LIONS SCHOOL, MIRZAPUR
PRE BOARD EXAMINATION 2020-21

CLASS-X   TIME: 3 HRS

SUBJECT – MATHEMATICS   M.M:-80

General Instruction:-
1. This question paper contains two parts A and B.
2. Part B have internal choices.

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

PART: - B:
1. Question no 21 to26 are Very short answer Type question of 2 mark 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.

(PART-A)   (1x16=16)
SECTIONT-I

1. Express 576 as the product of primes.

2. Write a quadratic polynomial, sum of whose zeroes is 8 and product is 3.

3. Find the LCM of (96,404).

4. On comparing the ratios of the coefficients, find out whether the pair of equations $2x + 3y = 4$ and $x - y + 1 = 0$ is consistent or inconsistent.

5. If a and b are co-prime number, then find the HCF (a, b).

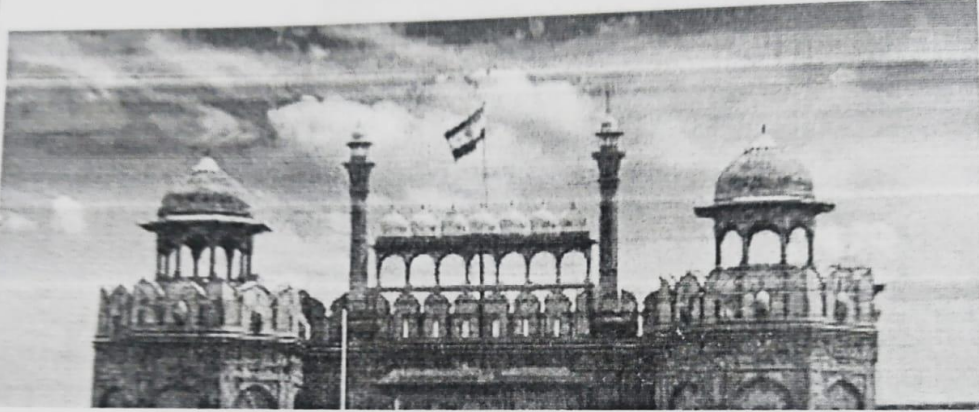6. Find the area of a sector of a circle with radius 14cm if angle of the sector is $45°$. $(Take\ \pi = \frac{22}{7})$

7. A horse tied to a pole with 35cm long rope. Find the perimeter of the field where the horse can graze. $(Take\ \pi = \frac{22}{7})$

8. The cost of fencing a circular field at the rate of Rs.24 per metre is Rs.10560. Find the radius of the field.

9. Value of $sin60°$.

10. Write the formula of TSA of cone.

11. Write the formula of mean for direct method.

12. Find distance between points (-2,-3) and (-1,-2).

13. For what values of p does the pair of equations $4x + py + 8 = 0\ and\ 2x + 2y + 2$ has unique solution?

14. A die is thrown once. What is the probability of getting a prime number?

15. If $sin\theta = \frac{3}{5}$, then find $Cot\theta$.

16. Find all possible outcomes when two unbaised coins are tossed simultaneously.

SECTION-II

(Case study – based questions are compulsory. Attempt any 4 sub parts from each question. Each question carries 1 mark.)

17.

Mathematics teacher of a school took her 10th standard students to show Red fort. It was a part of their Educational trip. The teacher had interest in history as well. She narrated the facts of Red fort to students. Then the teacher said in this monument one can find combination of solid figures. There are 2 pillars which are cylindrical in shape. Also 2 domes at the corners which are hemispherical.7 smaller domes at the centre. Flag hoisting ceremony on Independence Day takes place near these domes.

(i) How much cloth material will be required to cover 2 big domes each radius 2.5 metres? $\left(Take\ \pi = \frac{22}{7}\right)$

(a) $75m^2$ (c) $87.47m^2$

(b) $78.57m^2$ (d) $25.8m^2$

(ii)   Write the formula to find the volume of a cylindrical pillar.

(a) $\pi r^2 h$ (c) $\pi r(l + r)$

(b) $\pi r l$ (d) $2\pi r$

(iii)   Find the lateral surface area of two pillars if height of the pillar is

7m and radius of the base is 1.4m.

(a) $112.3cm^2$ (c) $90m^2$

(b) $123.2\ m^2$ (d)$345.2cm^2$

(iv) How much is the volume of a hemisphere if the radius of the base is 3.5m?

(a) $85.9\ m^3$ (c) $98\ m^3$

(b) $80\ m^3$ (d) $89.83\ m^3$

(v) What is the ratio of sum of volumes of two hemispheres of radius 1cm each to the volume of a sphere of radius 2cm.

(a) 1:1   (c) 8:1

(b) 1:8   (d) 1:16

18.

Class X students of a secondary school in Krishnagar have been allotted a rectangular plot of a land for gardening activity. 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 fig. The students are to sow seeds of flowering plants on the remaining area of the plot.

Considering A as origin, answer question (i) to (v)

(i)   Considering A as the origin, what are the coordinates of A?

(a) (0,1)   (c) (0,0)
(b) (1,0)   (d) (-1,-1)

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

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

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

(v)   What are the coordinates of P if D is taken as the origin?

(a) (12, 2)   (c) (12, 3)
(b) (-12, 6)   (d) (6, 10)

19.
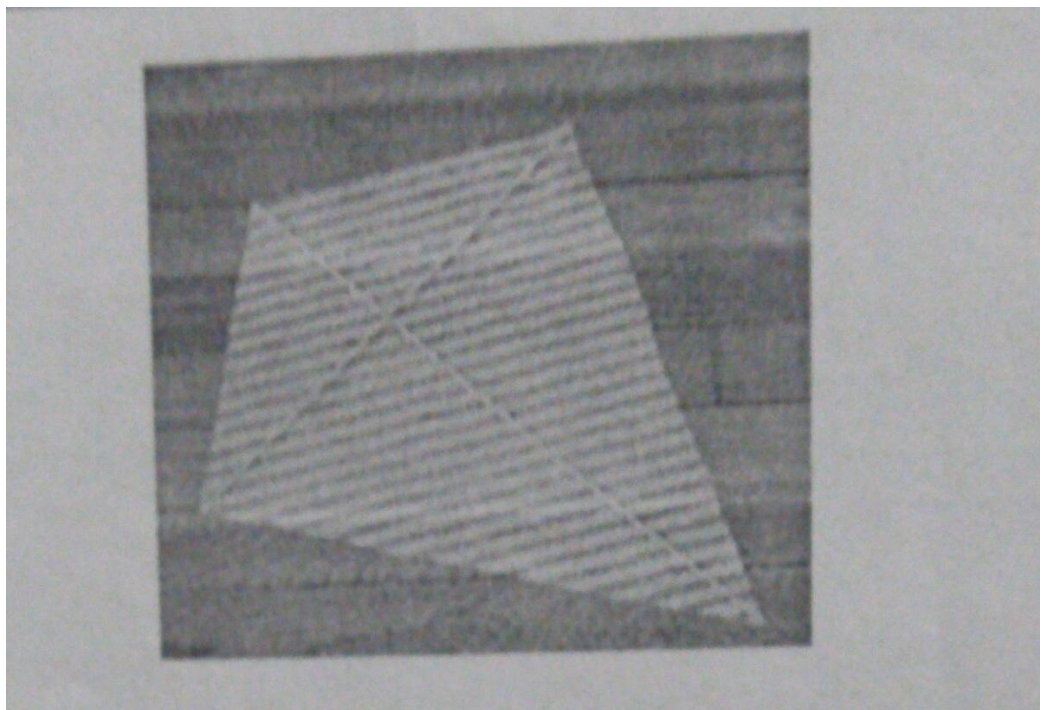
Rahul is student in X Standard. He is making a kite to fly it on a Sunday. Few
questions came to his mind while making the kite. Give answers to his questions
by looking at the figure.

(i) Rahul tied the sticks at what angles to each other?

(a) 30°   (c) 90°

(b) 60°   (d) 60°

(ii) Which is the correct similarity criteria applicable for smaller triangles at the upper part of this kite?

  (a) RHS   (c) SSA

  (b) SAS   (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   (c) 81:16

  (b) 4:9   (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 the first side is a right angle. This theorem is called as,

  (a) Pythagoras theorem   (c) Converse of Thales theorem

  (b) Thales theorem   (d) Converse of Pythagoras Theorem

(v) What is the area of kite, formed by two perpendicular sticks of length 6 cm and 8cm?
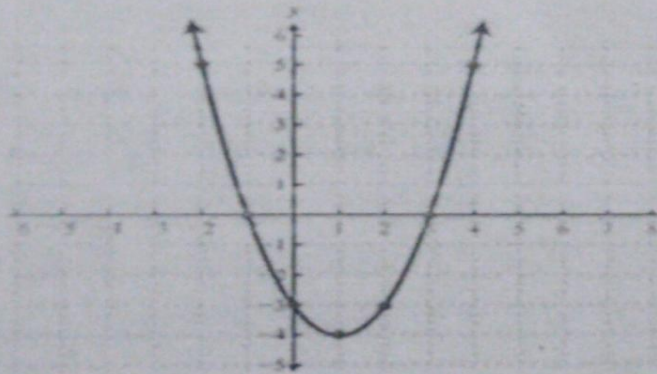
  (a) $48cm^2$ (c) $24cm^2$

  (b) $14cm^2$ (d) $96cm^2$

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

20.

(i) Name the shape in which the wire is bent

  (a) Spiral   (c) Linear

  (b) Ellipse   (d) Parabola

(ii) How many zeroes are there for the polynomial (shape of the wire)

  (a) 2   (c) 1

(b) 3   (d) 0

(iii) The zeroes of the polynomial are

  (a) -1, 5   (c) 3, 5

  (b) -1, 3   (d) -4, 2

(iv) What will be the expression of the polynomial?

  (a) $x^2 + 2x - 3$ (c) $x^2 - 2x - 3$

  (b) $x^2 - 2x + 3$ (d) $x^2 + 2x + 3$

(v) What is the value of the polynomial if $x = -1$?

  (a) 6   (c) 18

  (b) -18   (d) 0

(PART-B)

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

21. Find the coordinates of the point which divide the line segment joining the points (5, -2) and (9, 4) in the ratio 2:3 internally.

OR

Find a relation between x and y such that the point (x, y) is equidistant from the points (7, 1) and (3, 5).

22. In a $\Delta ABC, AD$ is the bisector of angle A, meeting side BC at D if BD=2.5cm, AC=4.2cm and AB=5cm, Find DC.

23. Prove that the tangents at the extremities of any chord make equal angles with the chord.

24. Find the value of x, if $3x^2 - 13x + 12 = 0$.

25. Given $15 \tan\theta = 8$, then find $\sin\theta$ and $\sec\theta$.

26. If 18, a, b, -3 are in A.P. then find value of (a + b).

27. Prove that $\left(5 - \sqrt{3}\right)$ is an irrational number.

28. Prove that a parallelogram circumscribing a circle is a rhombus.

29. SOLVE:-

$$4x + \frac{6}{y} = 15 \ and \ 6x - \frac{8}{y} = 14.$$

30. One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting

(i) A face card.

(ii) A red face card.

(iii) A queen of black suit.

31. A soil is in the form of a cylinder with hemispherical ends. The total height of the solid is 25 cm and diameter of cylinder is 21 cm. Find the volume and TSA of the solid. $\left(Use\ \pi = \frac{22}{7} \right).$

32. If $sec\theta + tan\theta = k$, obtained the values of $sec\vartheta, tan\theta$ and $sin\theta$ in term of K.

33. Find the roots of quadratic equation $x^2 - 4ax = b^2 - 4a^2$ using method of completing the square.

34. An aeroplane flying horizontally 1km above the ground is observed at an elevation of 60°. After 10 seconds, its elevation is observed to be 30°. Find the speed of the aeroplane in km/hr.

35. How many three digit natural numbers are divisible by 7?

36. The median of the following data is 50. Find the values of p and q, if the sum of the all the frequencies is 90.

Marks:	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency:	P	15	25	20	q	8	10