**BLUE PRINT 2019-2020**

**MATHEMATICS- Standard Paper -III**

**CLASS:-X**

**Time Allowed: 03Hours Maximum Marks: 80**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Topic/Unit** | **Section -A** | **Section -B** | **Section –C** | **Section -D** | **Total** |
| Number System | 1(1) | 2(1) | 3(1) | - | 06(3) |
| Algebra | 4(4) | 2(1) | 6(2) | 8(2) | 20(9) |
| Co-Geometry | 2(2) |  |  | 4(1) | 06(3) |
| Geometry | 4(4) | 4(2) | 3(1) | 4(1) | 15(8) |
| Trigonometry | 2(2) | - | 6(2) | 4(1) | 12(5) |
| Mensuration | 3(3) | - | 3(1) | 4(1) | 10(5) |
| Statistics & Probability | 4(4) | 4(2) | 3(1) |  | 11(7) |
| **Total** | **20(20)** | **12(6)** | **24(8)** | **24(6)** | **80(40)** |

**Note**: Number of questions are given within brackets and marks outside the brackets

**CLASS X (MATHEMATICS) STANDARD PAPER-III**

**Time : 3 Hours Maximum Marks : 80**

**General Instructions:**

1. **All questions are compulsory.**
2. **The question paper consists of 40 questions divided into four sections A, B, C and D.**
3. **Section A contains 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.**
4. **There is no overall choice. However, an internal choices have 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.**
5. **Use of calculators is not permitted.**

**SECTION – A**

**(1 mark each)**

**Questions 01 to 10 are multiple choice questions. Select the most appropriate answer from the given options.**

Q1.The least number which is a perfect square and is divisible by each of 16, 20 and 24 is…….

 (a) 240 (b) 1600 (c) 2400 (d) 3600

Q2. If the sum of the zeroes of the polynomial f (x)= 2x3+ 3kx + 4x - 5 is 6, then the value of k is

 (a) 2 (b) 2 (c) 4 (d) -4

Q3. x and y are 2 different digits. If the sum of the two digit numbers formed by using both the digits is a perfect square, then value of x + y is ………….

1. 10 (b) 11 (c) 12 (d) 13

Q4. The real roots of the equation x 2/3 +x 1/3 −2 =0 are

 (a) 1, 8 (b) -1-, 8 (c) -1, 8 (d) 1, -8

Q5. In an AP, if a= 3.5 , d = 0 and n= 101 , then an will be

1. 0 (b) 3.5 (c) 103.5 (d) 104.5

Q6. The area of the triangle whose vertices are (1,-1),(-4,6) and (-3,-5) is

1. 24 sq units (b) 48 sq units (c) 20 sq units (d)12 sq units

Q7. The ratio of the length of a rod and its shadow is 1:3 then the angle of elevation of the sun is

1. 900 (b) 450 (c) 300  (d) 750

Q8. A sphere is melted and half of the melted liquid is used to form 11 identical cubes, whereas the

 remaining half is used to form 7 identical smaller spheres. The ratio of the side of the cube to

 the radius of the new small sphere is

 (a) ($ \frac{4}{3}$ )1/3 (b) ($ \frac{8}{3}$ )1/3 (c) (3)1/3 (d) 2

Q9. If the mean of the observation x, x+3, x + 5, x+7 and x+ 10 is 9, the mean of the last three

 observation is

1. 10$\frac{1}{3}$ (b) 10$\frac{2}{3}$ (c) 11$\frac{1}{3}$ (d) 11$\frac{2}{3}$

Q10. If in a lottery, there are 5 prizes and 20 blanks, then the probability of getting a prize is

 (a) $\frac{2}{5}$ (b) $\frac{4}{5}$ (c) $\frac{1}{5}$ (d) 1

**(Q.11-Q.15) Fill in the blanks.**

Q11. Two ﬁgures having the same shape and size are said to be ...........

Q12. Points (3, 2), (-2,-3) and (2, 3) form a .......... triangle.

 **OR**

 The distance of the point (x1,y1) from the origin is ..........

Q13. Sin2(900) +sin2(900-θ) = ..........

Q14. The tangent to a circle is .......... to the radius through the point of contact.

Q15. A curve made by moving one point at a ﬁxed distance from another is called ..........

**(Q.16-Q.20) Answer the following**

Q16. If the angles of elevation of the top of a tower from two points distant a and b (a> b) from its foot and in the same straight line from it are respectively 300 and 600, then ﬁnd the height of the tower.

Q17. The diameter of a wheel is 1.26 m. What the distance covered in 500 revolutions.

Q18. The slant height of a bucket is 26 cm. The diameter of upper and lower circular ends are 36 cm and 16 cm. Find the height of the bucket.

 **OR**

 A cylinder and a cone have base radii 5 cm and 3 cm respectively and their respective heights are 4 cm and 8 cm. Find the ratio of their volumes.

Q19. Consider the following distribution :

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Marks Obtained | 0 or more | 10 or more | 20 or more | 30 or more | 40 or more | 50 or more |
| Number of students | 63 | 52 | 55 | 51 | 48 | 42 |

1. Calculate the frequency of class 30 - 40.
2. Calculate the class mark of the class 10 - 25.

Q20. A bag contains cards numbered from 1 to 25. A card is drawn at random from the bag.

 Find the probability that number is divisible by both 2 and 3.

**SECTION B**

**(Questions 21 to 26 carry 2 marks each)**

Q21. Given that HCF (306, 1314) = 18. Find LCM (306, 1314)

Q22. If one root of the quadratic equation 6x2-x-k =0 is $\frac{2}{3}$, then ﬁnd the value of k.

Q23. In the given ﬁgure, in a triangle PQR , ST || QR $\frac{PS}{SQ}$ = $\frac{3}{5}$ and PR= 28 cm, ﬁnd PT.

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**OR**

 ABCD is a trapezium in which AB || CD and its diagonals intersect each other at the point O . Show that $\frac{OA}{OB}$ = $\frac{CO}{DO}$ .

Q24. There are 60 students in a class among which 30 are boys. In another class there are 50 students among which 25 of them are boys. If one from each class is selected,

 (a) What is the probability of both being girls ?

 (b) What is the probability of having at least one girl?

Q25. Find the mean of the following distribution :

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Class interval** | **0-6** | **6-12** | **12-18** | **18-24** | **24-30** |
| **Frequency** | **5** | **4** | **1** | **6** | **4** |

**OR**

Find the mode of the following distribution :

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Classes** | **25-30** | **30-35** | **35-40** | **40-45** | **45-50** | **50-55** |
| **Frequency** | **25** | **34** | **50** | **42** | **38** | **14** |

26. Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

**SECTION C**

**(Questions 27 to 34 carry 3 marks each)**

Q27 . Find the HCF and LCM of 510 and 92 and verify that HCF × LCM = Product of two given numbers.

**OR**

 Show that any positive odd integer is of the form 6q+1,6q+ 3, or 6q+5 where q is some integer.

Q28. Solve for x : $√3$x2-2$√2$x-2$√3$=0

Q29. The sum of n terms of an A.P. is 3n2+5n. Find the A.P. Hence ﬁnd its 15th term.

**OR**

 Find the 20th term of an A.P. whose 3rd term is 7 and the seventh term exceeds three times the

 3rd term by 2. Also ﬁnd its nth term an**.**

Q30. A circle is inscribed in a $∆$ ABC which touches its sides AB, BC and AC at points D,E and F respectively. If the sides AC, AB and BC as 8 cm, 10 cm and 12 cm respectively. Find the length of AD, BE and CF.

Q31. A hemispherical bowl of internal diameter 36 cm contains liquid is ﬁlled into 72 cylindrical bottles of diameter 6 cm. Find. the height of the each bottle, if 10% liquid is wasted in this transfer.

Q32 During the medical check – up of 35 students of a class, their weights were recorded as follows:

|  |  |
| --- | --- |
| Weights (in kg) | Number of students |
| Less than 38 | 0 |
| Less than 40 | 3 |
| Less than 42 | 5 |
| Less than 44 | 9 |
| Less than 46 | 14 |
| Less than 48 | 28 |
| Less than 50 | 32 |
| Less than 52 | 35 |

 Draw a less than type ogive for the given data. Hence obtain the median weight from the graph.

Q33. The angle of elevation of the top of a building from the foot of the tower is 300 and the angle of elevation of the top of the tower from the foot of the building is 450 . If the tower is 30m high, ﬁnd the height of the building.

**OR**

 A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill as 600 and the angle of depression of the base of hill as 300. Find the distance of the hill from the ship and the height of the hill.

Q34. A boy, 1.4 metre tall standing at the edge of a river bank sees the top of a tree on the edge of the other bank at an elevation of 550. Standing back by 3 metre, he sees it at elevation of 450.

(a) Draw a rough ﬁgure showing these facts.

 (b) How wide is the river and how tall is the tree ?

[sin550=0.8192 c = , cos550=0.5736 , tan550=1.4281 ]

**SECTION D**

**(Questions 35 to 40 carry 4 marks each)**

Q35. Obtain all other zeroes of the polynomial x4 +6x3+x2-24x-20 if two of its zeroes are +2 and -5

**OR**

 Obtain all other zeroes of the polynomial 4x4+x3-72x2-18x , if two of its zeroes are 3$√$2 and -3$√$2 .

Q36. A and B are two points 150 km apart on a highway. Two cars start A and B at the same time. If they move in the same direction they meet in 15 hours. But if they move in the opposite direction, they meet in 1 hour. Find their speeds.

Q37. In $∆$ABC , AD is a median and O is any point on AD. BO and CO on producing meet AC and AB at E and F respectively. Now AD is produced to X such that OD= DX as shown in ﬁgure.

 Prove that :



(1) EF || BC

(2) AO : AX =AF: AB

**OR**

Let ABC be a triangle. D and E are two points on the side AB such that AD= BE. P is a point on AC such that DP || BC and Q is a point on BC such that EQ || AC, then prove that PQ || AB

Q38. When is an equation called ‘an identity’. Prove the trigonometric identity 1+tan2A= sec2A

**OR**

 Given that tan(A+B)=$\frac{\tan(A+tanB)}{1-\tan(Atan B)}$ , find the values of tan750 and tan900 by taking suitable

 values of A and B.

Q39. Find the values of ‘k’ for which the points A( k+1,2k), B(3k, 2k+3) and C(5k-1,5k) are collinear.

Q40. Figure depicts a racing track whose left and right ends are semi-circular. The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide every where, ﬁnd the area of the track.



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