INDIAN SCHOOL MUSCAT
PRACTICE PAPER - 2
MATHEMATICS

CLASS: X **Sub. Code: 041** **Time Allotted: 3 Hrs**
Max. Marks: 80

General Instructions:

1. *All questions are **compulsory**.*
2. *The question paper consists of **30** questions divided into **four sections A, B, C and D**. **Section-A** comprises of **6** questions of **1 mark** each; **Section-B** comprises of **6** questions of **2 marks** each; **Section-C** comprises of **10** questions of **3 marks** each and **Section-D** comprises of **8** questions of **4 marks** each.*
3. *There is no overall choice in this question paper. However, an internal choice has been provided in **two** questions of **1 mark**, **two** questions of **2 marks**, **three** questions of **3 marks** each and **three** questions of **4 marks** each. You have to attempt only one of the questions in all such questions.*
4. *Use of calculator is not permitted.*

SECTION A: (1 mark each)

1. Find the smallest positive rational number by which $\frac{1}{7}$ should be multiplied so that its decimal expansion terminates after 2 places of decimal.

2. If α and β are the roots of $ax^2 - bx + c = 0$ $(a \neq 0)$, then calculate $\alpha + \beta$

OR

Rewrite the following as a quadratic equation in x: $\frac{4}{x} - 3 = \frac{5}{2x+3}$; $x \neq 0, \frac{-3}{2}$

3. Find the third term of an A.P whose first term is 3x + y and common difference is x – y.

4. Find the perpendicular distance of A(5, 12) from the y-axis.

5. Find the value of $\tan^2 10° - \cot^2 80°$.

OR

If $\sin \emptyset = \frac{1}{2}$, find the value of $3 \cos \emptyset - 4 \cos^3 \emptyset$

6. A girl walks 200m towards East and then she walks 150m towards North. Find the distance of the girl from the starting point.

SECTION B: (2 marks each)

7. Explain whether 3 × 12 × 101 + 4 is a prime number or a composite number.

OR

Given that HCF (306, 1, 314) = 18. Find LCM (306, 1, 314)?

8. For what value of k, the following system of linear equations have no solution:
$3x + y = 1$ and $(2k - 1)x + (k - 1)y = 2k + 1$.

9. Find the sum of first n odd natural numbers?

OR

Which term of the A.P 36, 31, 26, 21,… is the first negative term?

10. Find the ratio in which the point $P\left(\frac{3}{4}, \frac{5}{12}\right)$ divides the line segment joining the points $A\left(\frac{1}{2}, \frac{3}{2}\right)$ and B (2,-5).

11. Two different dice are rolled together. Find the probability of getting two numbers whose product is less than 18.

12. A box contains 18 balls out of which x balls are red. (i) If one ball is drawn at random from the box, what is the probability that it is red? (ii) If two more red balls are put in the box, the probability of drawing a red ball will be two times the probability of drawing a red ball in the first case. Find the value of x.

SECTION C : (3 marks each)

13. Find the smallest number which when increased by 17 is exactly divisible by 520 and 468.

14. If one zero of a polynomial $3x^2 - 8x + 2k + 1$ is seven times the other, find the value of k.

15. A and B are two points 150 km apart on a highway. Two cars start from A and B at the same time. If they move in the same direction they meet in 15 hours. But if they move in the opposite direction, they meet in 1 hour. Find their speeds.

16. Find the area of a triangle ABC with A (1, - 4) and mid points of sides through A being (2, -1) and (0,-1).

OR

Prove that the points (-2, 3), (8, 3) and (6, 7) are the vertices of a right triangle.

17. In an acute angled triangle ABC, if sin (A +B – C) = $\frac{1}{2}$ and cos (B + C – A) = $\frac{1}{\sqrt{2}}$, find $\angle A$, $\angle B$ and $\angle C$

OR

If cos θ + sin θ = p and sec θ + cosec θ = q, prove that $q(p^2 - 1) = 2p$

18. In ΔABC, XY || AC and XY divides ABC into two parts of equal area. Determine The ratio AX : AB.

OR

In the figure 1, ΔABC is such that AC = BC and $AD \times BE = BC^2$. Prove that ΔACD is similar to ΔBEC.

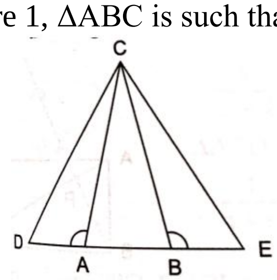

figure 1

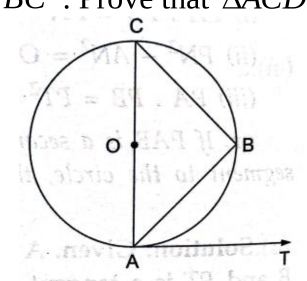

figure 2

19. Two circles touch externally. The sum of their areas is 289π cm^2 and the distance between their centres is 23 cm. Find the radii of the circles.

20. If AB is a chord of a circle with centre O, AOC is a diameter and AT is the tangent at A as shown in figure 2. Prove that $\angle BAT = \angle ACB$.

21. A vessel in the shape of a cuboid contains some water. If three identical spheres are immersed in the water, the level of water is increased by 2 cm. If the area of the cuboid is 160 cm^2 and its height is 12 cm, determine the radius of the spheres.

OR

A sector of a circle of radius 12 cm has the angle 120°. It is rolled up so that two bounding radii are joined together to form a cone. Find the volume of the cone.

22. Calculate the modal age from the given distribution·

Age(in years)	≥ 100	≥ 90	≥ 80	≥ 70	≥ 60	≥ 50	≥ 40	≥ 30	≥ 20	≥ 10	≥ 0
No.of persons	0	7	18	26	41	63	75	98	117	139	150

SECTION D: (4 marks each)

23. Prove that in a triangle, if the 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.

24. The total cost of a certain length of cloth is Rs 200. If the piece was 5 m longer and each metre of cloth costs Rs2 less, the cost of the piece would have remained unchanged. How longer is the piece and what is its original rate per metre?

OR

Solve for x: $x^2 - (2b-1)x + (b^2 - b - 20) = 0$.

25. If p^{th}, q^{th} and r^{th} terms of an A.P. are a, b and c respectively, then show that a(q – r) + b(r – p) + c(p – q) = 0.

26. Evaluate : $\frac{\operatorname{cosec}^2(90°-\theta)-\tan^2\theta}{4(\cos^2 40°+\cos^2 50°)} - \frac{2\tan^2 30°\sec^2 52°\sin^2 38°}{3(\operatorname{cosec}^2 70°-\tan^2 20°)}$

27. If the angle of elevation of a cloud from a point h metres above a lake is α and the angle of depression of its reflection in the lake is β, prove that the height of the cloud above the lake is $\frac{h(\tan\beta+\tan\alpha)}{(\tan\beta-\tan\alpha)}$.

OR

At a point on the level ground, the angle of elevation θ of a vertical tower is found to be such that its tangent is $\frac{5}{12}$. On walking 192m towards the tower, the tangent of the angle of elevation is $\frac{3}{4}$. Find the height of the tower.

28. To a circle of radius 4 cm, draw two tangents which are inclined to each other at an angle of 60°.

29. A tent consists of a frustum of a cone capped by a cone. If the radii of the ends of the frustum be 13m and 7m, the height of the frustum be 8m and slant height of the conical cap be 12m, find the canvas required for the tent.

30. Find the missing frequencies in the following frequency distribution table, if mean is 62.8.

Class	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	100 - 120	Total
Frequency	7	f_1	10	f_2	7	8	50

OR

Draw a less than ogive and a more than ogive for the following distribution and hence find its median.

Class	20 – 30	30 – 40	40 - 50	50 – 60	60 - 70	70 - 80	80 - 90
Frequency	10	8	12	24	6	25	15

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