INDIAN SCHOOL MUSCAT
FIRST PRE-BOARD EXAMINATION
MATHEMATICS

CLASS: X   Sub. Code: 041   Time Allotted: 3 Hrs.

05.01.2020   Max. Marks: 80

General Instructions:
- All the questions are compulsory.
- The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
- **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.
- 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.
- Use of calculator is not permitted.

SECTION –A

Q 1- Q 10 are multiple choice questions. Select the most appropriate answer from the given options.

1   The decimal expansion of the rational number $\frac{51}{600}$ will terminate after _____decimal place(s)

(A) one   (B) two   (C) three   (D) four

2.   If the product of the zeroes of the polynomial $ax^2 - 6x - 6$ is 4, then the value of a is:

A) $\frac{-3}{2}$ (B) -24   (C) $\frac{1}{2}$ (D) $\frac{3}{2}$

3.   The pair of linear equations $3x - 2y = 6$ and $2y - 3x + 12 = 0$ is
(A) consistent   (B) inconsistent   (C) consistent and dependent   (D) None of these

4.   Of the following quadratic equations, which is the one whose roots are 2 and -15?
(A) $x^2 - 2x + 15 = 0$ (B) $x^2 + 15x - 2 = 0$ (C) $x^2 + 13x - 30 = 0$ (D) $x^2 - 30 = 0$

5.   The distance of the point P (-6, 8) from the origin is
(A) 8   (B) 2   (C) 10   (D) 6

6.   What is the value of $\sec(90 - \theta)°. \sin\theta \sec 45°$?

(A) 1   (B) $\frac{\sqrt{3}}{2}$ (C) $\sqrt{2}$ (D)$\sqrt{3}$

7.   If A +B = 90°, then the simplest form of $\sqrt{\sin A \sec B - \sin A \cos B}$ is _____
(A) cos B   (B) cos A   (C) sin A   (D) sec A

8. A solid sphere of radius r is melted and recast into the shape of a solid cone of height 4r. The radius of the base of the cone is
   (A) r   (B) 2r   (C) 3r   (D) 4r

9. A card is drawn from a well-shuffled deck of 52 playing cards. The probability that it is not a face card
   (A) $\frac{12}{52}$ (B) $\frac{16}{52}$ (C) $\frac{10}{13}$ (D) $\frac{9}{13}$

10. If prime factorization of 2472 is expressed as $2^p \times 3 \times q$, then the value of p and q :
    (A) 103, 3   (B) 3, 107   (C) 3, 103   (D) 3, 101

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

11. The common difference of an A.P $\frac{1}{2r}, \frac{1-3r}{2r}, \frac{1-6r}{2r}, \dots$ is _____

12. The value of $4\cot^2 45° - \sec^2 60° + \sin^2 60° + \cos^2 90°$ is _____

13. In fig.1, O is the centre of a circle, PQ is a chord and PT is the tangent at P. If ∠POQ= 70°, then ∠TPQ = _____

    OR

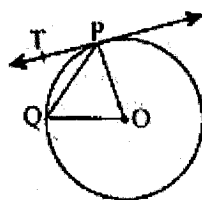   In fig.2, AOB is a diameter of a circle with centre O and AP is a tangent to the circle at A. If ∠POB=115°, then ∠APO = _____
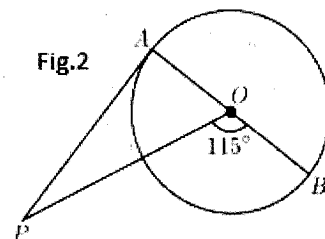

Fig.1

Fig.2

14. The x-coordinate of the point of intersection of less than type and more than type ogives of the grouped data is _____

15. The type of triangle formed by the points (-4, 0), (4, 0), (0, 3) is _____.

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

16. Examine the nature of the roots of the equation $2x^2 - 7x + 3 = 0$.
    OR
    If one zero of the polynomial $3x^2 - 8x + 2p+1$ is reciprocal of the other, find the value of p.

17. Can two numbers have 4 as their HCF and 250 as their LCM? Give reason.

18. Are the points (0, 1), (2, 3) and (3, 4) collinear? Justify your answer.

19. If ΔABC ~ ΔDEF such that 2AB = DE and BC = 8 cm, then find EF.

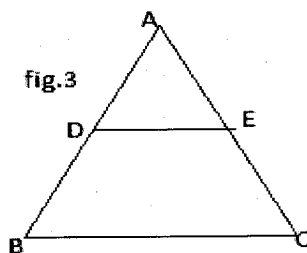20. In fig.3, D and E are points on AB and AC respectively, such that DE ‖ BC If $AD = \frac{1}{3}BD$, AE=4.5cm, find AC.

fig.3
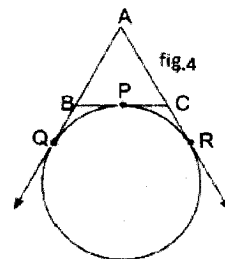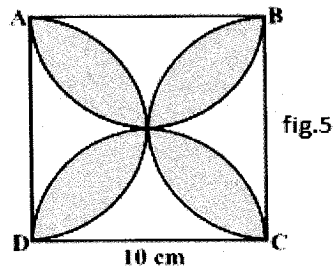
fig.4

SECTION – B

21 In fig.4, A circle touches sides AB and AC produced and side BC of ∆ABC at Q, R and P respectively. Show that AQ = ½ perimeter of ∆ABC

22 Check whether (-150) is a term of the A.P. 11, 8, 5, 2,. ... .

23. ∆PQR is right angled at P and M is a point on QR such that PM ⊥QR. Show that PM^2 = QM. MR

OR

In an equilateral triangle ABC, D is a point on side BC such that BD = $\frac{1}{3}$ BC.
Prove that $9(AD)^2 = 7(AB)^2$.

24. Find the length of kite string flying at 100m above the ground with the elevation of 45° (Use $\sqrt{2}$ = 1.41)

25. A copper rod of diameter 1cm and length 8 cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire.

26. A box contains cards bearing numbers from 6 to 70. If one card is drawn at random from the box, find the probability that it bears
(i) a one digit number   and (ii) a composite number between 50 and 70.

OR

Two dice are thrown simultaneously. Find the probability that
(i) the sum of numbers appearing on the two dice is 5
(ii) getting an odd number on the first die and a multiple of 3 on the other.

SECTION - C

27. Use Euclid's division algorithm to find the HCF of 726 and 275.

OR

Show that square of any positive integer is of the form 3q or 3q +1 for some integer q.

28. Find the centre of a circle passing through the points (6, -6), (3, -7) and (3, 3).

29. If the polynomial $6x^4 + 8x^3 + 17x^2 +21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, the remainder comes out to be (ax + b), find the value of a and b.

30. Solve for x and y: $\frac{6}{x-1} - \frac{3}{y-2} = 1$ and $: \frac{5}{x-1} + \frac{1}{y-2} = 2$, where x ≠ 1 and y ≠ 2

OR

2 men and 7 women can do a piece of work in 4 days. It is done by 4 men and 4 women in 3 days. How long would it take for one man or one woman to do it?

31. In an A.P., if a = 12, a_n = 248 and S_n =7800, then find n and d.

32. Prove that $(\cosec A - \sin A)(secA - cosA) = \frac{1}{tanA + cotA}$

OR

If sec θ + tan θ = p, then find the value of cosec θ

33. Find the area of the shaded region in fig.5, where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. (Use $\pi = 3.14$)

fig.5

34. The given distribution shows the number of runs scored by the batsmen in inter-school cricket matches:

Runs scored	0 – 50	50 – 100	100 – 150	150 – 200	200 – 250
No. of batsmen	4	6	8	7	5

Draw a more than type ogive for the above data using a suitable scale.

SECTION – D

35. If the mean of the following data is 14.7, find the values of p and q. Also find its mode.

Class	0 – 6	6 – 12	12 - 18	18 - 24	24 – 30	30 - 36	36 – 42	Total
Frequency	10	p	4	7	q	4	1	40

36 The total cost of a certain length of a piece of cloth is Rs. 200. If the piece was 5 m longer and each metre of cloth costs Rs. 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is its original rate per metre?

OR

Rs. 9000 were divided equally among a certain number of persons. Had there been 20 more persons, each would have got Rs. 160 less. Find the original number of persons.

37 Prove that "If a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio".

38 Construct a ΔABC with BC = 7 cm, ∠B = 60° and AB = 6 cm. Construct another triangle whose sides are $\frac{3}{4}$ times of the corresponding sides of ΔABC

OR

Construct a pair of tangents to a circle of radius 3cm from a point on the concentric circle of radius 5 cm. Measure the length of each tangent.

39 From a point P on the ground, the angles of elevation of the top of a 10 m tall building and a helicopter, hovering at some height vertically over the top of the building are 30° and 60° respectively. Find the height of the helicopter above the ground and also find distance between the foot of the building and the point.

40 A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of base of the cone is 21 cm and its volume is $\frac{2}{3}$ of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy. $\left(Use\ \pi = \frac{22}{7}\right)$

OR

A milk container is made of metal sheet in the shape of frustum of a cone whose volume is $10459\frac{3}{7}$ cm^3. The radii of its lower and upper circular ends are 8 cm and 20 cm respectively. Find the cost of metal sheet used in making the container at the rate of Rs 1.40 per square centimeter. $\left(Use\ \pi = \frac{22}{7}\right)$

End of the Question Paper

Page 4 of 4

Roll Number		

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SECTION – A

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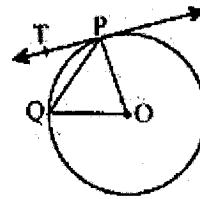
1   The decimal expansion of the rational number $\frac{54}{600}$ will terminate after _____ decimal place(s)
   (A) one   (B) three   (C) two   (D)   four

2.   If the product of the zeroes of the polynomial $ax^2 - 6x - 6$ is 4, then the value of a is:
   A) $\frac{-3}{2}$ (B) -24   (C) $\frac{1}{2}$ (D) $\frac{3}{2}$

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4.   What is the value of $\sec(90 - \theta)°. \sin\theta \operatorname{cosec} 45°$?
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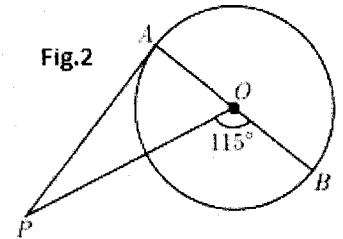
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13. In fig.1, O is the centre of a circle, PQ is a chord and PT is the tangent at P.   If $\angle POQ= 50°$, then $\angle TPQ = $ _____
    OR
    In fig.2, AOB is a diameter of a circle with centre O and AP is a tangent to the circle at A.   Fig.1
   If $\angle POB=115°$, then $\angle APO = $ _____

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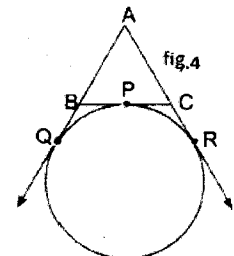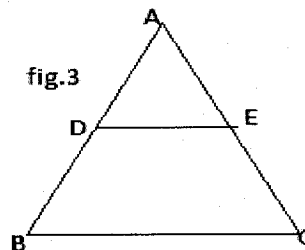
fig.3

fig.4

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fig.5

10 cm
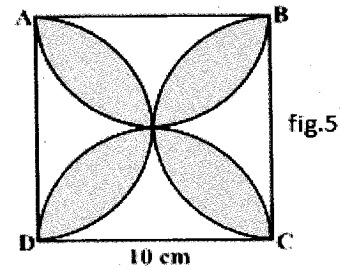
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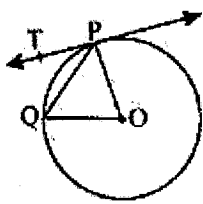
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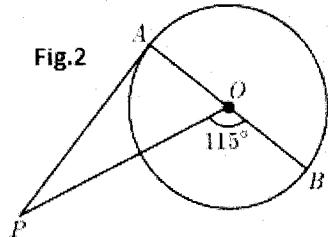
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Fig.1

Fig.2

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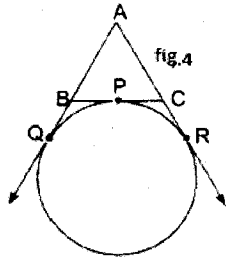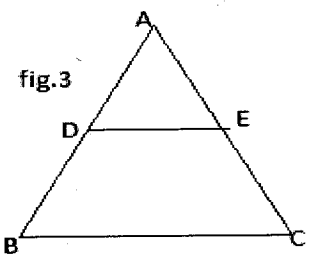
fig.3

fig.4

SECTION – B

21 In fig.4, A circle touches sides AB and AC produced and side BC of ΔABC at Q, R and P respectively. Show that AQ = ½ perimeter of ΔABC
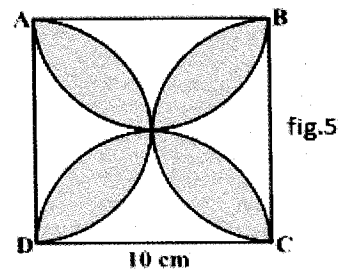
22 A copper rod of diameter 1cm and length 8 cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire.

23. $\triangle PQR$ is right angled at P and M is a point on QR such that PM $\perp$QR. Show that PM^2 = QM. MR

OR

In an equilateral triangle ABC, D is a point on side BC such that BD = $\frac{1}{3}$ BC.
Prove that $9(AD)^2 = 7(AB)^2$.

24. Find the length of kite string flying at 100m above the ground with the elevation of 45° (Use $\sqrt{2}$ = 1.41)

25. Find 10th term from the end of the A.P. 11, 8, 5, 2,. ...., - 61.

26. A box contains cards bearing numbers from 6 to 70. If one card is drawn at random from the box, find the probability that it bears
(i) a one digit number   and (ii) a prime number between 40 and 60.

OR

Two dice are thrown simultaneously. Find the probability that
(i) the sum of numbers appearing on the two dice is 5
(ii) getting an odd number on the first die and a multiple of 3 on the other.

SECTION - C

27. Use Euclid's division algorithm to find the HCF of 726 and 275.

OR

Show that square of any positive integer is of the form 3q or 3q +1 for some integer q.

28. Find the centre of a circle passing through the points (6, -6), (3, -7) and (3, 3).

29. Find the zeroes of the polynomial x^2 - 4x + 1 and verify the relationship between the zeroes and the coefficients.

30. Solve for x and y: $\frac{6}{x-1} - \frac{3}{y-2} = 1$ and : $\frac{5}{x-1} + \frac{1}{y-2} = 2$, where x $\neq$ 1 and y $\neq$ 2

OR

2 men and 7 women can do a piece of work in 4 days. It is done by 4 men and 4 women in 3 days. How long would it take for one man or one woman to do it?

31. In an A.P., if a = 12, a_n = 248 and S_n =7800, then find n and d.

32. Prove that $(\cosec A - \sin A)(secA - cosA) = \frac{1}{tanA+cotA}$

OR

If sec θ + tan θ = p, then find the value of cosec θ

33. Find the area of the shaded region in fig.5, where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter.   (Use π = 3.14)

fig.5

10 cm

34. The given distribution shows the number of runs scored by the batsmen in inter-school cricket matches:

Runs scored	0 – 50	50 – 100	100 – 150	150 – 200	200 – 250
No. of batsmen	4	6	8	7	5

Draw a more than type ogive for the above data using a suitable scale.

SECTION – D

35. If the mean of the following data is 14.7, find the values of p and q. Also find its mode.

Class	0 – 6	6 – 12	12 - 18	18 - 24	24 – 30	30 - 36	36 – 42	Total
Frequency	10	p	4	7	q	4	1	40

36. Construct a $\triangle ABC$ with BC = 7 cm, $\angle B = 60°$ and AB = 6 cm. Construct another triangle whose sides are $\frac{3}{4}$ times of the corresponding sides of $\triangle ABC$

OR

Construct a pair of tangents to a circle of radius 3cm from a point on the concentric circle of radius 5 cm. Measure the length of each tangent.

37. Prove that "If a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio".

38. The total cost of a certain length of a piece of cloth is Rs. 200. If the piece was 5 m longer and each metre of cloth costs Rs. 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is its original rate per metre?

OR

Rs. 9000 were divided equally among a certain number of persons. Had there been 20 more persons, each would have got Rs. 160 less. Find the original number of persons.

39. The angle of elevation of the top B of a tower AB from a point X on the ground is 60°. At a point Y, 40 m vertically above X, the angle of elevation of the top is 45°. Find the height of the tower AB and distance XB.

40. A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of base of the cone is 21 cm and its volume is $\frac{2}{3}$ of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy. $\left(Use\ \pi = \frac{22}{7} \right)$

OR

A milk container is made of metal sheet in the shape of frustum of a cone whose volume is $10459\frac{3}{7}$ cm^3. The radii of its lower and upper circular ends are 8 cm and 20 cm respectively. Find the cost of metal sheet used in making the container at the rate of Rs 1.40 per square centimeter. $\left(Use\ \pi = \frac{22}{7} \right)$

End of the Question Paper