

Roll Number

SET A



INDIAN SCHOOL MUSCAT  
FINAL EXAMINATION  
MATHEMATICS

CLASS: X

Sub. Code: 041

Time Allotted: 3 Hrs.

28.01.2021

Max. Marks: 80

**General Instructions:**

1. All questions are compulsory; however internal choices are provided in a few questions whose guidelines are given below.
2. Calculators are not allowed.
3. This question paper contains two parts A and B.
4. Both Part A and Part B have internal choices.

**Part – A:**

1. It consists two sections- I and II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. 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 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.
4. Internal choices are provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks in which any one out of two are only to be answered in each question.

**Note: One graph sheet to be provided**

Q.  
No.

**Part - A**

**Marks  
Allocated**

**Section-I**

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

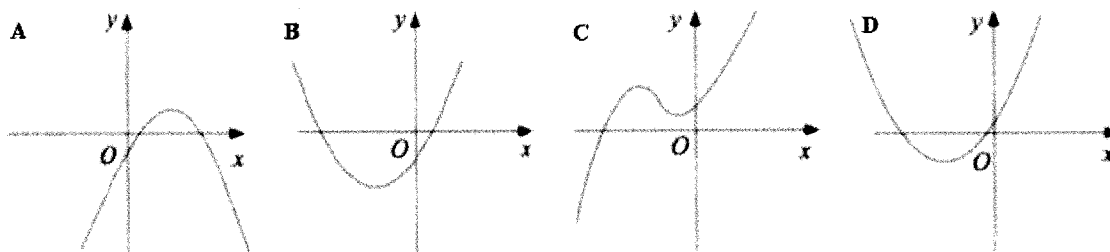
1. Find if  $\frac{395}{10500}$  will have terminating or non-terminating decimal expansion without actual division. (Give reason)

1

**OR**

The HCF and LCM of two numbers a and b are 3 and 18. Find ab.

2.



From above four graphs A, B, C and D which one could have the equation  $y = 2x^2 + 7x + 3$

3. Find the value of  $k$  for which the equations  $x + 2y = 5$  and  $3x + ky + 15 = 0$  are inconsistent. 1

**OR**

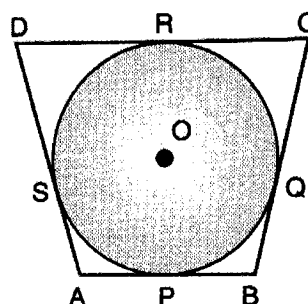
Find the point of intersection of the line  $-2x + 3y = -7$  with Y axis.

4. If  $x = 3m + 1$  and  $y = 4$  is a solution of the equation  $x - y = 6$ , then find the value of  $m$ . 1
5. If the product of the roots of the equation  $x^2 - 9x + p = 10$  is 5, then find the value of  $p$ . 1
6. Find the nature of the roots of the quadratic equation  $2x^2 - 3x + 5 = 0$  1
7. If  $b - 1$ ,  $b + 3$  and  $3b - 1$  are in A.P., then find  $b$ . 1
8. A and B are respectively the points on the sides PQ and PR of a triangle PQR such that  $PQ = 12.5$  cm,  $PA = 5$  cm,  $BR = 6$  cm and  $PB = 4$  cm. Is  $AB \parallel QR$ ? Give reason. 1

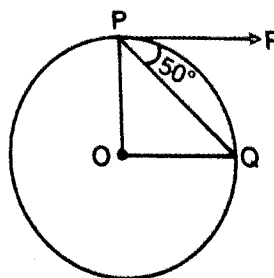
9. Find the distance between two parallel tangents of a circle with radius 5 cm. 1

**OR**

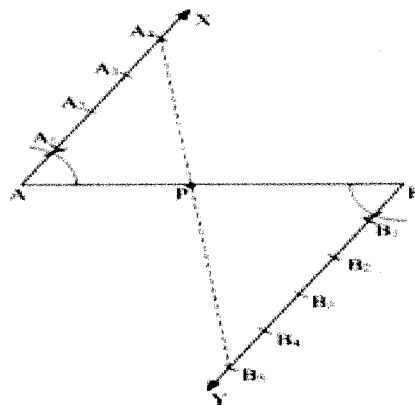
In the adjoining figure, if  $\angle COD = 125^\circ$ , what is the measure of  $\angle AOB$ .



10. In the figure, O is the centre of the circle, PQ is a chord and the tangent PR at P makes an angle of  $50^\circ$  with PQ. Find  $\angle POQ$ . 1



11. In the figure, if  $\angle XAB = \angle YBA$  and  $B_1, B_2, \dots$  and  $A_1, A_2, A_3, \dots$  have been marked at equal distances. In what ratio does P divide AB?



12. If  $x = 3\operatorname{cosec}^2\theta$  and  $y = 3\cot^2\theta + 2$ , then find  $x - y$ .

13. If  $\frac{4 - \sin^2 45^\circ}{\cot\theta \cdot \tan 30^\circ} = 3.5$ , then find  $\theta$ .

14. What is the diameter of a circle whose area is equal to the sum of the areas of two circles of radii 24 cm and 7 cm?

15. What is the ratio of volume of a cube to that of a sphere which will fit inside it? (Leave your answer in  $\pi$ )

**OR**

If two solid hemi-spheres of same base radius are joined together along their bases, then find the total surface area of this new solid.

16. If a pair of dice is thrown, find the probability of getting different numbers on the dice.

**OR**

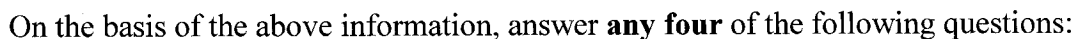
A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.

## Section-II

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

17. **Case Study based-1**

Villages A and B are located on the graph at A (10, 3) and B (6, 5). Government is planning to construct a highway running in-between these two villages in a straight line. Also the government has decided to keep a bus stop at a point D.



- ### 18. Case Study Based- 2

On the basis of the above information, answer **any four** of the following questions:

- Page 4 of 8

- (iii) The ratio of the areas of the triangles AGB and AEF is 1  
 (a)  $\frac{2}{5}$  (b)  $\frac{4}{25}$  (c)  $\frac{4}{5}$  (d)  $\frac{2}{25}$
- (iv) Which option below is wrong for triangles AGB and AEF? 1  
 (a)  $\frac{AG}{AE} = \frac{AB}{BF}$  (b)  $\frac{AG}{AE} = \frac{AB}{AF}$  (c)  $\frac{AG}{GE} = \frac{AB}{BF}$  (d)  $\frac{GE}{AE} = \frac{BF}{AF}$
- (v) The circular arc of the tent is exactly 40cm below the top vertex. What is the maximum height for a person to walk inside without bending? 1  
 (a) 185 cm (b) 175 cm (c) 190 cm (d) 160 cm

19. **Case Study Based- 3**

A 40-year old building programme for new houses began in Oldtown in the year 1951 (Year 1) and finished in 1990 (year 40). The number of houses built in each year form an Arithmetic sequence with first term **a** and common difference **d**.

Given that 2400 new houses were built in 1960 and 600 new houses were built in 1990.

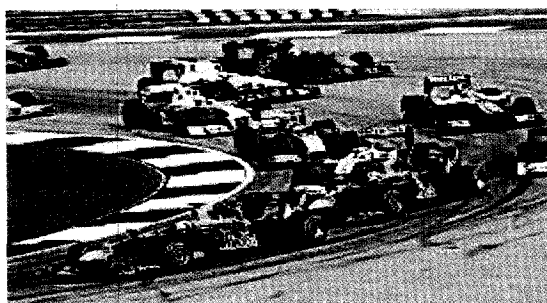
On the basis of the above information, answer **any four** of the following questions:



- (i) The value of d is 1  
 (a) - 60 (b) - 30 (c) - 20 (d) 10
- (ii) The value of a is 1  
 (a) 2300 (b) 2000 (c) 2940 (d) 2504
- (iii) Number of houses built in the 40<sup>th</sup> year is 1  
 (a) 500 (b) 600 (c) 450 (d) 300
- (iv) What is the total number of houses built? 1  
 (a) 35000 (b) 45000 (c) 70800 (d) 90700
- (v) In which year the number of houses became less than 1000? 1  
 (a) 1983 (b) 1984 (c) 1986 (d) 1985

20. **Case Study Based- 4**

The technical team of an international motor race are analyzing last year data of drivers' performance to provide valuable inferences on how the drivers can improve this year.



The length of time taken by 80 drivers to complete a journey is given in the table below:

Time (in minutes)	70 – 80	80 - 90	90 - 100	100 – 110	110 - 120	120 -130
No. of drivers	4	10	y	20	24	8

On the basis of the above information, answer **any four** of the following questions:

- (i) How many drivers are there in the range 90 – 100? 1  
 (a) 14 (b) 60 (c) 24 (d) 80
- (ii) The median class of the distribution is 1  
 (a) 80 – 90 (b) 90 – 100 (c) 100 – 110 (d) 110 – 120
- (iii) Class mark of the modal class is 1  
 (a) 105 (b) 115 (c) 120 (d) 100
- (iv) Modal time taken to complete the journey is 1  
 (a) 115 mins (b) 24 mins (c) 112 mins (d) 102 mins
- (v) Sum of the upper limits of the median and modal classes is 1  
 (a) 200 (b) 210 (c) 220 (d) 230

### Part –B

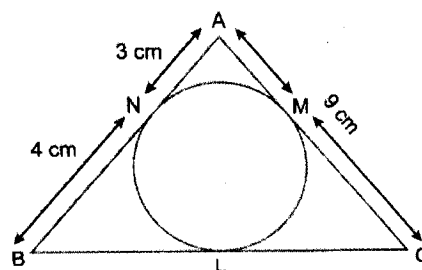
**All questions are compulsory. In case of internal choices, attempt any one.**

21. Show that  $12^n$  cannot end with the digit 0 or 5 for any natural number n. 2
22. Form a quadratic polynomial whose one zero is 4 and the product of the zeroes is 28. 2

**OR**

Find the zeroes of the polynomial  $p(x) = x^2 - 3$

23. In the figure  $\triangle ABC$  is circumscribing a circle. Find the length of BC. 2



24. Draw a circle of radius 3 cm and a point P at a distance of 7 cm from the centre of the circle. From point P, draw two tangents to the circle and write their measures. 2

25. Find a point on Y axis which is equidistant from the points A (4, 8) and B (−6, 6) 2

**OR**

Find the coordinates of the point P which divides the line segment joining the points A (2, 1) and B (5, −8) such that  $\frac{AP}{AB} = \frac{1}{3}$

26. If a pole 12 m high casts a shadow 12 m long on the ground, find the sun's elevation. 2

27. Prove that  $\sqrt{3}$  is irrational. 3

28. Solve for x:  $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq -4, 7$  3

29. Prove that a line drawn through the midpoint of one side of a triangle, parallel to another side, bisects the third side. 3

**OR**

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

30. Prove the following identity: 3  
 $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

31. The area of an equilateral triangle is  $49\sqrt{3}\text{cm}^2$ . With each vertex as centre, circles are drawn with radius equal to half the length of the side of the triangle. Find the area of the circles included in the triangle. 3

**OR**

A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding minor segment. (Take  $\pi = 3.14$ )

32. The distribution given below shows the number of wickets taken by bowlers in one-day cricket matches. Find the mean of the number of wickets taken. 3

No. of wickets	20 - 60	60 - 100	100 - 140	140 - 180	180 - 220	220 - 260
No. of bowlers	7	5	16	12	2	3

33. A lot of T-shirts consists of 30 round neck out of which 12 are red and remaining green and 25 V-neck out of which 11 are red and remaining green. Apoorv will buy either green round neck or red V-neck. Shekhar will buy only round neck and Varun will buy only red. If a T-shirt is selected at random, what is the probability that it is 3

- (i) acceptable to Shekhar
- (ii) acceptable to Varun
- (iii) not acceptable to any of the three?

34. The perimeter of a rectangle is 52 cm and its length is 6 cm more than its width. Form a pair of linear equations for the above situation and find the dimensions of the rectangle graphically. 5

35. If the angle of elevation of a cloud from a point 10 metres above a lake is  $30^\circ$  and the angle of depression of its reflection in the lake is  $60^\circ$ , find the height of the cloud from the surface of the lake? 5

**OR**

The shadow of a tower at a time is three times as long as its shadow when the angle of elevation of the sun is  $60^\circ$ . Find the angle of elevation of the sun at the time of the longer shadow.

36. A wall is constructed with dimensions  $270\text{cm} \times 300\text{cm} \times 350\text{cm}$  with bricks each of size  $22.5\text{cm} \times 11.25\text{cm} \times 8.75\text{cm}$ . If  $\frac{1}{8}$  of the wall is mortar, find the number of bricks used to construct the wall.

5

**End of the Question Paper**