## Maths

MCQ Single Correct (1 Marks) $20 \times 1 = 20$

1)   It is proposed to build a single circular park equal in area to the sum of areas of two   **1**
circular parks of diameters 16 m and 12 m in a locality. The radius of the new park
would be

  A)   10 m
  B)   15 m
  C)   20 m
  D)   24 m

2)   The probability that non - leap year has 53 Sundays is   **1**

  A)   5/7
  B)   3/7
  C)   1/7
  D)   9/7

3)   The value of   **1**

$$\frac{\tan 30^{\circ}}{\cot 60^{\circ}} \text{ is}$$

  A) $\dfrac{1}{\sqrt{2}}$

  B) $\dfrac{1}{\sqrt{3}}$

  C) $\sqrt{3}$

  D)   1

4)   If points (a, 0), (0, b) and (1, 1) are collinear then $\dfrac{1}{a} + \dfrac{1}{b}$ is   **1**

  A)   1
  B)   2
  C)   0
  D)   -1

5) A circle has a radius of 7 cm. A tangent PT is drawn from a point P such that the distance from P to the center of the circle O is 25 cm. What is the length of the tangent PT? **1**

A) 24 cm

B) 25 cm

C) 26 cm

D) 27 cm

6) Which of the following equations has no real roots? **1**

A) $x^2 - 4x + 3\sqrt{2} = 0$

B) $x^2 + 4x - 3\sqrt{2} = 0$

C) $x^2 - 4x - 3\sqrt{2} = 0$

D) $3x^2 + 4\sqrt{3}x + 4 = 0$

7) Assertion(A): There are 26 red cards in a deck of cards. **1**

Reason (R) : Each suit contains 2 red cards and there are 13 cards in each suit.

A) Both A and R are true and R is the correct explanation of A

B) Both A and R are true but R is NOT the correct explanation of A

C) A is true but R is false

D) A is false but R is true

8) If ∆ABC ~ ∆PQR, then what is the ratio of AC to PR? **1**

A) AB/PQ

B) BC/QR

C) BC/PR

D) AB/BQ

9) The coordinates of the endpoints of a line segment are (2, 3) and (5, 7). What is the length of the line segment? **1**

A) 3 units

B) 4 units

C) 5 units

D) 6 units

10) The number of polynomials having zeros as - 2 and 5 is **1**

A) 1

B) 2

C) 3

D) more than 3

11) In an arithmetic progression, if the first term is 333 and the common difference is 444, what is **1** the 7th term?

A) 24

B) 25

C) 26

D) 27

12) If two lines represented by the equations 3x−y=2 and 6x−2y=4 are graphed, what will you **1** observe?

A) Two parallel lines

B) Two perpendicular lines

C) Coincident lines

D) Lines intersecting at one point

13) If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are parallel, then value of k is **1**

A) $\dfrac{-5}{4}$

B) $\dfrac{2}{5}$

C) $\dfrac{15}{4}$

D) $\dfrac{3}{2}$

14) Which of the following can be the probability of an event? **1**

A) -1

B) 4

C) 3

D) 2/3

15) The points A (9, 0), B (9, 6), C (-9, 6) and D (-9, 0) are the vertices of a **1**

A) square

B) rectangle

C) rhombus

D) trapezium

16) How do you determine the point of intersection graphically for the equations x+y=4 and **1** x−y=2?

A) Solve each equation for y and plot the lines

B) Solve each equation for x and plot the lines

C) Only plot one of the lines

D) Plot both equations and find where they do not intersect

17) The value of (sin 30° + cos 30°) - (sin 60° + cos 60°) is **1**

A) -1

B) 0

C) 1

D) 2

18) The nth term of an arithmetic progression is $3n^2+2n+1$. What is the common difference? **1**

A) 2

B) 3

C) 4

D) 5

19) The radius of a circular wheel is 1.75cm. The number of revolutions that it will make **1** in covering 1km is - (take $\pi=22/7$)

A) 500

B) 100

C) 1000

D) 10000

20) In the following figure if ∠AOB = 125°, then ∠COD is equal to **1**
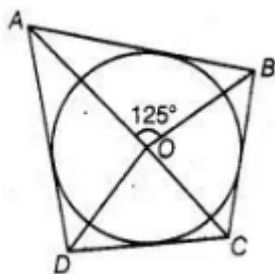
A) 62.5°

B) 45°

C) 35°

D) 55°

Short Questions (2 Makrs) 5 × 2=10

21) Name the type of triangle PQR formed by the points $P\sqrt{2}, \sqrt{2}, Q-\sqrt{2}, \sqrt{2}$ and $R-\sqrt{6}, \sqrt{6}$ **2**

22) Two unbiased dice are thrown. Find the probability that the total of the numbers on the dice is **2** greater than 10.

<div align="center">---OR---</div>

Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is less than 9.

23) Verify that each of the following is an AP, and then write its next three terms. **2**

$$5, \frac{14}{3}, \frac{13}{3}, 4, \dots$$

4

24) Find the coordinates of the point R on the line segment joining the points P (–1, 3) and Q (2, 5) such that **2**

$$PR = \frac{3}{5}PQ$$

25) In Figure, ABCD is a square of side 14 cm. With centres A, B, C and D, four circles are drawn such that each circle touch externally two of the remaining three circles. Find the area of the shaded region. **2**
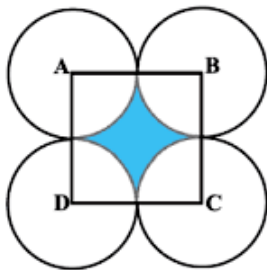
---OR---

Find the angle subtended at the centre of a circle of radius 5 cm by an arc of length $(5\pi/3)$ cm.

Medium Questions (3 Marks)   6 × 3=18

26) Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact. **3**

---OR---

Prove that the perpendicular at the point contact to the tangent to a circle passes through the centre of the circle.

27) On the same side of a tower, two objects are located. When observed from the top of the tower, their angles of depression are 45° and 60°. If the height of the tower is 150 m, find the distance between the objects. **3**

---OR---

From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

28) Prove that the square of any positive integer is of the form 5q, 5q + 1, 5q + 4 for some integer q. **3**

29) Prove that $\sqrt{5}$ is irrational. **3**

30) Find the coordinates of the point which divides the line-segment joining the points (3, - 1) and (10,13) internally in the ratio 2 : 5. **3**

31) Cards marked with numbers 13, 14, 15, ..., 60 are placed in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability that, number on the card drawn is **3**

(i) divisible by 5   (ii) a number is a perfect square

Long Questions (5 Marks)   4 × 5=20

32)   The central angles of two sectors of circles of radii 7 cm and 21 cm are respectively   **5**
            120° and 40°. Find the areas of the two sectors as well as the lengths of the
            corresponding arcs. What do you observe?

                                                    ---OR---

            On a square cardboard sheet of area 784 cm², four congruent circular plates of maximum size
            are placed such that each circular plate touches the other two plates and each side of the square
            sheet is tangent to two circular plates. Find the area of the square sheet not covered by the
            circular plates.

33)   Ramesh travels 760 km to his home partly by train and partly by car. He takes 8 hours   **5**
            if he travels 160 km. by train and the rest by car. He takes 12 minutes more if the
            travels 240 km by train and the rest by car. Find the speed of the train and car
            respectively.

                                                    ---OR---

            Form the pair of linear equations in the following problems, and find their solutions graphically.

            10 students of Class X took part in a Mathematics quiz. If the number of girls is 4 more than the
            number of boys, find the number of boys and girls who took part in the quiz.

34)   The distribution of heights (in cm) of 96 children is given below   **5**

Height (in cm)	Number of children
124 – 128	5
128 – 132	8
132 – 136	17
136 – 140	24
140 – 144	16
144 – 148	12
148 – 152	6
152 – 156	4
156 – 160	3
160 – 164	1

            Draw a less than type cumulative frequency curve for this data and use it to compute median
            height of the children.

35)   In the centre of a rectangular lawn of dimensions 50 m × 40 m, a rectangular pond has to be   **5**
            constructed so that the area of the grass border of uniform width surrounding the pond would
            be 1184 m² (See figure given below). Find the length and breadth of the pond.

6
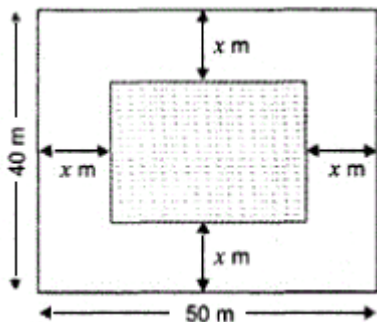
Solve Question 36 to Question 38 based on the following paragraph:
Case Study Questions:

REAL NUMBERS:

At the time of Diwali, the shop is filled with people to purchase the different kinds of sweets. There are some square shaped sweets, some round shaped and some kite shaped also.

Answer the following questions on the basis of the information given.

36)   A man named Ram asked for 250 gm of square Barfi. But due to unavailability of large box   **1**
the shopkeeper fit it in the small box. The barfi covered 1/3 part of the box only. Which kind
of number is represented by the amount of Barfi   in the box?

   A)   Natural

   B)   Rational

   C)   Irrational

   D)   Complex

37)   If Ramesh divides the sweets in the pair of seven sweets, he ends up having 3 sweets remained **1**
with him. How can you represent this information?

   A) $a = 7r + 3$

   B) $a = 7r - 3$

   C) $a = 3r + 7$

   D) $a = 3r - 7$

<div align="center">

---OR---

</div>

   How many minimum people needed to distribute 216 sweets if one person gets 8 sweets so that no
sweet is left?

   A) $216 = 8(25) + 0$

   B) $216 = 8(26) + 0$

   C) $216 = 8(27) + 0$

   D) $216 = 8(28) + 0$

38) The 200 sweets are distributed equally among 7 people. How can you represent the remaining **2** sweets and the ones which are distributed?

A) $200 = 7(25) + 9$

B) $200 = 7(28) - 9$

C) $200 = 7(28) + 4$

D) $200 = 7(29) + 4$

Solve Question 39 to Question 41 based on the following paragraph:

Case Study Questions:

REAL NUMBERS:

There is a new mall opened in the city of Scranton. There are hundred different shops here to buy different things. Everyday 1000's of people come and visit in the mall.

Answer the following questions on the basis of the information given.

39) Sheena and Heena are two friends. Sheena go to the mall every 14th day and Heena goes to **1** the mall every 8th day. After how many days will they both meet?

A) 30 days

B) 45 days

C) 56 days

D) 64 days

40) A new outlet of Tommy Hilfiger has to open in the mall. The available has dimension of 6 m **1** 80 cm, 5 m 10 cm, 3m 40 cm. what is the length if longest tape needed to measure the dimension of the room?

A) 50 cm

B) 1 m 70 cm

C) 2 m 55 cm

D) 4 m 65 cm

---OR---

What is the least length of Diwali lights needed to cover the whole room of dimensions 45 m, 75 m and 81 m?

A) 2125 m

B) 2025 m

C) 2200 m

D) 2354 m

41) What is the least number of clothes that can be arranged in numbers of 12, 16 and 25 in each shelf of a cloth outlet? **2**

A) 1200

B) 1500

C) 1250

D) 1345

Solve Question 42 to Question 44 based on the following paragraph:
CASE STUDY 2:

Read the following passage and answer the questions:

An asana is a body posture, originally and still a general term for a sitting meditation pose, and later extended in hatha yoga and modern yoga as exercise, to any type of pose or position, adding reclining, standing, inverted, twisting, and balancing poses. In the figure, one can observe that poses can be related to representation of quadratic polynomial.

42) The two zeroes in the above shown graph are **1**

A) 2, 4

B) -2, 4

C) -8, 4

D) 2, -8

43) The shape of the poses shown is **1**

A) Spiral

B) Ellipse

C) Linear

D) Parabola

---OR---

The zeroes of the quadratic polynomial $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$ are

A) $\dfrac{2}{\sqrt{3}}, \dfrac{\sqrt{3}}{4}$

B) $-\dfrac{2}{\sqrt{3}}, \dfrac{\sqrt{3}}{4}$

C) $\dfrac{2}{\sqrt{3}}, -\dfrac{\sqrt{3}}{4}$

D) $-\dfrac{2}{\sqrt{3}}, -\dfrac{\sqrt{3}}{4}$

44)   The graph of parabola opens downwards, if _____   **2**

A) $a \geq 0$

B) $a = 0$

C) $a < 0$

D) $a > 0$