



INDIAN SCHOOL MUSCAT FINAL EXAMINATION MATHEMATICS

CLASS: X

Sub. Code: 041

Time Allotted: 3 Hrs.

25.11.2019

Max. Marks: 80

General Instructions:

- (i) All questions are compulsory.
- (ii) Questions in section A are MCQ, F.I.B. and very short answer type questions carrying 1 mark each.
- (iii) Questions in section B are short answer type questions carrying 2 marks each.
- (iv) Questions in section C are long answer -I type questions carrying 4 marks each.
- (v) Questions in section D are long answer -II type questions carrying 6 marks each.
- (vi) 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, three 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.
- (vii) Use of calculators is not permitted.

SECTION A: (Questions 1 - 20 carry 1 mark each)

I. Q1 - Q10 ARE MULTIPLE CHOICE QUESTIONS. WRITE THE ANSWER ALONG WITH THE CORRECT OPTION: (1 × 10 = 10 marks)

1. The area of a square inscribed in a circle of radius 8cm is:
 (a) 64cm^2 (b) 100cm^2 (c) 125cm^2 (d) 128cm^2
2. If $\operatorname{cosec} \theta = \frac{3}{2}$ then $2(\operatorname{cosec}^2 \theta + \cot^2 \theta)$ is :
 (a) 3 (b) 7 (c) 9 (d) 5
3. Euclid's division lemma states that for any two positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy:
 (a) $1 < r < b$ (b) $0 < r \leq b$ (c) $0 \leq r < b$ (d) $0 < r < b$
4. The common point of the tangent to a circle and the circle, is called:
 (a) the point of contact (b) the centre (c) the origin (d) the end point of tangent
5. In tossing a die, the probability of getting an odd number less than 4 is:
 (a) 1 (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) $\frac{3}{4}$
6. The point on the X-axis which is equidistant from points (-1, 0) and (5, 0) is
 (a) (0, 2) (b) (2, 0) (c) (3, 0) (d) (0, 3)
7. The area of a square inscribed in a circle of radius 8cm is:

(a) 64cm^2

(b) 100cm^2

(c) 125cm^2

(d) 128cm^2

8. If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k is :

(a) $\frac{1}{2}$

(b) -2

(c) $\frac{1}{4}$

(d) 2

9. A shuttle cock used for playing badminton has the shape of the combination of :

- (a) a cylinder and a sphere (b) a sphere and a cone (c) a cylinder and a hemisphere
(d) a hemisphere and frustum of a cone .

10. If $\Delta ABC \sim \Delta DEF$, $BC = 4\text{cm}$, $EF = 5\text{cm}$ and $\text{ar}(\Delta ABC) = 80\text{cm}^2$, then $\text{ar}(\Delta DEF)$ is

(a) 100cm^2

(b) 125cm^2

(c) 150cm^2

(d) 200cm^2

II. **(Q11- Q15) FILL IN THE BLANKS:**

(1 x 5 = 5 marks)

11. If the points A (6, 1), B (8, 2), C (9, 4) and D (p, 3) are the vertices of a parallelogram, taken in order, then the value of p is _____.

12. The ratio of corresponding sides of two similar triangles is 5: 6, then the ratio of their areas is _____.

13. If $x = 2^3 \times 3 \times 5^2$ and $y = 2^2 \times 3^3$, then HCF (x, y) is -----.

14. The common difference of an AP in which $a_{25} - a_{12} = -52$ is -----.

15. The distance between two parallel tangents of a circle of radius 3 cm is -----.

OR

Length of a tangent drawn to a circle with radius 3 cm from a point 4 cm from the centre of the circle is -----.

III. **(Q16-Q20) ANSWER THE FOLLOWING :**

(1 x 5 = 5 marks)

16. Find the value of $\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$

17. Two players, Khushi and Rimaz play a badminton match. If the probability of Khushi's winning the match is 0.62, then find the probability of Rimaz's winning.

18. What is the product of the HCF and LCM of the smallest prime number and the smallest composite number?

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

OR

Find the coordinates of the point which divides the line segment joining the points (4, -3) and (8, 5) in the ratio 3:1 internally

20. If $x=1$ is a common root of the equations $ax^2 + ax + 3 = 0$ and $x^2 + x + b = 0$, then find the

value of ab ?

SECTION B: (Questions 21 – 26 carry 2 marks each)

21. An integer is chosen at random between 1 and 100. Find the probability that it is
(i) divisible by 8 (ii) not divisible by 8

OR

One card is drawn at random from a well shuffled pack of 52 cards. Find the probability of drawing (i) Neither an ace nor a king. (ii) a non-spade.

22. From an airport, two aeroplanes start at the same time. If speed of first aeroplane due north is 500 km/h and that of other due east is 650 km/h, then find the distance between two aeroplanes after 2 hours.

OR

Prove that the diagonals of a trapezium intersect each other in the same ratio

23. Draw a line segment AB of length 9.8 cm and divide it internally in the ratio 3:4. Measure the two parts.
24. Two concentric circles of radii 5 cm and 3 cm are given. Find the length of the chord of the larger circle which touches the smaller circle.
25. Which term of the AP: 3, 15, 27, 39 ... is 132 more than its 54th term?
26. How many spherical lead balls of radius 2.1 cm can be obtained from a rectangular solid lead with dimensions 88 cm, 42 cm and 21 cm?

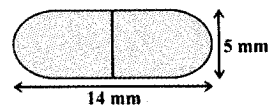
SECTION C: (Questions 27 – 34 carry 3 marks each)

27. Prove that $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2\operatorname{cosec}\theta$

OR

Given $\tan\theta = \frac{4}{3}$, Evaluate $\frac{2\sin\theta\cos\theta}{\cos^2\theta - \sin^2\theta}$.

28. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends (see Fig). The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area.



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

OR

A car has two wipers which do not overlap. Each wiper has a blade of length 25 cm

sweeping through an angle of 115° . Find the total area cleaned at each sweep of the blades.

30. Find sum of all natural numbers between 200 and 1502 which are exactly divisible by 8.
31. (i) Prove that $\sqrt{3}$ is an irrational number.

OR

(ii) The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds respectively. If they all change simultaneously at 8:00 hours, then at what time will they again change simultaneously?

32. ABCD is a parallelogram with co-ordinates of its vertices as A (-2, -1), B (1, 0), C (4, 3) and D (1, 2). Show that the diagonal AC divides it into two triangles equal in area. Also find the length of the diagonal AC.
33. An observer 1.5 m tall is 28.5 m away from a chimney. The angle of elevation of the top of the chimney from her eyes is 45° . What is the height of the chimney?
34. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segment joining the points of contact at the centre.

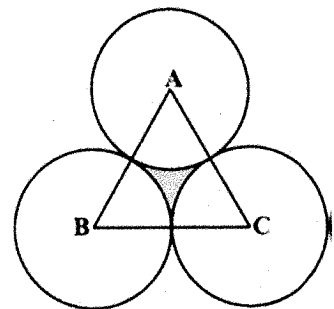
SECTION D: (Questions 35 – 40 carry 4 marks each)

35. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle.

OR

Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length. Also verify the measurement by actual calculation.

36. The area of an equilateral triangle ABC is 17320.5 cm^2 . With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle (See Fig given). Find the area of the shaded region.
(use $\pi = 3.14$ and $\sqrt{3} = 1.73205$)



37. Find two consecutive odd positive integers, sum of whose square is 290.

OR

A motor boat whose speed is 18km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

38. Prove that in a right triangle, the square of the hypotenuse is equal to the

sum of the squares of the other two sides.

39. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire.
40. As observed from the top of a 100m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships. ($\sqrt{3} = 1.732$)

OR

The shadow of a tower standing on a level ground is found to be 40 m longer when the sun's altitude is 30° than when it is 60° . Find the height of the tower.

End of the Question Paper