



INDIAN SCHOOL MUSCAT
FIRST PRELIMINARY EXAMINATION 2017
MATHEMATICS

CLASS: X
07.12.2017

Sub. Code: 041

Time Allotted: 3 Hrs
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 contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choice has been provided in 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

- 1 For a given data with 70 observations the less than ogive and the more than ogive intersect at (20.5, 35). What is the median of the data?
- 2 AB is a diameter of a circle with centre O (4,5). If A is (1,1), find the coordinates of B.
- 3 TP and TQ are the two tangents to a circle with centre O such that $\angle POQ = (2x+3)^\circ$ and $\angle PTQ = (3x-8)^\circ$. What is the value of x?
- 4 Find the common difference and write next term of the AP: 1.7, 2.3, 2.6.....
- 5 If $\sin A = \sqrt{3}/2$, find the value of $2\cot^2 A - 1$
- 6 Find the distance of (4, -3) from the origin.

SECTION B

- 7 A stunt man is climbing a 20m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. What is the length of the pole, if the angle of elevation made by the rope with the ground level is 30° ?

- 8 Draw a line segment PQ = 7.5cm and divide it internally in the ratio 3:4.
- 9 Determine the more than type cumulative frequency for the given grouped frequency distribution.

Marks obtained	Number of students
60-70	8
70-80	12
80-90	6
90-100	6

10 Evaluate: $\frac{\sin 90^\circ}{\cos 45^\circ} + \frac{1}{\operatorname{cosec} 30^\circ}$

- 11 The largest sphere is carved out of a cube of side 7cm. Find the volume of the sphere.
- 12 A bag contains 5 black, 7 red and 3 white balls. A ball is drawn from the bag at random. Find the probability that the ball drawn is (i) red (ii) black or white (iii) not black.

SECTION C

- 13 Solve the given equation by the method of completing the squares. $6x^2 + 7x - 10 = 0$.

OR

Solve for a: $(a-2) + \frac{1}{(a-2)} = 3$; $a \neq 2$

- 14 In a quadrilateral ABCD, $\angle D = 90^\circ$, BC = 38cm and DC = 25cm. A circle is inscribed in this quadrilateral which touches AB at point Q such that QB = 27cm. Find the radius of the circle.
- 15 If the second term of an AP is 4 and the seventh term is -11, find its 16th term.

OR

The first and the last term of an AP are 4 and 81 respectively. If the common difference is 7, how many terms are there and what is their sum?

16 $\frac{4}{3} \tan^2 30^\circ + \sin^2 60^\circ - 3 \cos^2 60^\circ + \frac{3}{4} \tan^2 60^\circ - 2 \tan^2 45^\circ$

OR

If $\cos \theta + \sin \theta = \sqrt{2} \cos \alpha$, show that $\cos \theta - \sin \theta = \sqrt{2} \sin \alpha$

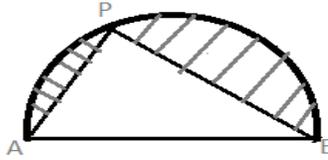
- 17 Find the area of a quadrilateral ABCD formed by the points A (-2, -2), B (5, 1), C (2, 4) and D (-1, 5).

OR

The vertices of a triangle are A (-1, 3), B (1, -1) and C (5, 1). Find the length of the median through the vertex C.

- 18 A solid is hemispherical at the bottom and conical at the top. If both have equal surface areas then find the ratio of the radius and the slant height of the conical part. (both have same radius).

- 19 In a circle of radius 21cm, an arc subtends an angle of 60° at the centre.
Find i) length of the arc ii) area of the sector formed by the arc.
- 20 In the fig, AB is the diameter, AP = 12cm and PB = 16cm. Taking the value of $\pi = 3.14$, find the perimeter of the shaded region.



- 21 A box 90 cards which are numbered from 1 to 90. If one card is drawn at random from the box, find the probability that it bears (i) a two digit number (ii) a perfect square (iii) a number divisible by 5.
- 22 Find the ratio in which the point $(-3, p)$ divides the line segment joining the points $(-5, -4)$ and $(-2, 3)$. Hence find the value of p .

SECTION D

- 23 Draw a triangle ABC with sides $AB = 5\text{cm}$, $BC = 6\text{cm}$ and $\angle ABC = 60^\circ$. Construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of triangle ABC.
- 24 XY and LM are two parallel tangents to a circle with centre O touching the circle at P and Q respectively. Another tangent AB touches the circle at C and intersects XY at A and LM at B. Prove that $\angle AOB = 90^\circ$.
- 25 If $15 \tan^2 \theta + 4 \sec^2 \theta = 23$, then find the value of $(\sec \theta + \operatorname{cosec} \theta)^2 - \sin^2 \theta$
- 26 A solid metal cone with base radius 12cm and height 24cm is melted to form spherical solid balls of diameter 6cm each. Find the number of balls thus formed.

OR

The radii of the circular ends of a bucket of height 15cm are 14cm and r cm ($r < 14$). If the volume of the bucket is 5390cm^3 , find the value of r .

- 27 Using step deviation method, find the arithmetic mean of the following grouped distribution.

Class interval	10-30	30-50	50-70	70-90	90-110	110-130
frequency	5	8	12	20	3	2

OR

Draw a less than type ogive on a graph and obtain the median for the given grouped distribution.

Class interval	30-39	40-49	50-59	60-69	70-79	80-89	90-99
frequency	14	6	10	20	30	8	12

Also verify the same using the formula for the median.

- 28 Two poles of equal heights are standing opposite to each other on either side of a road 100m. From a point between them on a road, the angles of elevation of their tops are 30° and 60° . Find the position of the point and also the heights of the poles.
($\sqrt{3} = 1.73$)
- 29 An Aero plane left 30 minutes later than its scheduled time and in order to reach its destination 1500 km away in time, it had to increase its speed by 250km/h from its usual speed. Determine its usual speed.
- 30 After being set up a pen factory manufactured 16000 pens in the 5th year and 20,500 pens in the 18th year. Assuming that the production increases uniformly by a fixed number every year, find
- The number of pens manufactured in the first year
 - The total production in 10 years
 - The production in the 7th year.

End of the Question Paper