

11619/2017 - 18/Mid- Term/10
MATHEMATICS

Time : 3Hrs.

M.M: 80

General Instructions:

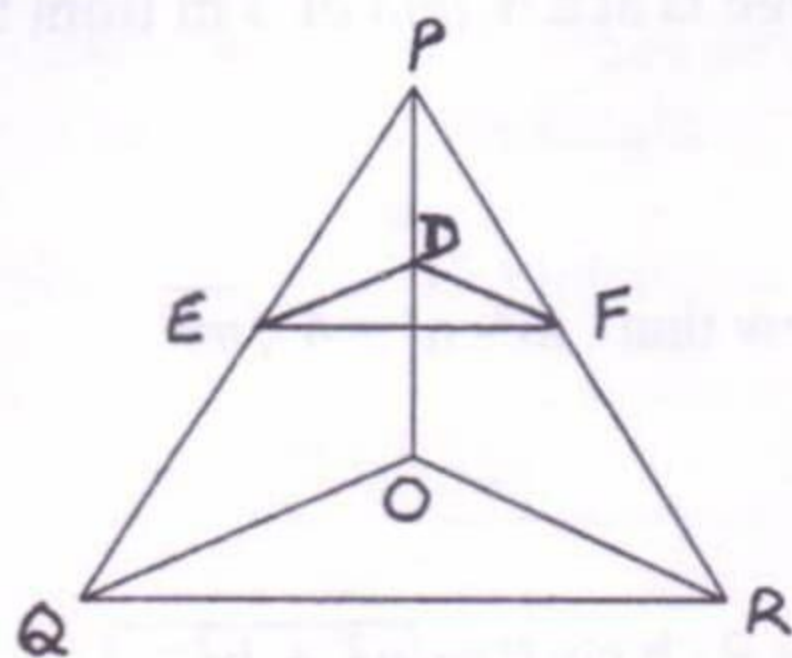
- i) All questions are compulsory. There is no overall choice, but internal choice is given under different sections.
- ii) Total number of questions is 30 divided into four sections.
- iii) Section A comprises of 6 questions of 1 mark each.
- iv) Section B comprises of 6 questions of 2 marks each.
- v) Section C comprises of 10 questions of 3 marks each.
- vi) Section D comprises of 8 questions of 4 marks each.

SECTION A (1 mark each)

- Q1 Given that H.C.F (306,657) = 9, find L.C.M (306,657).
- Q2 Find a quadratic polynomial with 0 as sum and $\sqrt{5}$ as the product of its zeroes.
- Q3 The nth term of an A.P. is $6n+2$. Find its common difference.
- Q4 If $\Delta ABC \sim \Delta QRP$, $\frac{ar \Delta ABC}{ar \Delta QRP} = \frac{9}{4}$, $AB = 18$ cm and $BC = 15$ cm, then find the length of PR.
- Q5 In ΔABC , if $\angle A + \angle B = 90^\circ$ and $\tan A = \frac{3}{4}$, what is the value of $\cot B$?
- Q6 If the Mode of a distribution is 8 and its Mean is also 8, then find its Median.

SECTION B (2 MARKS EACH)

- Q7 In the given figure, $DE \parallel OQ$ and $DF \parallel OR$. Show that $EF \parallel QR$.



- Q8 Find the 20th term from the last term of A.P. 3, 8, 13,....., 253.
- Q9 Find the values of p for which the quadratic equation $4x^2 + px + 3 = 0$ has equal roots?
- Q10 Is it true to say that the pair of equation $-x+2y+2=0$ and $\frac{x}{2} - \frac{y}{4} - 1 = 0$ has a unique solution? Justify your answer.
- Q11 Find the H.C.F of 867 and 255, using Euclid's Division Algorithm.
- Q12 If one of the zeroes of the quadratic polynomial $(k-1)x^2 + kx + 1$ is -3, then find the value of k.

Q13 Show that $5-2\sqrt{3}$ is an irrational number.

Q14 Solve $ax+by=a-b$
 $bx-ay=a+b$ by cross multiplication method.

OR

Solve the given pair of equations by reducing them to a pair of linear equations.

$$\frac{7x-2y}{xy} = 5$$

$$\frac{8x+7y}{xy} = 15$$

Q15 Find the roots of quadratic equation $2x^2 - 7x + 3 = 0$, if they exist, by the method of completing the square.

Q16 How many terms of the A.P. $54, 51, 48, \dots$ be taken so that their sum is 513? Explain the double answer.

Q17 $\triangle ABC$ is a right angled isosceles triangle with $\angle B = 90^\circ$ and $AB=BC$. Prove that area of an equilateral triangle described on side AB is half the area of the equilateral triangle described on side AC .

Q18 Prove that $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{1}{\sec \theta - \tan \theta}$, using the identity $\sec^2 \theta = 1 + \tan^2 \theta$

Q19 If the mean of the following data is 20.6, find the value of p .

x	10	15	P	25	35
f	3	10	25	7	5

Q20 From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° , respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

Q21 If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, show that $m^2 - n^2 = 4\sqrt{mn}$.

OR

If $a \sin \theta + b \cos \theta = c$, then prove that $a \cos \theta - b \sin \theta = \sqrt{a^2 + b^2 - c^2}$

Q22 Some people of a society decorated their area with flags and tricolor ribbons on Republic Day. The following data shows the number of persons in different age groups who participated in the decorations:

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65
No. of persons	6	11	21	23	14	5

Find the mode of the above data. What values do these persons possess?

Q23 Given that $\sqrt{2}$ is a zero of the cubic polynomial $6x^3 + \sqrt{2}x^2 - 10x - 4\sqrt{2}$, find its other zeroes.

Q24 In an A.P. of 50 terms, the sum of first 10 terms is 210 and the sum of its last 15 terms is 2565. Find the A.P.

OR

The eighth term of an A.P. is half its second term and the eleventh term exceeds one-third of its fourth term by 1. Find the 15th term of the A.P.

Q25 The area of a rectangle gets reduced by 8 sq m if its length is reduced by 5 m and the breadth is increased by 3 m. If we increase the length by 3 m and breadth by 2 m, the area is increased by 74 sq m. Find the length and breadth of the rectangle. (solve graphically)

OR

A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days and an additional charge for each day thereafter. Shreya paid ₹22 for a book she kept for 6 days and Riya paid ₹16 for the book kept for 4 days. Find the fixed charges and the additional charge for each extra day. (solve graphically)

Q26 Prove that the ratio of areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

Q27 Using quadratic formula, solve the following equation for x :

$$abx^2 + (b^2 - ac)x - bc = 0$$

Q28 In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one of its altitudes.

Q29 A person standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60° . When he moves 40 metres away from the bank, he finds the angle of elevation to be 30° . Find the height of the tree and the width of the river.

Q30 During the medical check-up of 35 students of a class, their weights were recorded as follows:

Weights (in kg)	No. of students
less than 38	0
less than 40	3
less than 42	5
less than 44	9
less than 46	14
less than 48	28
less than 50	32
less than 52	35

Draw a less than type ogive for the given data and obtain the median weight from the graph.