Roll Number		

SET **A**

INDIAN SCHOOL MUSCAT
FINAL TERM EXAMINATION
MATHEMATICS

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

18.11.2018 Max.Marks: 80

General Instructions:

1. All the questions are **compulsory**.
2. The questions paper consists of **30** questions divided into 4 sections A, B, C and D.
3. **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. **Section D** comprises of **8** questions of**4 marks** each.
4. 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, four 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.
5. Use of calculators is not permitted.

SECTION – A
(Questions 1 to 6 carry 1 mark each)

1. If $\sin\theta = \frac{1}{3}$, $then find the value of (2\ cot^2\theta + 2)$

   (OR)

   If sec (7° - 2θ) = cosec(5θ - 7°) then find the value of θ.

2. If tangents AB and AC from a point A to a circle with centre O are inclined to each other at an angle of 70°, then find ∠AOB.

3. Find the mode of the data, using an empirical formula, when it is given that median = 41.25 and mean = 33.75.

4. Find the area (in square units) of the triangle formed by the points A(a,0), O(0,0) and B(0,b).

   (OR)

   A(5,1), B(1,5) and C(-3, -1) are the vertices of ΔABC. Find the length of median AD.

5. After how many decimal places will the decimal expansion of $\frac{26}{2^4 \times 5^3}$ terminate?

6. Write a quadratic polynomial, the product and sum of whose zeroes are $\frac{-9}{2} and \frac{-3}{2}$ respectively

SECTION – B
(Questions 7 to 12 carry 2 marks each)

7. The ratio of the height of a tower and the length of its shadow on the ground is $\sqrt{3}$: 1. What is the angle of elevation of the sun?

8. If tan (3x + 30)° = 1, then find x.

(OR)

If in ΔABC, ∠A = 90° then find the value of $\cos^2 B + \cos^2 C$.

9. For the following cumulative frequency distribution, find the modal class.

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
No. of students	3	12	27	57	75	80

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

11. Given that $\sin\theta = \frac{15}{17}$, find the value of $\frac{3-4\sin^2\theta}{4\cos^2\theta-3}$

12. Draw a circle of radius 3 cm. From a point P, 6cm away from its centre, construct a pair of tangents to the circle

(OR)

Draw a line segment AB of length 7 cm. Using ruler and compasses, find a point P on AB such that $\frac{AP}{AB} = \frac{3}{5}$

SECTION – C
(Questions 13 to 22 carry 3 marks each)

13. Solve the following system of equations for x and y: $\frac{5}{x-1} + \frac{1}{y-2} = 2$, $\frac{6}{x-1} - \frac{3}{y-2} = 1$

14. Show that ΔABC, where A(-2, 0), B(2, 0), C(0, 2) and ΔPQR where P(-4, 0), Q(4, 0) , R(0, 4) are similar triangles.

(OR)

Show that the points A(3,5), B(6,0), C(1,-3) and D(-2, 2) are the vertices of a square

15. Prove that $\sqrt{5}$ is an irrational number.

16. Prove that $(cosecA - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$

(OR)

Prove that $(1 + \cot A - cosecA)(1 + \tan A + \sec A) = 2$

17. In a hospital used water is collected in a cylindrical tank of diameter 4 m and height 5 m. After recycling, this water is used to irrigate a park of hospital whose length is 25 m and breadth is 20 m. If tank is filled completely then what will be the height of standing water used for irrigating the park.

(OR)

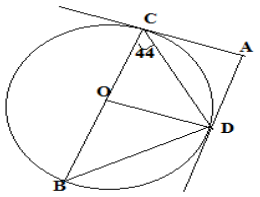
The radii of internal and external surfaces of a hollow spherical shell are 3 cm and 5 cm respectively. It is melted and recast into a solid cylinder of diameter 14 cm. Find the height of the cylinder.

18. Find the ratio in which the y-axis divides the line segment joining the points (5, -6) and (-1, -4). Also find the point of intersection.

19. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that∠PTQ = 2 ∠OPQ

(OR)

In the given figure, AC and AD are tangents to a circle with centre O, at C and D respectively. If∠BCD = 44°, then find ∠CAD, ∠CBD and ∠ACD



20. Use Euclid's Division Algorithm to find the HCF of 726 and 275.

21. A top is shaped like a cone surmounted by a hemisphere. The entire top is 7 cm in height and the diameter of the top is 6 cm. If a child wants to colour the top, find the area he has to colour. (Take $\pi = \frac{22}{7}$)

22. Two different dice are thrown together. Find the probability that the numbers obtained (i) have a sum less than 5 (ii) have a product less than 6 (iii) is a doublet of odd numbers

SECTION D
(Questions 23 to 30 carry 4 marks each)

23. Construct a ΔABC in which BC = 6.5 cm, AB = 4.5 cm and $\angle ACB = 60°$. Construct another triangle similar to ΔABC such that each side of new triangle is $\frac{4}{5}$ of the corresponding sides of ΔABC.

24. A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that of the boat in still water.

(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?

25. Draw '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	8	12	24	6	10	15	25

26. Prove that the lengths of tangents drawn from an external point to a circle are equal.

27. From the top of a 60 m high building, the angles of depression of the top and the bottom of a tower are observed to be 30° and 60° respectively. Find the height of the tower.

(OR)

The angle of elevation of the top of a tower from certain point is 30°. If the observer moves 20 m towards the tower, the angle of elevation of the top increased by 15°. Find the height of the tower.

28. On dividing the polynomial $3x^3 + 4x^2 + 5x - 13$ by a polynomial g(x), the quotient and the remainder were (3x +10) and (16x – 43) respectively. Find g(x).

29. A drinking glass is in the shape of a frustum of a cone of height 14 cm. The diameters of its two circular ends are 16cm and 12cm. Find the capacity and surface area of the glass. (Use $\sqrt{2} = 1.4, \pi = \frac{22}{7}$)

30. If the mean of the following frequency distribution is 65.6, find the missing frequencies:

Class	10 – 30	30 – 50	50 – 70	70 – 90	90 – 110	110 – 130	Total
Frequency	5	8	f_1	20	f_2	2	50

(OR)

The median of the following data is 32.5. Find the values of x and y, if the total frequency is 40.

Class	0 –10	10 –20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	x	5	9	12	y	3	2

End of the Question Paper