received ₹ 7725 at the time of maturity find: [3]
- the rate of interest per annum.
  - the total interest earned.
- c) From a pack of 30 cards marked with numbers 1, 2, 3, 4, ..., 30, all cards whose numbers are multiples of 3 are removed. A card is now drawn at random. Find the probability of getting a card which is: [4]
- a prime number less than 10.
  - a number divisible by 5.
  - a perfect cube.
  - a number that is multiple of 6.

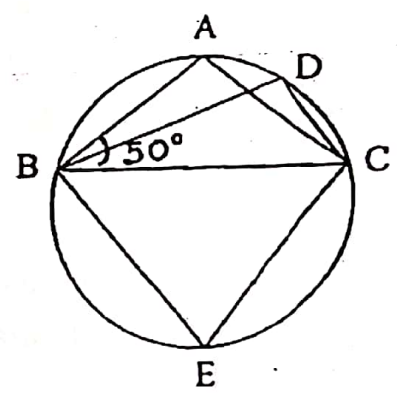
**Question 2**

- a) Solve the following inequation, write down the solution set and represent it on the real number line. [3]

$$-2 \frac{5}{6} < \frac{1}{2} - \frac{2x}{3} \leq 2, x \in W$$

- b) In the given figure,  $\Delta ABC$  is an isosceles triangle with  $AB = AC$  and  $\angle ABC = 50^\circ$ . [3]

Find: i)  $\angle BDC$     ii)  $\angle BEC$



- c) The radius and height of a cone are in the ratio 1 : 3. The area of the base is  $154 \text{ cm}^2$ . Find the curved surface area of the cone. (use  $\pi = 22/7$ ). [4]

**Question 3**

- a) Prove the identity:  $\frac{\tan \theta - \cot \theta}{\sin \theta \cos \theta} = \sec^2 \theta - \text{cosec}^2 \theta$  [3]

- b) Solve the quadratic equation  $2x^2 - 3x = 1$  for  $x$  and give your answer correct to 2 decimal places. [3]

- c) Find the value of  $k$  if  $(x - 2)$  is a factor of  $x^3 + kx^2 + 14x - 8$ . [4]  
Hence, factorise the polynomial completely after substituting the value of  $k$ .

**Question 4**

- a) If median of given numbers arranged in ascending order 8, 10,  $x + 1$ ,  $x + 3$ ,  $x + 4$  and 19 is 13, find  $x$ . Hence find the mean. [3]

- b) Find  $a$ ,  $b$  and  $c$  such that the following numbers are in A.P. [3]

$$a, 7, b, 23, c.$$

- c) Use graph paper for this question [4]

(Take 2cm = 1 unit along both  $x$  and  $y$  axes)

Plot  $P(0,2)$  and  $Q(3,2)$ . Reflect  $P$  in the line  $y=0$  to get  $P'$  and reflect  $Q$  in the origin to get  $Q'$ .

- Write the co-ordinates of  $P'$  and  $Q'$ .
- Name two points from the figure which are invariant on reflection from the line  $x=0$ .
- In what ratio is the line  $PQ'$  divided by the line  $y=0$ .

### Section - B (40 marks)

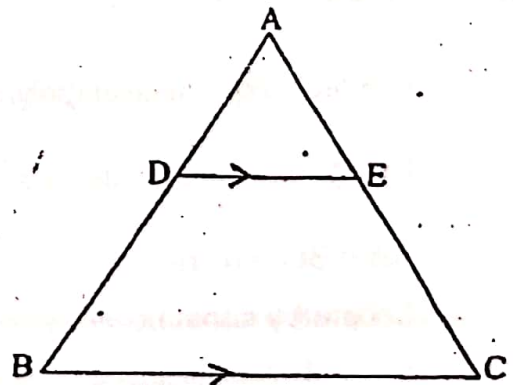
[Attempt any four complete questions from this section.]

#### Question 5

- a) ABCD is a rhombus where  $A(3,6)$  and  $C(-1,2)$  are end points of one diagonal, find the equation of a diagonal BD. [3]
- b) A man invests a sum of money on 60 shares available at ₹150 of face value ₹100. [3]
- What is his investment?
  - If the dividend is 6% p.a., what will be his annual income?
  - If he sells one third of shares and get ₹3510 as sales proceeds then at what price did he sell the shares?

- c) In the given figure, in  $\triangle ABC$ ,  $D$  and  $E$  are points on sides  $AB$  and  $AC$  respectively such that  $DE \parallel BC$  [4]

- Given that  $AD : BD = 3:5$ , Calculate  $DE$  if  $BC = 4.8$  cm.
- Find the ratio  $\text{Area}(\triangle ADE) : \text{Area}(\text{trapezium } BCED)$ .



**Question 6**

a) Find the value of  $k$  for which  $x = 2$  is a solution of the quadratic equation [3]

$(k + 2)x^2 - 3(k + 4)x + 18 = 0$ . Hence find the other root of the equation.

b) If  $x = \frac{\sqrt[3]{m+1} + \sqrt[3]{m-1}}{\sqrt[3]{m+1} - \sqrt[3]{m-1}}$ , show that  $x^3 - 3mx^2 + 3x - m = 0$ . [3]

using the properties of proportion.

c) Using graph paper draw a histogram for the given distribution showing the Weekly pocket money (in ₹) of 50 students in a school. (Take 2 cm = ₹ 10 on one axis and 2 cm = 2 students on the other axis.) [4]

(i) State the modal class.

(ii) Estimate the mode of the data.

Weekly pocket money (in ₹)	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100
No. of students	2	8	12	14	8	6

**Question 7**

a) Metallic spheres of radii 6 cm, 8 cm and 10 cm respectively are melted and recasted into a single solid sphere. Taking  $\pi = 3.14$ , find the surface area of the solid sphere formed correct to nearest square centimetre. [3]

b) When  $3x^3 + ax^2 + bx - 6$  is divided by  $(x + 2)$ , the remainder is 20 and  $(x + 3)$  is a factor of the given polynomial. Find the values of  $a$  and  $b$ . [3]

c) Using ruler and compass only, construct an isosceles  $\Delta ABC$  in which [4]

$AB = BC = 6$  cm,  $\angle ABC = 120^\circ$ .

Locate by construction the point P such that:

i) P is equidistant from B and C.

ii) P is equidistant from AB and BC.

iii) Construct a circle passing through the points A, B and C

**Question 8**

a) A manufacturer of T.V. sets produced 600 units in the third year and 700 units in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find : [4]

- i) the production in the first year
- ii) the production in the 10<sup>th</sup> year
- iii) the total production in 7 years

b) The table given below shows scores obtained by 168 shooters in the first round of a shooting competition, where qualifying score for the next round was scoring more than 55. [6]

Scores	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of shooters	5	11	14	26	34	20	25

Using a graph paper draw an ogive of the given distribution taking 2 cm = 10 score on one axis and 2 cm = 20 shooters on the other axis.

From the ogive determine :

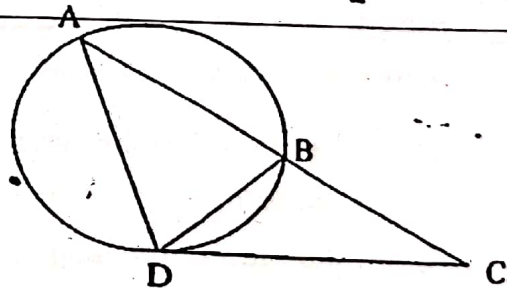
- i) the median score.
- ii) the number of shooters who qualifies for the second round.
- iii) Inter quartile range.

**Question 9**

a) In the given figure, AB = 7 cm and BC = 9 cm, [3]

CD is tangent to the circle at D.

- i) Prove that  $\Delta ACD \sim \Delta DCB$ .
- ii) Find the length of CD.



b) A person on tour has ₹ 360 for his expenses. If he extends his tour for 4 days he has to cut down his daily expenses by ₹ 3. Find the original duration of the tour. [3]

c) Marks obtained by 110 students in Mathematics exam is given below:

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
No. of students	6	10	13	14	23	17	20	7

Calculate the mean marks correct to the nearest whole number by using the short - cut method.

Question 10

a) Given  $\begin{bmatrix} 1 & 3 \\ 2 & 8 \end{bmatrix} X = \begin{bmatrix} 5 \\ 12 \end{bmatrix}$ , where  $X$  is a matrix

- i) Write the order of the matrix  $X$ .
- ii) Find the matrix  $X$ .

b) Find the equation of a straight line passing through the point of intersection of  $5x + 2y - 10 = 0$  with  $x$ - axis and parallel to the line  $3x - 7y + 8 = 0$

c) From the top of a hill, the angles of depression of two consecutive kilometre stones due east are found to be  $30^\circ$  and  $45^\circ$  respectively. Find the height of the hill correct to two significant figures.

Question 11

a) The sum of first three terms of a G.P. is  $\frac{13}{12}$  and their product is  $-1$ .

Find the common ratio and the first three terms.

- b) A model of airplane is made to a scale of  $1 : 100$ . Calculate :
  - i) the length of the airplane if the length of the model is  $0.25$  m,
  - ii) the volume of the airplane if the volume of the model is  $3 \text{ m}^3$ .
  - iii) the area of the wing of the model if the area of the wingspan of airplane is  $20000 \text{ m}^2$ .

c) Prove that :

$$\frac{\tan^2 A (\operatorname{cosec} A - 1)}{\cos A + 1} + \frac{\operatorname{cosec}^2 A (\cos A - 1)}{\operatorname{cosec} A + 1} = 0$$