1. If H.C.F. of \((x, y) = 1\), then H.C.F. of \((x - y; x + y) = \) _______.
   (A) 1 or 2  (B) \(x\) or \(y\)  (C) \(x + y\) or \(x - y\)  (D) 4

2. In Euclid’s division Lemma, for positive integers \(a\) and \(b\) the unique and \(r\) are obtained such that \(a = bq + r\) is _______.
   (A) \(0 < r < b\)  (B) \(0 \leq r \leq b\)  (C) \(0 < r \leq b\)  (D) \(0 \leq r < b\)

3. The cubic polynomial \(p(a) = a^3 - a\) has _______ zeros.
   (A) 0  (B) 1  (C) 2  (D) 3

4. If one root of equation \(x^2 + ax - 8 = 0\) is 4, then \(a = \) _______.
   (A) 2  (B) 4  (C) -2  (D) -4

5. The product of zeros of cubic polynomial \(p(x)\) is _______.
   (A) \(\text{Coefficient of } -x^2\) \over \(\text{Coefficient of } x^3\)
   (B) \(\text{Coefficient of } -x\) \over \(\text{Coefficient of } x^3\)
   (C) \(-\text{The constant Term}\) \over \(\text{Coefficient of } x^2\)
   (D) None of these

6. The diagram below shows two sticks – one BLACK and the other WHITE. Based on the measurements shown, what is the length of the white stick ?
   (A) 5 cm  (B) 8.5 cm  (C) 13.5 cm  (D) 17 cm

   22 cm

   (Figure is not to scale)

7. \(x = \) _______ is identified as GOLDEN NUMBER.
   (A) \(1 + \sqrt{5}\) \over 2  (B) 0  (C) \(1 + \sqrt{2}\) \over 2  (D) 1

8. The Discriminant value of equation \(5x^2 - 6x + 1 = 0\) is _______.
   (A) 16  (B) \(\sqrt{56}\)  (C) 4  (D) 56

9. If _______ is there, then the quadratic equation does not have real solution.
   (A) \(D = 0\)  (B) \(D > 0\)  (C) \(D < 0\)  (D) \(D \geq 0\)
10. Given below is a graph showing two lines.

![Graph Image]

Which of the following statements is true about the solution(s) of the pair of equations represented by these lines?

(A) They have a unique solution.
(B) They do not have any solution.
(C) They have infinite solutions.
(D) We cannot predict the number of solutions without knowing the algebraic form of these equations.

11. 2 years ago, the addition of ages of father–mother and their two daughters was 40 years. After 3 years the addition of their ages will be ________.

(A) 40  (B) 46  (C) 50  (D) 60

12. In a two-digit number, the digit at the tens place is 4 and the product of two numbers is 4 times greater than the tens place, then that number is ________.

(A) 42  (B) 48  (C) 44  (D) 84

13. As per the given figure, y = p(x) graph has ________ real zeros.

(A) 0  (B) 1  (C) 2  (D) 3

14. If 2k + 1, 13, 5k − 3 are three consecutive terms of A.P., then k = ________.

(A) 17  (B) 13  (C) 4  (D) 9

15. If the sequence is 1, 1, 2, 3, 5, 8, 13, 21, 34, ________.

(A) Arithmetic Progression.  (B) Finite Sequence.
(C) Fibonacci Sequence.  (D) None of the given three.

16. \(S_n = 2n^2 + 3n\); then d = ________.

(A) 13  (B) 4  (C) 9  (D) −2

17. In \(\triangle ABC\), the bisector of \(\angle A\) bisects \(BC\) at point D, then ________.

(A) \(BD \times AC = BC \times AB\)  (B) \(BD \times AB = DC \times AC\)
(C) \(AC \times AB = DC \times BC\)  (D) \(BD \times AC = DC \times AB\)
18. In \( \triangle ABC \), the measures of \( BC, CA \) and \( AB \) are in 3:4:5 proportion. Correspondence \( ABC \rightarrow PQR \) is congruence. If \( PR = 12 \), then perimeter of \( \triangle PQR \) is _______.
   (A) 12 (B) 24 (C) 27 (D) 36

19. Out of following Pythagorean triplet, _______ is not a correct triplet.
   (A) 7, 24, 25 (B) 20, 21, 29 (C) 11, 60, 61 (D) 13, 35, 37

20. In \( \triangle ABC \), \( AD \) is a median, then as per Apollonius theorem, _______ is true.
   (A) \( AB^2 + AC^2 = 2(AD^2 + BC^2) \) (B) \( AB^2 + AC^2 = 2(BD^2 + DC^2) \)
   (C) \( AB^2 + AC^2 = 2(AD^2 + DC^2) \) (D) \( AB^2 + AC^2 = 2(BD^2 + BC^2) \)

21. In Mathematics Exam, the probability of Aayushi to score 100 out of 100 is _______.
   (A) 1 (B) 0 (C) \( \frac{1}{100} \) (D) \( \frac{1}{100} \)

22. The probability in an event \( k \) is _______.
   (A) \( \geq P(k) \geq 1 \) (B) \( 0 \leq P(k) \leq 1 \) (C) \( 0 > P(k) > 1 \) (D) \( 0 < P(k) < 1 \)

23. If the dice is lifted once, then the probability of having divisible number on the dice is _______.
   (A) \( \frac{1}{3} \) (B) \( \frac{1}{6} \) (C) \( \frac{1}{2} \) (D) 1

24. \( \overline{x} - Z = 3, \overline{x} + Z = 45 \), then \( M = \) _______.
   (A) 22 (B) 23 (C) 24 (D) 26

25. Rachna had an average score of 45 from 6 tests. Her teacher dropped her lowest score, which is 30 and calculated the average of the remaining scores to decide her grade. Which of these gives her new average score?
   (A) \( \frac{45 \times 5 - 30}{5} \) (B) \( \frac{45 \times 5 - 30}{6} \)
   (C) \( \frac{45 \times 6 - 30}{5} \) (D) \( \frac{45 \times 6 - 30}{6} \)

26. In a Maths test taken by 35 students, the average score of 15 girls is 10 and that of 20 boys is also 10. Which of the following can be calculated based on the data we have?
   (A) The highest score in the class.
   (B) The lowest score among the boys in the class.
   (C) The sum of the scores of the 35 students of the whole class.
   (D) All of the above can be calculated.

27. \( \tan^2 \theta = \sin^2 \theta + \cos^2 \theta \), then \( \theta = \) _______.
   (A) 30 (B) 45 (C) 60 (D) 90

28. Which of the following pair is correct for trigonometric inter-relationship?
   (1) \( \cos \theta \) (a) \( \frac{\cos \theta}{\sin \theta} \)
   (2) \( \tan \theta \) (b) \( \frac{1}{\cot \theta} \)
   (3) \( \cot \theta \) (c) \( \frac{1}{\sec \theta} \)
   (4) \( \sin \theta \) (d) \( \frac{1}{\cosec \theta} \)
   (e) \( \sin \theta \cdot \cos \theta \)
29. \[ \tan 70^\circ \cdot \tan 30^\circ = 1; \text{ then value of } \theta = \underline{\text{ }}. \]
(A) 0  
(B) 9  
(C) 10  
(D) 18

30. When observed from top of tower, the angle of depression of two houses A and B in Eastern and Western direction is 30° and 60° respectively, then ________ .
(A) House A is nearer to tower than House B.
(B) House B in nearer to tower than House A.
(C) House A and House B are equidistant from tower
(D) None of the given three.

31. On walking for search of a ball x meters on a hill making an angle of measure 30° with the ground, one can reach the height of ‘y’ meters from the ground, then ________ .
(A) \[ x = y \]  
(B) \[ x = 2y \]  
(C) \[ 2x = \sqrt{3}y \]  
(D) \[ 2x = y \]

32. The length of minor arc \( \overline{AB} \) of Circle is \( \frac{1}{4} \) of its circumference, then the angle subtended by the minor arc \( \overline{AB} \) will be ________ .
(A) 30°  
(B) 45°  
(C) 90°  
(D) 60°

33. The length of minute hand of a Clock is 14 cm. If minute hand moves from 1 to 10 on the dial, then ________ cm² area will be covered.
(A) 462  
(B) 154  
(C) 308  
(D) 616

34. If the radius of Circle is increased by 10%, then the corresponding area of new circle will be ________ . \( (\pi = 3.14) \)
(A) 121 \( \pi r^2 \)  
(B) 121.1 \( \pi r^2 \)  
(C) 1.21 \( \pi r^2 \)  
(D) None of the given three.

35. The maximum area of inscribed triangle in a semi–circle having radius 10 cm is ________ m².
(A) 10  
(B) 50  
(C) 100  
(D) 200

36. If the area of a circle is 38.5 m², then its circumference will be ________ .
(A) 22  
(B) 2.2  
(C) 38.5  
(D) 3.85

37. □ ABCD is a Rhombus. If it is inscribed in \( O(O, r) \), then □ ABCD is ________ .
(A) Square  
(B) Rectangle  
(C) Trapezium  
(D) None of these

38. In \( \triangle ABC \), \( \angle B = 90^\circ \), \( AB = 4 \) and \( BC = 3 \), then the radius of circle touching all three sides of triangle will be ________ .
(A) 1  
(B) 2  
(C) 3  
(D) 4

39. One Circle touches all sides of □ ABCD. If \( AB = 5 \), \( BC = \) ? \( CD = 6 \); then \( AD = \) ________ .
(A) 3  
(B) 7  
(C) 4  
(D) 9

40. Point P is on the outer side of Circle \( O(O, 15) \). The tangent drawn from point P touches the circle at T. If PT = 8; then OP = ________ .
(A) 7  
(B) 13  
(C) 17  
(D) 23
41. The cubic (cubical) volume of Hemisphere having 1 cm diameter will be ______ cm$^3$.

(A) $\frac{\pi}{6}$  (B) $\frac{\pi}{12}$  (C) $\frac{2\pi}{3}$  (D) $\frac{4\pi}{3}$

42. If the frustum of a Cone is having 6 cm height and radius 5 cm and 9 cm respectively; then its cubical volume will be ______ cm$^3$.

(A) $320\pi$  (B) $151\pi$  (C) $302\pi$  (D) $98\pi$

43. The formula for finding the total surface area of a Cylinder having cone shaped lid at both the ends, will be ______.

(A) $\pi r(l + 2r)$  (B) $\pi r(2h + r)$  (C) $2\pi r(h + l)$  (D) $2\pi r(h + 2r)$

44. 1 meter$^2$ = ______ cm$^3$.

(A) 1  (B) $10^2$  (C) $10^3$  (D) $10^6$

45. The two triangles in the figure are congruent using congruence theorem. Here, it is given OQ = OR. Which of these conditions along with the given condition is sufficient to prove that the two triangles are congruent to each other?

(A) $\angle P = \angle S$  (B) $\angle Q = \angle R$

(C) OP = OS  (D) PQ = SR

46. In $\triangle PQR$, $\frac{PQ}{1} = \frac{PR}{2} = \frac{QR}{\sqrt{3}}$, then $m\angle R = ______$.

(A) $90^\circ$  (B) $60^\circ$  (C) $45^\circ$  (D) $30^\circ$

47. From P(-3, 2) the feet of perpendicular drawn on Y-axis is M. Then the co-ordinate of M is ______.

(A) (3, 0)  (B) (0, 2)  (C) $\left(\frac{3}{2}, -1\right)$  (D) (-3, 2)

48. The difference of P(a, b) from point of origin is ______.

(A) $a^2 + b^2$  (B) $|a - b|$  (C) $|a + b|$  (D) $\sqrt{a^2 + b^2}$

49. Which of the following group is true for $\square$ ABCD?

(1) $\square$ ABCD is Rhombus  (a) $\overline{AC}$ and $\overline{BD}$ bisects

(2) $\square$ ABCD is Parallelogram  (b) $\overline{AC}$ and $\overline{BD}$ bisects at right angle

(3) $\square$ ABCD is Rectangle.  (c) $\overline{AC}$ and $\overline{BD}$ are congruent and bisects at right angle

(4) $\square$ ABCD is Square  (d) $\overline{AC}$ and $\overline{BD}$ are congruent and bisects.

(A) 1-d, 2-a, 3-d, 4-c  (B) 1-c, 2-d, 3-a, 4-b

(C) 1-b, 2-a, 3-d, 4-c  (D) 1-b, 2-c, 3-d, 4-a
Answer the following questions by doing the calculations in brief.
(Each question carries 2 marks).

1. Find the square root: \( 14 + 6\sqrt{5} \).

2. Find the Quadratic equation, whose addition of zeros is \(-\frac{7}{3}\) and multiplication is \(\frac{4}{3}\).

3. In an Arithmetic Progression \( T_7 = 18 \) and \( T_{18} = 7 \), obtain \( T_{25} \).

OR

3. Addition of which term of Arithmetic Progression 2, 7, 12, 17, ... will be 990?

4. In \( \triangle PQR \), \( m\angle Q = 90 \) and \( QM \) is an altitude; \( M \in PR \). If \( QM = 12 \), \( PR = 26 \); then find \( PM \) and \( RM \). If \( PM < RM \); then find \( PQ \) and \( QR \).

5. Two concentric circles having radii 73 and 55 are given. The chord of circle having greater (larger) radius touches the small circle. Then find the length of this chord.

6. Find the area of triangle \( \triangle ABC \) having vertices \( A(4, 2) \), \( B(3, 9) \) and \( C(10, 10) \).

OR

Find the co-ordinates of points which divide the line segment joining \( A(-2, 5) \) and \( B(5, -1) \) into three congruent segments (Such points are called the points of trisection of segment).

7. In a Hostel, one day reading hours of 20 students was observed, whose result is mentioned in the table below. From the table, find the Mode.

<table>
<thead>
<tr>
<th>No. of Reading Hours</th>
<th>1-3</th>
<th>3-5</th>
<th>5-7</th>
<th>7-9</th>
<th>9-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student's strength in Hostel</td>
<td>7</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

8. A card is selected at random from well-shuffled pack of 52 cards. Find the probability that the selected card is
   (1) black coloured queen.
   (2) not a king.

Answer the following questions from No. 9 to 12 with calculations.
(Each question is of 3 marks).

9. Prove \( (\sin\theta + \cosec\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot\theta \).
9. Find the value of \( \frac{\csc 38}{\sec 52} + \frac{2}{\sqrt{3}} \) \( \tan 38 \cdot \tan 60 \cdot \tan 52 - 3 \) \((\sin^2 32 + \sin^2 58)\)

10. The chord of Circle of 84 cm diameter subtends an angle of 60° at the centre of a Circle. Find the area of minor segment corresponding to the chord. (Take \( \sqrt{3} = 1.73 \))

11. Find the solution of pair of equation

\[
\frac{5}{2x} + \frac{2}{3y} = 7 ; \frac{3}{x} + \frac{2}{y} = 12 \text{ (} x \neq 0; y \neq 0 \text{)}
\]

12. Find the median of the following Frequency Distribution.

<table>
<thead>
<tr>
<th>Class</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8</td>
<td>9</td>
</tr>
<tr>
<td>8-12</td>
<td>16</td>
</tr>
<tr>
<td>12-16</td>
<td>12</td>
</tr>
<tr>
<td>16-20</td>
<td>7</td>
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<td>20-24</td>
<td>15</td>
</tr>
<tr>
<td>24-28</td>
<td>1</td>
</tr>
</tbody>
</table>

SECTION-C

Answer the following questions from No. 13 to 15, as directed calculations. (Each question is of 4 marks).

13. On Hemisphere, frustum of a Cone shaped shuttle-cock is used for playing Badminton. The outer radius of frustum of cone is 5 cm and inner radius is 2 cm. The height of entire shuttle-cock is 7 cm. Then find the outer surface area of shuttle-cock.

14. A jet plane is at a vertical height of \( h \). The angles of depression of two tanks on the horizontal ground are have measures \( \alpha \) and \( \beta \) \((\alpha > \beta)\). Prove that the distance between the tanks is \( \frac{h (\tan \alpha - \tan \beta)}{\tan \alpha - \tan \beta} \).

15. The petrol rate is increased by Rs. 5/- per litre. Now in Rs. 1320/-, 2 litres less petrol is obtained as compared to previous rate. Find the increase in rate of petrol per litre.

OR

15. Kailash's age at present is 2 years less than 6 times the age of his daughter Prerna. The product of their ages 5 years later will be 330. What was the age of Kailash when his daughter Prerna was born?

SECTION-D

Answer the following questions from No. 16 to 17. (Each question carries 5 marks).

16. Draw \( \overline{PQ} \), where \( PQ = 10 \text{ cm} \). Draw circle \( \Theta(P, 4) \) and \( \Theta(Q, 3) \). Draw tangent to each circle from centre of other circle. Write points of construction.

OR

16. Draw \( \triangle ABC \), where \( m \angle ABC = 90; BC = 4 \text{ cm and AC} = 5 \text{ cm} \) and then construct \( \triangle BXY \) with \( \frac{4}{3} \) scale factor. Write points of construction.

17. Write converse of Pythagoras Theorem and prove it.