

PRE-BOARD EXAMINATION-2020-21

SUBJECT – MATHEMATICS- BASIC

Class: X (CBSE)

Total Marks: 80

Date.....

Time: 3 hrs

General instructions:

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

Part – A :

1. It consists of two sections – I and II
2. Section I has 16 questions. Internal choice is provided in 5 questions.
3. Section II has four case study-based questions. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

Part – B:

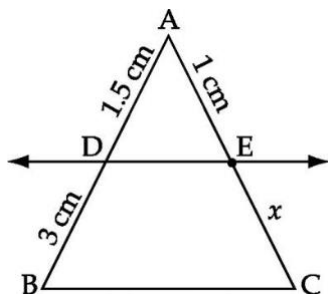
1. Question No 21 to 26 are Very short answer Type questions of questions 2 marks each.
2. Question No 27 to 33 are Short answer Type questions of 3 marks each.
3. Question No 34 to 36 are Long answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

PART – A

Section – I

Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

1. Express 132 as the product of primes. 1
 2. Write a quadratic polynomial, sum of whose zeroes is 5 and product is -14. 1
 3. Given that $HCF(306, 657) = 9$, find $LCM(306, 657)$ 1
- OR**
- State the fundamental theorem of arithmetic.
4. Find the value of k for which the following equations are inconsistent. 1
 $x - 4y = 6$
 $3x + ky = 5$
 5. Find the HCF of the smallest composite number and the smallest prime number. 1
 6. Find the area of a sector of a circle with radius 6 cm and sector angle 60° . (Take $\pi = \frac{22}{7}$) 1
- OR**
- Find the area of a quadrant of a circle whose circumference is 22 cm.
7. In figure, if $DE \parallel BC$ then find x 1



OR

$\triangle ABC$ is similar to $\triangle PQR$. $\text{ar}(\triangle ABC) = 36 \text{ sq.cm}$ and $\text{ar}(\triangle PQR) = 49 \text{ sq cm}$. If $BC = 12 \text{ cm}$, find QR .

8. The cost of fencing a circular field at the rate of Rs 24/m is Rs 5280. Find the radius of the field. 1
9. The angle of elevation of the top of a tower at a distance of 150 m from its foot on a horizontal plane is found to be 30° . Find the height of the tower. 1
10. Find the angle subtended by an arc of length $2\pi \text{ cm}$, at the center of a circle of radius 6cm. 1
11. If the median and mode of a data are 52 and 52.4 respectively, then find its mean. 1
12. To divide a line segment BC internally in the ratio 4:7, first a ray AX is drawn so that angle BAX is an acute angle. What will be the minimum number of points to be located at equal distances on ray AX ? 1
13. If the lines given by $3x-4y+7 = 0$ and $kx+3y-5 = 0$ are parallel then find the value of k . 1

OR

If the equations $2x+3y-5 = 0$ and $kx-6y-8 = 0$ have a unique solution then find the value of k .

14. A card is drawn from a well shuffled deck of plain cards. Find the probability of drawing a face card. 1

OR

A bag contains 5 black, 7 red and 3 white balls. A ball is drawn from the bag at random. Find the probability that the ball drawn is not black.

15. If the length of the shadow of a vertical pole is $\sqrt{3}$ times the height of the pole, find the angle of elevation of the sun. 1
16. If a letter is chosen at random from the English alphabet, find the probability that the letter is a vowel. 1

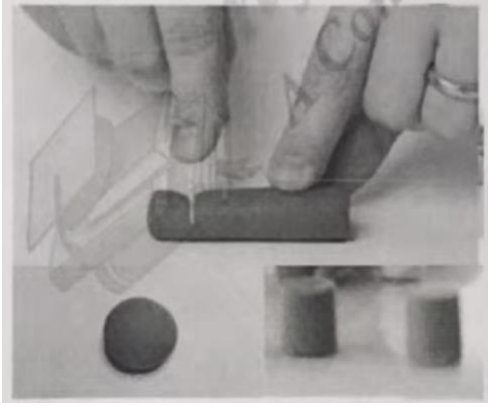
Section-II

Case study based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark. 4

17. **Case study based -1**

SURFACE AREAS AND VOLUMES

To make the teaching learning process easier, creative and innovative a teacher bring a clay in the classroom to teach the topic mensuration. She thought this method of teaching is more interesting, leave a long lasting impact. She forms a cylinder of radius 6 cm and height 8 cm with the clay, then she moulds the cylinder into a sphere and asks some question to the students(Use $\pi = 3.14$)



- i) The radius of the sphere so formed
 - a) 6 cm
 - b) 7 cm
 - c) 4 cm
 - d) 8 cm

- ii) The volume of the sphere so formed
 - a) 902.32 cm^3
 - b) 899.34 cm^3
 - c) 904.32 cm^3
 - d) 999.33 cm^3

- iii) What is the ratio of the volume of a sphere to the volume of a cylinder
 - a) 1:2
 - b) 2:1
 - c) 1:1
 - d) 3:1

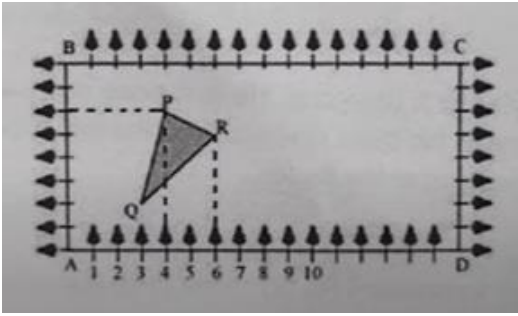
- iv) The total surface area of the cylinder is
 - a) 525.57 cm^2
 - b) 557.55 cm^2
 - c) 534.32 cm^2
 - d) 527.52 cm^2

- v) During the conversion of a solid from one shape to another the volume of the new shade will
 - a) Increase
 - b) Decrease
 - c) Remain unaltered
 - d) Be double

18. **Case study based -2**
Coordinate geometry

Class 10 students of a secondary school in Krishnagar have been allotted a rectangular plot of a land for gardening activities. Saplings of Gulmohar are planted on the boundary at a distance of 1m from each other. There is a triangular grassy lawn in the plot as shown in the figure. The students are to sow seeds of flowering plants on the remaining area of the plot.

4



- i) Considering A as origin, what are the coordinates of A?
 - a) (0,1)
 - b) (1,0)
 - c) (0,0)
 - d) (-1,-1)

- ii) What are the coordinates of P?
 - a) (4,6)
 - b) (6,4)
 - c) (4,5)
 - d) (5,4)

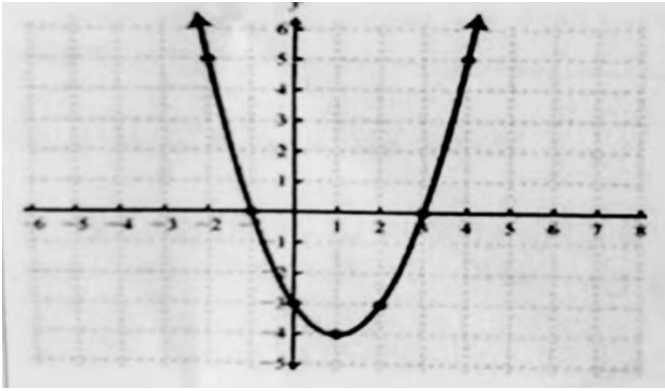
- iii) What are the coordinates of R?
 - a) (6,5)
 - b) (5,6)
 - c) (6,0)
 - d) (7,4)

- iv) What are the coordinates of D?
 - a) (16,0)
 - b) (0,0)
 - c) (0,16)
 - d) (16,1)

- v) What are the coordinates of P if D is taken as the origin?
 - a) (12,2)
 - b) (-12,6)
 - c) (12,3)
 - d) (6,10)

19. **Case study based -3**
Polynomials

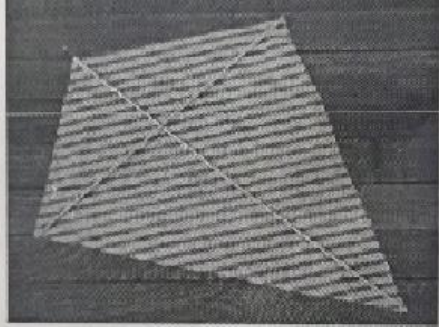
Due to heavy storm an electric wire got bent as shown in the figure. It follows a mathematical shape. Answer the following questions below. 4



- i) Name the shape in which the wire is bent.
- Spiral
 - Ellipse
 - Linear
 - Parabola
- ii) How many zeroes are there for the polynomial (shape of the wire)?
- 2
 - 3
 - 1
 - 0
- iii) The zeroes of the polynomial are
- 1,5
 - 1,3
 - 3,5
 - 4,2
- iv) What will be the expression of the polynomial
- $x^2 + 2x - 3$
 - $x^2 - 2x + 3$
 - $x^2 - 2x - 3$
 - $x^2 + 2x + 3$
- v) What is the value of the polynomial if $x = -1$?
- 6
 - 18
 - 18
 - 0

20. **Case study based – 4**
Triangles

4



Rahul is studying in 10 standard. He is making a Kite to fly it on a Sunday. Few questions came to his mind while making the kite. Give answers to the questions by looking at the figure.

- i) Rahul tied the sticks at what degree to each other?
 - a) 30°
 - b) 60°
 - c) 90°
 - d) 50°
- ii) Which is the correct similarity criteria applicable for smaller triangles at the upper part of this kite?
 - a) RHS
 - b) SAS
 - c) SSA
 - d) AAS
- iii) Sides of two similar triangles are in the ratio 4:9. Corresponding medians of these triangles are in the ratio
 - a) 2:3
 - b) 4:9
 - c) 81:16
 - d) 16:81
- iv) In a triangle if 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. This theorem is called as
 - a) Pythagoras theorem
 - b) Thales theorem
 - c) Converse of Thales theorem
 - d) Converse of Pythagoras theorem.
- v) What is the area of the kite, formed by two perpendicular sticks of length 6 cm and 8 cm.
 - a) 48 cm^2
 - b) 14 cm^2
 - c) 24 cm^2
 - d) 96 cm^2

PART – B

All questions are compulsory. In case of internal choices, attempt any 1.

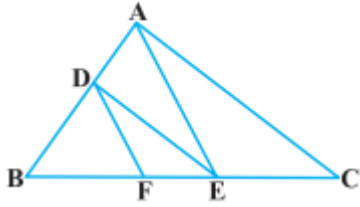
Section – III

21. Find the coordinates of the point which divides the join of $(-1, 7)$ and $(4, -3)$ in the ratio 2:3. 2

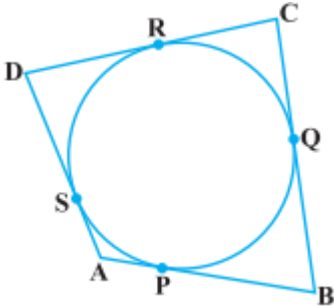
OR

Find the point on the x-axis which is equidistant from (2,-5) and (-2,9).

22. In Figure, $DE \parallel AC$ and $DF \parallel AE$. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$. 2



23. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that $AB + CD = AD + BC$ 2



24. Draw a circle of radius 6cm. From a point 10 cm away from its center, construct the pair of tangents to the circle and measure their lengths. 2
25. Given $\tan A = \frac{4}{3}$. Find $\sin^2 A + \cos^2 A$ 2

OR

Given $15 \cot A = 8$. Find $\sin A$ and $\sec A$.

26. How many terms of the AP 24, 21, ... must be taken so that the sum is 78? 2

Section - IV

27. Prove that $\sqrt{5}$ is irrational. 3
28. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the center. 3
29. In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed? 3
30. One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will 3
- (i) be an ace,
 - (ii) not be an ace.
 - (iii) a red king.

OR

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) 8?
 - (ii) 13?
 - (iii) less than or equal to 12?
31. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap. 3
32. Prove that $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$ 3

33. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream. 3

Section - V

34. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 50 m high, find the height of the building. 5

OR

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.

35. Find the sum of all two digit odd positive numbers. 5
36. The following table gives the daily income of 50 workers of a factory. 5

Daily income (in Rs)	100-120	120-140	140-160	160-180	180-200
No. of workers	12	14	8	6	10

Find the mean, median and mode for the above data.

