## BLUE PRINT : CLASS X

<table>
<thead>
<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
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. If the HCF of 65 and 117 is expressible in the form $65m – 117$, then the value of $m$ is
   (a) 4        (b) 2        (c) 1        (d) 3

2. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is
   (a) 13        (b) 65        (c) 875        (d) 1750

3. If the mid-point of the line segment joining the points $P(6, b – 2)$ and $Q(-2, 4)$ is $(2, –3)$, find the value of $b$.
   (a) 8        (b) –8        (c) –1        (d) none of these

4. If $19x – 17y = 55$ and $17x – 19y = 53$, then the value of $x – y$ is:
   (a) $\frac{1}{3}$    (b) $–3$    (c) 3    (d) 5

5. The value of $\sin^2 60^\circ + 2\tan 45^\circ – \cos^2 30^\circ$ is
   (a) 1    (b) 2    (c) $–1$    (d) none of these

6. If $\tan A = \frac{5}{12}$, find the value of $(\sin A + \cos A) \cdot \sec A$.
   (a) $\frac{7}{12}$    (b) $\frac{17}{12}$    (c) $\frac{5}{12}$    (d) none of these

7. If $\cot 2\theta = \tan 4\theta$, where $2\theta$ and $4\theta$ are acute angles, find the value of $\sin 3\theta$.
   (a) $\sqrt{2}$    (b) $\frac{1}{\sqrt{2}}$    (c) $\frac{\sqrt{3}}{2}$    (d) none of these

8. AOABC is a rectangle whose three vertices are vertices $A (0, 3), O (0, 0)$ and $B (5, 0)$. The length of its diagonal is
   (a) 5    (b) 3    (c) $\sqrt{34}$    (d) 4

9. The area of a triangle with vertices $A (3, 0), B (7, 0)$ and $C (8, 4)$ is
   (a) 14    (b) 28    (c) 8    (d) 6
10. The median class of the following data is:

<table>
<thead>
<tr>
<th>Marks</th>
<th>Below 10</th>
<th>Below 20</th>
<th>Below 30</th>
<th>Below 40</th>
<th>Below 50</th>
<th>Below 60</th>
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<tr>
<td>No. of students</td>
<td>4</td>
<td>10</td>
<td>18</td>
<td>28</td>
<td>40</td>
<td>70</td>
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</table>

(a) 20 – 30  (b) 30 – 40  (c) 40 – 50  (d) 50 – 60

11. The 11th term of the AP: −5, −\(\frac{5}{2}\), 0, \(\frac{5}{2}\), ... is _____

12. A vertical pole of length 20 m casts a shadow 10 m long on the ground and at the same time a tower casts a shadow 50 m long, then the height of the tower is _____

13. Rasheed got a playing top (lattu) as his birthday present, which surprisingly had no colour on it. He wanted to colour it with his crayons (See below figure). The top is shaped like a cone surmounted by a hemisphere of radius 'r'. The total surface area of the top is ________

14. If the sum of the zeroes of the quadratic polynomial \(ky^2 + 2y – 3k\) is equal to twice their product, then the value of \(k\) is ________ OR

If the roots of quadratic equation \(ax^2 + bx + c = 0\) are equal in magnitude but opposite in sign then the value of \(b\) is ________.

15. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is ________.

16. Find the 9th term from the end (towards the first term) of the A.P. 5, 9, 13, ...., 185.

17. At one end A of a diameter AB of a circle of radius 5 cm, tangent XAY is drawn to the circle. Find the length of the chord CD parallel to XY and at a distance 8 cm from A . OR

In below figure, AT is a tangent to the circle with centre O such that OT = 4 cm and \(\angle OTA = 30^\circ\). Then find AT

18. If \(\alpha, \beta\) are the roots of the quadratic equation \(x^2 – p(x + 1) – c = 0\), then find the value of \((\alpha + 1)(\beta + 1)\)
19. Find the HCF of 96 and 404 by the prime factorisation method.

20. ABC and BDE are two equilateral triangles such that D is the midpoint of BC. Find the ratio of the areas of triangles ABC and BDE.

**SECTION – B**
Questions 21 to 26 carry 2 marks each.

21. Raj is an electrician in a village. One day power was not there in entire village and villagers called Raj to repair the fault. After thorough inspection he found an electric fault in one of the electric pole of height 5 m and he has to repair it. He needs to reach a point 1.3m below the top of the pole to undertake the repair work. What should be the length of the ladder that she should use which, when inclined at an angle of α such that \( \cot \alpha = \tan(210^\circ - 3\alpha) \) to the horizontal, would enable his to reach the required position? Also, how far from the foot of the pole should he place the foot of the ladder? (Use \( \sqrt{3} = 1.73 \))

22. An ice cream cone full of ice cream having radius 5 cm and height 10 cm as shown in the below figure. Calculate the volume of ice cream, provided that its 1/6 part is left unfilled with ice cream.

23. Cards marked with number 3, 4, 5, ...., 50 are placed in a box and mixed thoroughly. A card is drawn at random form the box. Find the probability that the selected card bears (i) a perfect square number (ii) a number divisible by 5

OR

In a single throw of a pair of different dice, what is the probability of getting (i) a prime number on each dice? (ii) a total of 9 or 11?
24. The first term, common difference and last term of an AP are 12, 6 and 252 respectively. Find the sum of all terms of this AP.

25. In the below figure, O is the centre of a circle of radius 5 cm. T is a point such that OT = 13 cm and OT intersects circle at E. If AB is a tangent to the circle at E, find the length of AB, where TP and TQ are two tangents to the circle.

26. If three or more parallel lines are intersected by two transversals, prove that the intercepts made by them on the transversal are proportional.

OR

In the figure, AP = 3 cm, AR = 4.5 cm, AQ = 6 cm, AB = 5 cm and AC = 10 cm. Find the length of AD.

SECTION – C

Questions 27 to 34 carry 3 marks each.

27. Prove that one and only one out of \(n\), \(n + 2\) and \(n + 4\) is divisible by 3, where \(n\) is any positive integer.

OR

If the HCF of 65 and 117 can be written as \((65m + 117n)\), find the value of \(m\) and \(n\).

28. If \(\alpha\) and \(\beta\) are the zeroes of the quadratic polynomial \(f(x) = 2x^2 - 5x + 7\), then find a quadratic polynomial whose zeroes are \(2\alpha + 3\beta\) and \(2\beta + 3\alpha\).

29. If the sum of first 7 terms of an A.P. is 49 and that of its first 17 terms is 289, find the sum of first \(n\) terms of the A.P.

30. The present age of a woman is 3 years more than three times the age of her daughter. Three years hence, the woman’s age will be 10 years more than twice the age of her daughter. Find their present ages.

OR

Solve the following system of equations: \(\frac{x}{a} - \frac{y}{b} = 0\) and \(ax + by = a^2 + b^2\).

31. Mohan collected the details of weekly pocket money received by students of his class. The total number of students is 44. After collecting the data, he analyzed the data and prepared a report.
on the weekly pocket money received by students of his class. Using this report, he drew the following graph for a particular of weekly pocket money received by students of his class:

Based on the above graph, answer the following questions:
(i) Identify less than type ogive and more than type ogive from the given graph.
(ii) Find the median weekly pocket money received by students.
(iii) Obtain the Mode of the data if mean weekly pocket money is 86.5 cm

32. To raise social awareness about the hazards of smoking a school decided to start “No smoking campaign”. A student is asked to prepare a campaign banner in the shape of a triangle shown in the figure. If cost of 1 cm² of banner is 2 (a) find the cost of the banner and (b) which value is depicted in the question?

33. In the below figure, ABCD is a square of side 14 cm. Semi-circles are drawn with each side of square as diameter. Find the area of the shaded region.
34. Evaluate: \[
\frac{\sec 0 \cos ec(90^0 - 0) - \tan 0 \cot(90^0 - 0) + (\sin^2 35^0 + \sin^2 55^0)}{\tan 10^0 \tan 20^0 \tan 45^0 \tan 70^0 \tan 80^0}
\]

OR

If \(a^2 \sec^2 \theta - b^2 \tan^2 \theta = c^2\), prove that \(\sin^2 \theta = \frac{c^2 - a^2}{c^2 - b^2}\)

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

35. A well of diameter 4 m is dug 21 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 3 m to form an embankment. Find the height of the embankment.

OR

A bucket open at the top is in the form of a frustum of a cone with a capacity of 12308.8 cm³. The radii of the top and bottom circular ends are 20 cm and 12 cm, respectively. Find the height of the bucket and the area of metal sheet used in making the bucket. (use \(\pi = 3.14\))

36. A bird is sitting on the top of a 80 m high tree. From a point on the ground, the angle of elevation of the bird is 45°. The bird flies away horizontally in such a way that it remained at a constant height from the ground. After 2 seconds, the angle of elevation of the bird from the same point is 30°. Find the speed of flying of the bird. (Take \(\sqrt{3} =1.732\)).

37. Draw a triangle ABC with side BC = 7 cm, \(\angle B = 45^0\), \(\angle A = 105^0\). Then, construct a triangle whose sides are \(7/4\) times the corresponding sides of Δ ABC.

OR

Draw two concentric circles of radii 3 cm and 5 cm. Construct a tangent to smaller circle from a point on the larger circle. Also measure its length.

38. A passenger, while boarding the plane, slipped from the stairs and got hurt. The pilot took the passenger in the emergency clinic at the airport for treatment. Due to this, the plane got delayed by half an hour. To reach the destination 1500 km away in time, so that the passengers could catch the connecting flight, the speed of the plane was increased by 250 km/hour than the usual speed. Find the usual speed of the plane.

OR

A thief runs with a uniform speed of 100 m/minute. After one minute, a policeman runs after the thief to catch him. He goes with a speed of 100 m/minute in the first minute and increases his speed by 10 m/minute every succeeding minute. After how many minutes the policeman will catch the thief.

39. 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.

40. Draw more than ogive for the following frequency distribution:

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<th>155-160</th>
<th>160-165</th>
<th>165-170</th>
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<td>10</td>
<td>9</td>
<td>15</td>
<td>10</td>
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</table>

Also find the median from the graph.