### 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>
<th>LA (4 marks)</th>
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| **Note:** * - Internal Choice Questions and Yellow shaded with ** - PISA type questions
1. HCF of 96 and 404 is
   (a) 9696    (b) 4    (c) 36    (d) none of these

2. The product of a non-zero rational and an irrational number is
   (a) always irrational    (b) always rational
   (c) rational or irrational    (d) one

3. A number when divided by 61 gives 27 quotient and 32 as remainder is
   (a) 1679    (b) 1664    (c) 1449    (d) none of these

4. If the sum of the zeroes of the polynomial \( f(x) = 2x^3 - 3kx^2 + 4x - 5 \) is 6, then value of \( k \) is
   (a) 2    (b) 4    (c) -2    (d) -4

5. The zeroes of a polynomial \( p(x) \) are precisely the \( x \)-coordinates of the points, where the graph of
   \( y = p(x) \) intersects the
   (a) \( x \)-axis    (b) \( y \)-axis    (c) origin    (d) none of the above

6. The point P(1, 2) divides the join of A(−2, 1) and B(7, 4) are in the ratio of
   (a) 3 : 2    (b) 2 : 3    (c) 2 : 1    (d) 1 : 2

7. The distance of the point P(-6, 8) from the origin is:
   (a) 8    (b) 27    (c) 10    (d) 6

8. In the formula \( \bar{x} = a + \left( \frac{\sum f_i u_i}{\sum f_i} \times h \right) \), finding the mean of the grouped data, \( u_i = \)
   (a) \( \frac{x_i + a}{h} \)    (b) \( \frac{x_i - a}{h} \)    (c) \( \frac{a - x_i}{h} \)    (d) \( h(x_i - a) \)

9. Cards are marked with numbers 1 to 25 are placed in the box and mixed thoroughly. What is the probability of getting a number greater than 25?
   (a) 1    (b) 0    (c) \( \frac{1}{5} \)    (d) \( \frac{2}{5} \)
10. The common point of a tangent to a circle with the circle is called
   (a) centre   (b) point of contact   (c) end point   (d) none of these.

11. If A and B are the points (−6, 7) and (−1, −5) respectively then the distance AB is ______

12. If A + B = 90°, cot B = \( \frac{3}{4} \) then tanA is equal to ______

13. Maximum value of \( \frac{1}{\cos \theta} \), \( 0^\circ < \theta < 90^\circ \) is ______

14. \( \triangle ABC \sim \triangle DEF \) and their areas be, respectively, 64 cm\(^2\) and 121 cm\(^2\). If EF = 15.4 cm, then the value of BC is ______

15. The nature of the roots of the quadratic equation \( 2x^2 − 3x + 5 = 0 \) is ______

   OR

16. What is the perimeter of a sector of angle 45° of a circle with radius 7 cm?

17. A game of chance consists of spinning an arrow which comes to rest pointing at one of the
   numbers 1, 2, 3, 4, 5, 6, 7, 8, and these are equally likely outcomes. What is the probability that
   it will point at a number greater than 2?

18. Check whether 301 is a term of the list of numbers 5, 11, 17, 23, . . .

19. If \( \sin 3A = \cos (A − 26^\circ) \), where 3A is an acute angle, find the value of A.

   OR

20. In figure, DE \parallel BC in \( \triangle ABC \) such that BC = 8 cm, AB = 6 cm and DA = 1.5 cm. Find DE.

   \[ \text{SECTION – B} \]

   Questions 21 to 26 carry 2 marks each.

21. Two dice are thrown simultaneously. What is the probability that 5 will not come up on either of
   them?

   OR

   A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that
   the card drawn is a king or a jack

22. A box contains 19 balls bearing numbers 1, 2, 3, ......19. A ball is drawn at random from the box. What is the probability that the number on the ball is a prime number?
23. The perimeter of a sector of a circle of radius 5.2 cm is 16.4 cm. Find the area of the sector.

24. Evaluate: \[ \frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ} \]

OR

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 \( B \).

25. Find a quadratic polynomial, whose zeroes are –6 and 5.

26. In figure, common tangents \( AB \) and \( CD \) to the two circles with centres \( O_1 \) and \( O_2 \) intersect at \( E \). Prove that \( AB = CD \).

\[ \text{SECTION – C} \]

Questions 27 to 34 carry 3 marks each.

27. Prove that \( \sqrt{3} \) is an irrational number.

OR

In a seminar the number of participants in Mathematics, Physics and Biology are 336, 240 and 96. Find the minimum number of rooms required if in each room same number of participants is to be seated and all of them being in the same subject.

28. Find the zeroes of \( p(x) = 4x^2 + 24x + 36 \) quadratic polynomials and verify the relationship between the zeroes and their coefficients.

29. Solve the following system of equations graphically: \( 3x - 5y + 1 = 0 \), \( 2x - y + 3 = 0 \). Also find the points where the lines represented by the given equations intersect the x-axis.

30. Prove that: \( \frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \cos \theta \cot \theta \)

OR

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

31. Draw a triangle \( ABC \) with side \( BC = 6 \) cm, \( AB = 5 \) cm and \( \angle ABC = 60^\circ \). Then construct a triangle whose sides are 3/4 of the corresponding sides of the triangle \( ABC \).

OR

Draw a line segment of length 10 cm and divide it in the ratio 3 : 5. Measure the two parts.

32. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.
33. From each corner of a square of side 4 cm a quadrant of a circle of radius 1 cm is cut and also a circle of diameter 2 cm is cut as shown in below figure. Find the area of the remaining portion of the square.

![Diagram of square with circles cut out]

34. The below figure shows the arrangement of desks in a classroom. Ashima, Bharti and Camella are seated at A, B and C respectively. Find the coordinate of their positions and also find in which type of triangle they are seated?

![Graph paper with desks marked A, B, C]

SECTION – D

Questions 35 to 40 carry 4 marks each.

35. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

36. An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11 km/h more than that of the passenger train, find the average speed of the two trains.
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.

OR

Find the sum of all three-digit numbers which are divisible by 7.

38. 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”.

OR

Prove that “In a triangle, if the square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle.

39. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in below figure. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article.

OR

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?

40. For the following distribution, draw the cumulative frequency curve less than type and hence obtain the median from the graph.

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<th>Below 40</th>
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<th>Below 60</th>
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