INDIAN SCHOOL MUSCAT
SECOND PRELIMINARY EXAMINATION
MATHEMATICS

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

10. 02. 2019   Max. Marks: 80

General Instructions:

(i) *All questions are compulsory.*

(ii) *The question paper consists of 30 questions divided into four sections A, B, C and D.*

(iii) *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.*

(iv) *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.*

(v) *Use of calculators is not permitted.*

SECTION A
(Question numbers 1 to 6 carry 1 mark each)

1. Explain why 13233343563715 is a composite number?

2. If the common difference of an A.P is -6, find $a_{16} - a_{12}$.

3. If $\sin A = \dfrac{1}{2}$ and $\cos B = \dfrac{1}{2}$, then find the value of A + B.
    OR
    If 5 cosec A = 7, then find $\sin^2 A - \cos^2 A$.

4. In the fig., if $\angle M = \angle N = 46°$, express x in terms of a, b and c.
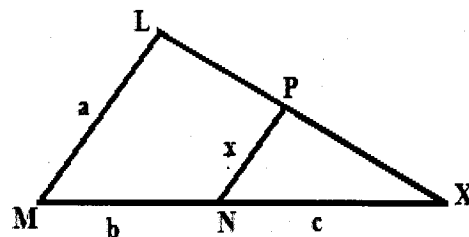
5. Two vertices of a triangle are (3, 5) and (-4, -5). If the centroid of the triangle is (4, 3), find the third vertex.

6. Find the discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$.
    OR
    Find the value of '*k*', for which one root of the quadratic equation $kx^2 - 14x + 8 = 0$ six times the other.

SECTION B
(Question numbers 7 to 12 carry 2 marks each)

7. Find the smallest natural number by which 1200 should be multiplied so that the square root of the product is a rational number?

OR

Find HCF of the numbers given below: k, 2k, 4k and 5k, where k is any positive integer

8. Find the value of k for which the pair of equations has no solution:
$x + 2y = 3$ and $(k-1)x + (k+1)y = (k+2)$

9. Find the middle term of the A.P. 213, 205, 197...37

OR

Find the eleventh term from the end of the A.P. 10, 7, 4... -62.

10. Points A (-1, y) B (5, 7) lie on a circle with centre O (2, -3y). Find the value of y.

11. 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 number divisible by 5 (ii) a composite number between 50 and 70.

12. A bag contains 14 balls of which x are white. If 6 more white balls are added to the bag, the probability of drawing a white ball is $\frac{1}{2}$. Find the value of x.

SECTION C
(Question numbers 13 to 22 carry 3 marks each)

13. If p is a prime number, then prove that $\sqrt{p}$ is irrational.

14. Find the value of x if, $4\left(\dfrac{\sec^2 59^\circ - \cot^2 31^\circ}{3}\right) - \dfrac{2}{3}\sin 90^\circ + 3\tan 56^\circ \tan 34^\circ = \dfrac{x}{3}$.

OR

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

15. If the points *(p, q), (m, n)* and *(p – m, q – n)* are collinear, then show that *pn = qm*.

OR

A (1, -4), B (3, 2) and C (-1, 2) are the vertices of ∆ABC and D is the midpoint of BC. If P is a point on AD such that $\dfrac{AP}{PD} = \dfrac{2}{1}$, then find the coordinates of P.

16. Solve for x and y: $2(3x - y) = 5xy$ and $2(x + 3y) = 5xy$

17. If α and β are the zeroes of a quadratic polynomial such that α + β= 24 and α – β = 8, find the quadratic polynomial having α and β as its zeroes. Also verify the relationship between the zeroes and the coefficients of the polynomial.

18. S and T are respectively the points on sides PR and QR of triangle PQR such that $\angle P = \angle RTS$. Show that $\triangle RPQ \sim \triangle RTS$.

OR

The diagonals of a trapezium ABCD with AB || CD meet at O. If AB = $\frac{1}{3}$ CD and ar($\triangle$ AOB) = 21 cm², find ar($\triangle$ COD).

19. A chord AB of a circle of a circle of radius 28 cm subtends an angle of 90° at the centre of the circle. Find the area of the corresponding minor segment of the circle.

20. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle

21. A right triangle, whose perpendicular sides are 15 cm and 20 cm, is made to revolve about its hypotenuse. Find the surface area of the double cone so formed.

OR

Water is flowing at the rate of 0.7 m/sec through a circular pipe whose internal diameter is 2 cm into a cylindrical tank, the radius of whose base is 40 cm. Determine the increase in the level of water in half an hour.

22. Find p if the mean of the given data is 15.4.

Class intervals	0 - 6	6 - 12	12 - 18	18 – 24	24 - 30
Frequency	6	8	p	9	7

SECTION D
(Question numbers 23 to 30 carry 4 marks each)

23. One fourth of a herd of camels was seen in forest. Twice the square root of the herd had gone to mountains and remaining 15 camels were seen on the bank of the river. Find the total number of camels?

OR

Solve for x : $\frac{2}{x+1} + \frac{3}{2(x-2)} = \frac{23}{5x}$; $x \neq 0,-1,2$.

24. Find $\left(4 - \frac{1}{n}\right) + \left(7 - \frac{2}{n}\right) + \left(10 - \frac{3}{n}\right) + \ldots$ upto n terms.

25. Prove that : $\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \sec\theta + \tan\theta$

26. The angle of elevation of a stationary cloud from a point 25 m above a lake is 30° and the angle of depression of its reflection in the lake is 60°. What is the height of the cloud above that lake-level?

OR

A vertical tower stands on a horizontal plane and is surrounded by a vertical flag staff of height h. At a point on the plane, the angles of elevation of the bottom and top of the flag staff are α and β respectively.

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Prove that the height of the tower is $\dfrac{h\tan\alpha}{\tan\beta - \tan\alpha}$.

27. 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.

28. Draw a pair of tangents to a circle of radius 5cm which are inclined to each other at an angle of 60°.

29. A building is in the form of a cylinder surmounted by a hemispherical dome. The base diameter of the dome is equal to   of the total height of the building. Find the height of the building if it contains $67\dfrac{1}{21}\, m^3$ of air.

30. The following data indicates the marks of 54 students in English.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of Students	5	3	4	3	4	4	7	9	7	8

Draw a less than and a more than type ogive for the data above and hence find its median.

OR

Find the values of x and y, if the median for the following data is 31.

Class	0-10	10 -20	20-30	30-40	40-50	50-60	Total
Frequency	5	x	6	y	6	5	40

End of the Question Paper

Roll Number		

SET B

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SECTION A
(Question numbers 1 to 6 carry 1 mark each)

1. If the common difference of an A.P is – 6, find $a_{16} - a_{12}$.

2. Find the discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$.
    OR
    Find the value of 'k', for which one root of the quadratic equation $kx^2 - 14x + 8 = 0$ six times the other.

3. Explain why 13233343563715 is a composite number?

4. Two vertices of a triangle are (3, 5) and (-4, -5). If the centroid of the triangle is (4, 3), find the third vertex.

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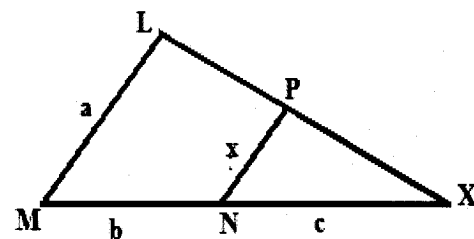
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Find HCF of the numbers given below: k, 2k, 4k and 5k, where k is any positive integer

10. Find the middle term of the AP, 213, 205, 197...37

OR

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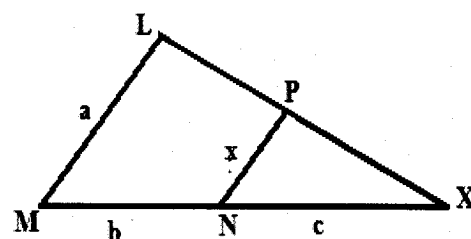
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