### General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of calculators is not permitted.

### SECTION – A
Questions 1 to 20 carry 1 mark each.

1. The HCF of 52 and 130 is 
   (a) 52  
   (b) 130  
   (c) 26  
   (d) 13  
   Ans: (c) 26

2. The decimal expansion of \( \frac{63}{72 \times 175} \) is 
   (a) terminating  
   (b) non-terminating  
   (c) non-termination and repeating  
   (d) an irrational number  
   Ans: (a) terminating

3. If HCF and LCM of two numbers are 4 and 9696, then the product of the two numbers is: 
   (a) 9696  
   (b) 24242  
   (c) 38784  
   (d) 4848  
   Ans: (c) 38784

4. The number of zeroes of the polynomial \( f(x) \) from the below graph is 
   (a) 0  
   (b) 1  
   (c) 2  
   (d) none of these  
   Ans: (d) none of these

5. The zeroes of the polynomial \( x^2 + 7x + 10 \) are 
   (a) 2 and 5  
   (b) –2 and 5  
   (c) –2 and –5  
   (d) 2 and –5  
   Ans: (c) –2 and –5

6. If the origin is the mid-point of the line segment joined by the points (2,3) and (x,y), then the value of \( (x,y) \) is 
   (a) (2, –3)  
   (b) (2, 3)  
   (c) (–2, 3)  
   (d) (–2, –3)  
   Ans: (d) (–2, –3)
7. The distance of the point P(2, 3) from the x-axis is:
   (a) 2  (b) 3  (c) 1  (d) 5
   Ans: (b) 3

8. Find the length of tangent drawn to a circle with radius 7 cm from a point 25 cm away from the centre.
   (a) 24 cm  (b) 27 cm  (c) 26 cm  (d) 25 cm
   Ans: (a) 24 cm

9. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting a king of red colour
   (a) $\frac{1}{26}$  (b) $\frac{2}{13}$  (c) $\frac{1}{13}$  (d) $\frac{3}{26}$
   Ans: (a) $\frac{1}{26}$

10. The abscissa of the point of intersection of the less than type and of the more than type ogives gives its
    (a) mean  (b) median  (c) mode  (d) all three
    Ans: (b) median

11. The coordinates of the point on y-axis which is nearest to the point (–2, 5) is (0, 5)

12. The value of $9 \sec^2 A - 9 \tan^2 A$ is 9

13. If $\cos A = \frac{24}{25}$, then the value of $\sin A$ is $\frac{7}{25}$

14. The values of $k$ for quadratic equation $2x^2 + kx + 3 = 0$, so that they have two equal roots is $\pm\sqrt{6}$

   **OR**

   The value of $k$ for which the system of equations $2x + 3y = 5$ and $4x + ky = 10$ has infinite many solution is 6

15. It is given that $\triangle ABC \sim \triangle PQR$ with $\frac{BC}{QR} = \frac{1}{3}$, then $\frac{ar(\triangle ABC)}{ar(\triangle PQR)}$ is 1 : 9

16. If $\sin A = \frac{1}{2}$, find the value of $\frac{2 \sec A}{1 + \tan^2 A}$. (Ans: $\sqrt{3}$)

   **OR**

   If $\sin \theta = \cos \theta$, then find the value of $2 \tan \theta + \cos^2 \theta$
   Ans: $5/2$

17. The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the sum of the circumferences of the two circles.
   Ans: 28 cm

18. If $P(E) = 0.35$, what is the probability of ‘not E’?
   Ans: 0.65

19. In the adjoining figure, DE || BC then find the value of AD.
   Ans: 2.4 cm

20. Which term of the AP: 3, 8, 13, 18, .... is 78?
   Ans: NCERT Exercise 5.2 Q4 p-106
SECTION – B
Questions 21 to 26 carry 2 marks each.

21. A box contains cards numbered 1 to 100. A card is drawn at random from the box. Find the probability that the number on the drawn card is (i) a square number (ii) a multiple of 5
Ans: (i) \( \frac{10}{100} = \frac{1}{10} \) (ii) \( \frac{20}{100} = \frac{1}{5} \)
OR
A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is (i) red ? (ii) not red?
Ans: (i) \( \frac{3}{8} \) (ii) \( \frac{5}{8} \)

22. A die is thrown once. Find the probability of getting (i) an odd number; (ii) a number lying between 2 and 6.
Ans: (i) \( \frac{3}{6} = \frac{1}{2} \) (ii) \( \frac{3}{6} = \frac{1}{2} \)

23. Find the area of a quadrant of a circle whose circumference is 22 cm.
Ans: NCERT Exercise 12.2 Q2 p-230

24. If \( \tan 2A = \cot (A – 18^\circ) \), where 2A is an acute angle, find the value of A.
Ans: NCERT Exercise 8.3 Q3 p-189
OR
If \( \sin (A – B) = \frac{1}{2} \), \( \cos (A + B) = \frac{1}{2} \), \( 0^\circ < A + B \leq 90^\circ \), \( A > B \), find A and B.
Ans: NCERT Example 8 p-186

25. Find a quadratic polynomial, whose zeroes are –3 and 2.
Ans: Sum = –3 + 2 = –1 and
Product = –3 x 2 = –6
\( x^2 + x – 6 \)

26. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.
Ans: NCERT Exercise 10.2 Q4 p-215

SECTION – C
Questions 27 to 34 carry 3 marks each.

27. Prove that \( 5 – 2\sqrt{3} \) is an irrational number.
Ans: Let \( 5 – 2\sqrt{3} \) is a rational number such that \( 5 – 2\sqrt{3} = a \) where a is a rational number then we have
\[ 2\sqrt{3} = 5 – a \Rightarrow \sqrt{3} = \frac{5 – a}{2} \]
Since 5, 2 are integers and a is rational number, therefore \( \frac{5 – a}{2} \) is a rational number.
Thus \( \sqrt{3} \) is a rational number which contradicts the fact that \( \sqrt{3} \) is an irrational number.
Therefore our assumption is wrong.
Hence \( 5 – 2\sqrt{3} \) is an irrational number.
In a morning walk, three persons step off together. Their steps measure 80 cm, 85 cm and 90 cm respectively. What is the minimum distance each should walk so that all can cover the same distance in complete steps?

Ans: The distance covered by each one of them is required to be the same as well as minimum. The required minimum distance each should walk would be the lowest common multiple of the measures of their steps.

LCM of 80, 85 and 90 is 12240.
The required minimum distance is 12240 cm.

28. The below figure shows the arrangement of desks in a classroom. Ashima, Bharti and Camella are seated at A(3, 1), B(6, 4) and C(8, 6) respectively. Do you think they are seated in a line? Give reasons for your answer. (Ans: NCERT Example 3 p-159)

29. Find the zeroes of the quadratic polynomial \(x^2 - 2x - 8\), and verify the relationship between the zeroes and the coefficients.

Ans: NCERT Exercise 2.2 Q1(i) p-33

30. Solve \(2x + 3y = 11\) and \(2x - 4y = -24\) and hence find the value of ‘\(m\)’ for which \(y = mx + 3\).

Ans: NCERT Exercise 3.3 Q2 p-53

31. Prove that: \((\sin A + \csc A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A\)

Ans: NCERT Exercise 8.4 Q5(viii) p-194

OR

Prove that: \(\frac{1 + \sin A}{1 - \sin A} = \sec A + \tan A\).

Ans: NCERT Exercise 8.4 Q5(vi) p-194

32. Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are \(4/7\) of the corresponding sides of the first triangle.

OR

Draw a line segment of length 7.6 cm and divide it in the ratio 5 : 8. Measure the two parts.
33. Prove that the parallelogram circumscribing a circle is a rhombus.
   Ans: NCERT Exercise 10.2 Q11 p-215

34. In the below figure, ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region.
   Ans: NCERT Exercise 12.3 Q15 p-237

![Diagram of a quadrilateral with a circle circumscribing it, and a shaded region]

SECTION – D
Questions 35 to 40 carry 4 marks each.

35. Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30°, respectively. Find the height of the poles and the distances of the point from the poles.
   Ans: NCERT Exercise 9.1 Q10 p-205

36. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.
   Ans: NCERT Example 15 p-87

37. If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms.
   Ans: NCERT Exercise 5.3 Q9 p-113
   OR
   How many terms of the AP : 24, 21, 18, . . . must be taken so that their sum is 78?
   Ans: NCERT Example 13 p-110

38. Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.
   OR
   State and prove Basic proportionality theorem.

39. Water in a canal, 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed?
   Ans: NCERT Exercise 13.3 Q8 p-251
   OR
   A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.
   Ans: NCERT Exercise 13.1 Q3 p-244
40. Draw more than ogive for the following frequency distribution:

<table>
<thead>
<tr>
<th>Marks</th>
<th>0 – 10</th>
<th>10 – 20</th>
<th>20 – 30</th>
<th>30 – 40</th>
<th>40 – 50</th>
<th>50 – 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Also find the median from the graph.

**Ans:**

<table>
<thead>
<tr>
<th>Marks</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than or equal to 0</td>
<td>41</td>
</tr>
<tr>
<td>More than or equal to 10</td>
<td>36</td>
</tr>
<tr>
<td>More than or equal to 20</td>
<td>28</td>
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<tr>
<td>More than or equal to 40</td>
<td>12</td>
</tr>
<tr>
<td>More than or equal to 50</td>
<td>6</td>
</tr>
</tbody>
</table>

Draw the graph between Marks and Number of Students with the coordinates (0, 41), (10, 36), (20, 28), (30, 22), (40, 12) and (50, 6).

Median from the graph is 31.8 (approx)