### BLUE PRINT : CLASS X

<table>
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<tr>
<th>Unit</th>
<th>Chapter</th>
<th>MCQ (1 mark)</th>
<th>FIB (1 mark)</th>
<th>VSA (1 mark)</th>
<th>SA-I (2 marks)</th>
<th>SA-II (3 marks)</th>
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**Note:** * - Internal Choice Questions and Yellow shaded with ** - PISA type questions
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 smallest composite number and the smallest prime number is
   (a) 0  (b) 1  (c) 2  (d) 3

2. Given that HCF(1152, 1664) = 128 the LCM(1152, 1664) is
   (a) 14976  (b) 1664  (c) 1152  (d) none of these

3. Which one of the following rational number is a non-terminating decimal expansion:
   (a) \(\frac{33}{50}\)  (b) \(\frac{66}{180}\)  (c) \(\frac{6}{15}\)  (d) \(\frac{41}{1000}\)

4. A cubic polynomial can have at most ……. zeroes.
   (a) 0  (b) 1  (c) 2  (d) 3

5. Which are the zeroes of \(p(x) = x^2 – 1:\)
   (a) 1, –1  (b) –1, 2  (c) –2, 2  (d) –3, 3

6. If P(–1, 1) is the middle point of the line segment joining A(–3, b) and B(1, b + 4) then the value of b is
   (a) 1  (b) –1  (c) 2  (d) 0

7. y–axis divides the join of P(–4, 2) and Q(8, 3) in the ratio
   (a) 3 : 1  (b) 1 : 3  (c) 2 : 1  (d) 1 : 2

8. For the following distribution

<table>
<thead>
<tr>
<th>Marks</th>
<th>Number of students</th>
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<tbody>
<tr>
<td>Below 10</td>
<td>3</td>
</tr>
<tr>
<td>Below 20</td>
<td>12</td>
</tr>
<tr>
<td>Below 30</td>
<td>27</td>
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<td>Below 40</td>
<td>57</td>
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<tr>
<td>Below 50</td>
<td>75</td>
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<tr>
<td>Below 60</td>
<td>80</td>
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</table>

the modal class is
   (a) 10 – 20  (b) 20 – 30  (c) 30 – 40  (d) 40 – 50
9. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.
   (a) 4 cm (b) 3 cm (c) 6 cm (d) 5 cm

10. A coin is flipped to decide which team starts the game. What is the probability of your team will start?
   (a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

11. If the points A(−3, 12), B(7, 6) and C(x, 9) are collinear, then the value of x is _____

12. The value of $\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ$ is _____

13. If $\triangle ABC$ is right angled at C, then the value of $\cos(A + B)$ is_____

14. 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 equal to _____

15. The values of k for which the quadratic equation $kx(x − 3) + 9 = 0$ has real equal roots is _____.
   OR
   The value of k for which the system of equations $kx − y = 2$ and $6x − 2y = 3$ has a unique solution is

16. If $\cos \theta = \frac{1}{2}$, $\sin \phi = \frac{1}{2}$ then find the value of $\theta + \phi$.
   OR
   Express $\cot 85^\circ + \cos 75^\circ$ in terms of trigonometric ratios of angles between 0° and 45°.

17. How many two-digit numbers are divisible by 3?

18. Find the area of a sector of a circle with radius 6 cm if angle of the sector is 60°.

19. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting a red face card.

20. If a ladder 10 m long reaches a window 8 m above the ground, then find the distance of the foot of the ladder from the base of the wall.

SECTION – B

Questions 21 to 26 carry 2 marks each.

21. 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) black? (ii) not black?
   OR
   A piggy bank contains hundred 50p coins, fifty Re 1 coins, twenty Rs 2 coins and ten Rs 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin (i) will be a 50 p coin? (ii) will not be a Rs 5 coin?

22. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 13? (ii) less than or equal to 12?

23. Find the area of a quadrant of a circle whose circumference is 66 cm.
24. If \( \tan 2A = \cot (A - 18^\circ) \), where \( 2A \) is an acute angle, find the value of \( A \).

OR

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

25. Find a quadratic polynomial with the given numbers as the sum and product of its zeroes respectively: 4, 1

26. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

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

27. Prove that \( \sqrt{5} \) is an irrational number.

OR

Three tankers contain 403 litres, 434 litres and 465 litres of diesel respectively. Find the maximum capacity of a container that can measure the diesel of the three containers exact number of times.

28. Find the zeroes of the quadratic polynomial \( 3x^2 - x - 4 \), and verify the relationship between the zeroes and the coefficients.

29. Draw the graphs of the equations \( 5x - y = 5 \) and \( 3x - y = 3 \). Determine the co-ordinates of the vertices of the triangle formed by these lines and the y axis.

30. Express the ratios \( \cos A, \tan A \) and \( \sec A \) in terms of \( \sin A \).

OR

Prove that: \( \cot A - \cos A = \frac{\cos ec A - 1}{\cot A + \cos A} \).

31. Draw a line segment of length 8 cm and divide it in the ratio 4 : 3. Measure the two parts.

OR

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

32. In the below figure, \( XY \) and \( X'Y' \) are two parallel tangents to a circle with centre \( O \) and another tangent \( AB \) with point of contact \( C \) intersecting \( XY \) at \( A \) and \( X'Y' \) at \( B \). Prove that \( \angle AOB = 90^\circ \).
33. 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.

34. In a classroom, four friends are seated at the points A, B, C and D as shown in below figure. Aditya and Anish walk into the class and after observing for a few minutes Aditya asks Amish, “Don’t you think ABCD is a parallelogram?” Anish disagrees. Using distance formula, find which of them is correct.

35. As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.

SECTION – D
Questions 35 to 40 carry 4 marks each.
36. The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

37. Find the sum of first 51 terms of an AP whose second and third terms are 14 and 18 respectively.

OR

If the sum of the first n terms of an AP is \(4n - n^2\), what is the first term (that is \(S1\))? What is the sum of first two terms? What is the second term? Similarly, find the 3rd, the 10th and the nth terms.

38. Prove that "The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides."

OR

State and prove Pythagoras theorem.

39. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs 500 per m². (Note that the base of the tent will not be covered with canvas.)

OR

Rachel, an engineering student, was asked to make a model shaped like a cylinder with two cones attached at its two ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model that Rachel made. (Assume the outer and inner dimensions of the model to be nearly the same.)

40. From the following data, draw the more than cumulative frequency curve and determine the median from the graph.

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<th>Frequency</th>
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