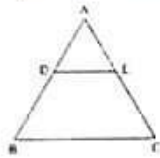


(Section - A)

Section A consists of 20 questions of 1 mark each.

- Q.1 If two positive integers  $p$  and  $q$  can be expressed as  $p = 18a^2b^4$  and  $q = 20a^3b^2$ , where  $a$  and  $b$  are prime numbers, then LCM ( $p, q$ ) is :  
(a)  $2a^2b^2$  (b)  $180a^2b^2$  (c)  $12a^2b^2$  (d)  $180a^3b^4$
- Q.2 If the product of two coprime numbers is 553, then their HCF is  
(a) 1 (b) 553 (c) 7 (d) 79
- Q.3 The greatest number which divides 281 and 1249, leaving remainders 5 and 7 respectively, is  
(a) 23 (b) 276 (c) 138 (d) 69
- Q.4 Which of these is the polynomial whose zeroes are  $\frac{1}{3}$  and  $-\frac{3}{4}$ ?  
(a)  $12x^2 + 5x - 3$  (b)  $12x^2 - 5x - 3$  (c)  $12x^2 + 13x + 3$  (d)  $12x^2 - 13x - 3$
- Q.5 If one zero of the polynomial  $f(x) = 2x^2 + 13x + k$  is the reciprocal of the other, then the value of  $k$  is  
(a) 2 (b) -2 (c)  $\frac{13}{2}$  (d)  $\frac{2}{13}$
- Q.6 The pair of linear equations  $x + 2y + 5 = 0$  and  $-3x = 6y - 1$  has  
(a) Unique solution (b) Exactly two solutions (c) Infinitely many solutions (d) No solution
- Q.7 The point of intersection of the line represented by  $3x - y = 3$  and  $y$  axis is given by  
(a)  $(0, -3)$  (b)  $(0, 3)$  (c)  $(2, 0)$  (d)  $(-2, 0)$
- Q.8 The number of solutions of  $3^{x+y} = 2+3$  and  $2+2^{x-y} = 3$  is  
(a) 0 (b) 1 (c) 2 (d) Infinite
- Q.9 In a  $\triangle ABC$ ,  $DE \parallel BC$  (as shown in the figure). If  $AD=2\text{cm}$ ,  $BD=3\text{cm}$ ,  $BC=7.5\text{cm}$ , then the length of  $DE$  is  
(a) 2.5cm (b) 3cm (c) 5cm (d) 6cm
- 
- Q.10 If the diagonals of a quadrilateral divide each other proportionally, then it is a :  
(a) Parallelogram (b) Rectangle (c) Square (d) Trapezium
- Q.11 If  $\cos(\alpha + \beta) = 0$ , then value of  $\cos\left(\frac{\alpha + \beta}{2}\right)$  is equal to  
(a)  $\frac{1}{\sqrt{2}}$  (b)  $\frac{1}{2}$  (c) 0 (d)  $\sqrt{2}$
- Q.12 If  $\sec\theta - \tan\theta = m$ , then the value of  $\sec\theta + \tan\theta$  is  
(a)  $1 - \frac{1}{m}$  (b)  $m^2 - 1$  (c)  $\frac{1}{m}$  (d)  $-m$
- Q.13 If  $4\sec\theta - 5 = 0$ , then the value of  $\cot\theta$  is  
(a)  $\frac{3}{4}$  (b)  $\frac{4}{5}$  (c)  $\frac{5}{3}$  (d)  $\frac{4}{3}$
- Q.14 If the distance between the points  $(3, -5)$  and  $(x, -5)$  is 15 units, then the values of  $x$  are  
(a) 12, -18 (b) -12, 18 (c) 18, 5 (d) -9, -12
- Q.15 The centre of a circle is at  $(2, 0)$ . If one end of the diameter is at  $(6, 0)$ , then other end is at :  
(a)  $(0, 0)$  (b)  $(4, 0)$  (c)  $(-2, 0)$  (d)  $(-6, 0)$
- Q.16 The middle most observation of every data arranged in order is called :  
(a) Mode (b) Median (c) Mean (d) Deviation

- Q.17 If mean and median of a data are 12 and 15 respectively, then its mode is :  
 (a) 13.5 (b) 21 (c) 6 (d) 14

- Q.18 Find the upper limit of the modal class from the given distribution :

| Height (in cm)  | Below 140 | Below 145 | Below 150 | Below 155 | Below 160 | Below 165 |
|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Number of girls | 4         | 11        | 29        | 40        | 46        | 51        |

- (a) 165 (b) 160 (c) 155 (d) 150

Direction : In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). choose the correct option.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).  
 (b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).  
 (c) Assertion (A) is true but Reason (R) is false.  
 (d) Assertion (A) is false but Reason (R) is true.

- Q.19 Assertion (A): If a graph of a polynomial touches  $x$ -axis at only one point, then the polynomial cannot be a quadratic polynomial.

Reason (R): A polynomial of degree  $n(n > 1)$  can have atmost  $n$  zeroes.

- Q.20 Assertion (A): Mid point of a line segment divides the line segment in the ratio 1:1.  
 Reason (R): The ratio in which the point  $(-3, k)$  divides the line segment joining the points  $(-5, 4)$  and  $(-2, 3)$  is 1:2.

#### (Section - B)

Section B consists of 5 questions of 2 marks each.

- Q.21  $p(x) = 7x^2 - 6x - 3$ . The two zeroes are of the form  $\frac{3 \pm \sqrt{k}}{2}$ , where  $k$  is a real number.  
 Use the relationship between the zeroes and coefficients of a polynomial to find the value of  $k$ .

- Q.22 The line segment joining the points A  $(4, -5)$  and B  $(4, 5)$  is divided by the point P such that  $AP:AB = 2:5$ . Find the coordinates of P.

OR

A  $(5, 1)$ , B  $(1, 5)$  and C  $(-3, -1)$  are the vertices of  $\triangle ABC$ . Find the length of median AD.

- Q.23 If  $\tan(A+B) = \sqrt{3}$  and  $\tan(A-B) = \frac{1}{\sqrt{3}}$ ;  $0^\circ < A+B \leq 90^\circ$ ,  $A > B$ , Find A and B.

- Q.24 Find the value of  $x$ :  
 $2 \operatorname{cosec}^2 30^\circ + x \sin^2 60^\circ - \frac{3}{4} \tan^2 30^\circ = 10$

OR

If  $\operatorname{cosec}^2 \theta (1 + \cos \theta)(1 - \cos \theta) = k$ , then find the value of  $k$ .

- Q.25 E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that  $\triangle ABE \sim \triangle CFB$ .

#### (Section - C)

Section C consists of 6 questions of 3 marks each.

- Q.26 In a workshop, the number of teachers of English, Hindi and Science are 36, 60 and 84 respectively. Find the minimum number of rooms required, if in each room the same number of teachers are to be seated and all of them being of the same subject.

OR

Find the greatest 5 digit number which is exactly divisible by 12, 18 and 24.

- Q.27 If  $\alpha$  and  $\beta$  are the zeroes of the quadratic polynomial  $f(x) = x^2 - 4x + 3$ , find the value of  $\frac{\alpha}{\beta^2} + \frac{\beta}{\alpha^2}$ .

OR

If  $\alpha$  and  $\beta$  are zeroes of the polynomial  $x^2 - 5x + 2$ , then form a quadratic polynomial whose zeroes are  $\alpha^2$  and  $\beta^2$ .

- Q.28 Solve the following system of equations graphically :

$2x + y = 6$ ,  $2x - y - 2 = 0$ . Find the area of triangle so formed by two lines and  $x$ -axis.

- Q.29 If  $a \cos \theta + b \sin \theta = m$  and  $a \sin \theta - b \cos \theta = n$ . Prove that  $a^2 + b^2 = m^2 + n^2$ .

- Q.30 The median of the following data is 50. Find the values of  $p$  and  $q$ , if sum of all frequencies is 90.

| Marks obtained     | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
|--------------------|-------|-------|-------|-------|-------|-------|-------|
| Number of students | $p$   | 15    | 25    | 20    | $q$   | 8     | 10    |

- Q.31 Find the ratio in which the line  $x - 3y = 0$  divides the line segment joining the points  $(-2, -5)$  and  $(6, 3)$ . Find the coordinates of the point of intersection.

#### (Section - D)

Section D consists of 4 questions of 5 marks each.

- Q.32 Prove that  $\sqrt{7}$  is an irrational number. Hence show that  $3\sqrt{7} - 8$  is also an irrational number.

- Q.33 The sum of a two digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?

OR

Two people are 16 km apart on a straight road. They start walking at the same time. If they walk towards each other with different speeds, they will meet in 2 hrs. Had they walked in the same direction with same speeds as before, they would have met in 8 hrs. Find their walking speeds.

- Q.34 Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

Hence in  $\Delta PQR$ , If a line  $l$  intersects the sides  $PQ$  and  $PR$  at  $L$  and  $M$  respectively such that  $LM \parallel QR$ . If  $PL = 5.7$  cm,  $PQ = 15.2$  cm and  $MR = 5.5$  cm, then find the length of  $PM$  (in cm).

- Q.35 Prove that :  $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$

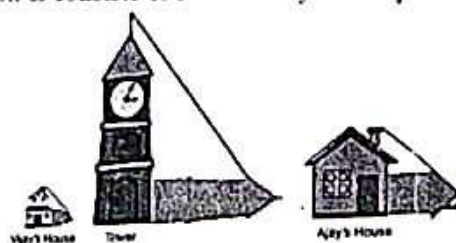
OR

Prove that :  $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$

#### (Section - E)

Section E consists of 3 case study based questions of 4 marks each.

- Q.36



Vijay is trying to find the average height of a tower near his house. He is using the properties of similar triangles. The height of Vijay's house is 20m when Vijay's house casts a shadow 10m long on the ground. At the same time, the tower casts a shadow 50 m long on the ground and the house of Ajay casts 20 m shadow on the ground.

Based on the above information, answer the following questions.

- (i) What is the height of the tower? [2]  
 (ii) What will be the length of the shadow of the tower when Vijay's house casts a shadow of 12m? [1]  
 (iii) When the tower casts a shadow of 40m, at the same time what will be the length of shadow of Ajay's house? [2]

OR

When the tower casts a shadow of 40m, at the same time what will be the length of shadow of Vijay's house?

- Q.37 Tharunya was thrilled to know that the football tournament is fixed with a monthly time frame from 20<sup>th</sup> July to 20<sup>th</sup> August 2025 and for the first time in the FIFA women's world cup's history, two nations host in 10 venues. Her father felt that the game can be better understood if the position of players is represented as points on a coordinate plane.



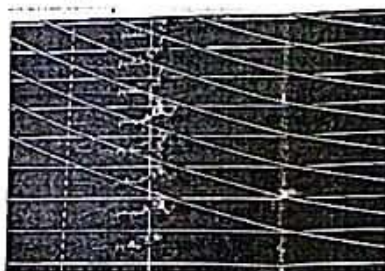
- (i) At an instance, the midfielders and forward formed a parallelogram. Find the position of central midfielder (D) if the position of other players who formed the parallelogram are : A(1, 2), B (4, 3) and C (6, 6) [1]  
 (ii) Check if the Goal Keeper G (-3, 5), sweeper H (3, 1) and wing-back K (0, 3) fall on a same straight line. [2]

OR

Check if the full-back J (5, -3) and centre-back I (-4, 6) are equidistant from forward C(0, 1)

- (iii) If defensive midfielder A (1, 4), attacking midfielder B (2, -3) and striker E (a, b) lie on the same straight line and B is equidistant from A and E, find the position of E. [1]

- Q.38 Activities like running or cycling reduce stress and risk of mental disorders like depression. Running helps build endurance. Children develop stronger bones and muscles and are less prone to gain weight. The physical education teacher of a school has decided to conduct an inter school running tournament in his school premises.



The time taken by a group of students to run 100 m, was noted as follow :

| Time (in seconds)  | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 |
|--------------------|------|-------|-------|-------|--------|
| Number of students | 8    | 10    | 13    | 6     | 3      |

Based on the above, answer the following questions :

- (i) What is the median class of the above given data? [1]  
 (ii) Find the mean time taken by the students to finish the race. [2]

OR

Find the mode of the above given data.

- (iii) How many students took time less than 60 seconds? [1]