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Roll Number		

SET A

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 x 10 = 10 marks)**

1. 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:

   $(a)\ 1 < r < b$ $(b)\ 0 < r \leq b$ $(c)\ 0 \leq r < b$ $(d)\ 0 < r < b$

2. If n^{th} term of an AP is (2n + 1) , then the sum of its first three terms is :

   (a) 10 (b) 15 (c) 20 (d) 25

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

   $(a)\ 100cm^2$ $(b) 125cm^2$ $(c) 150cm^2$ $(d) 200cm^2$

4. The point on the X-axis which is equidistant from points (-1, 0) and (5, 0) is

   $(a)\ (0,2)$ $(b)\ (2,0)$ $(c)\ (3,0)$ $(d)\ (0,3)$

5. If cosec $\theta = \frac{3}{2}\ then\ 2(cosec^2\theta + cot^2\theta)\ is$:

   (a) 3 (b) 7 (c) 9 (d) 5

6. 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

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. 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

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

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. In tossing a die, the probability of getting an odd number less than 4 is:

$(a)\ 1$ $(b) \frac{1}{2}$ $(c)\ \frac{1}{3}$ $(d)\ \frac{3}{4}$

II. **(Q11- Q15) FILL IN THE BLANKS**: **(1 x 5 = 5 marks)**

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

12. 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 --------------.

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

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

15. 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 ________.

III. **(Q16-Q20) ANSWER THE FOLLOWING** : **(1 x 5 = 5 marks)**

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

17. 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.

18. 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?

19. Find the value of $\sin 60^0 \cos 30^0 - \cos 60^0 \sin 30^0$

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

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

21. 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.

22. 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?

23. Which term of the AP: 3, 15, 27, 39 … is 132 more than its 54^{th} term?

24. Draw a line segment AB of length 9.8cm and divide it internally in the ratio 3:4 .Measure the two parts.

25. 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.

26. From an airport, two aeroplanes start at the same time. If speed of first aeroplane due north is 500km/h and that of other due east is 650km/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.

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

27. Find sum of all natural numbers between 200 and 1502 which are exactly divisible by 8.

28. 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 in to two triangles equal in area. Also find the length of the diagonal AC.

29. (i) Prove that $\sqrt{5}$ 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?

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

OR

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

31. From the top of a 12m high building, the angle of elevation of the top of a tower is 60^0 and the angle of depression of its foot is 45^0. Determine the height of the tower.

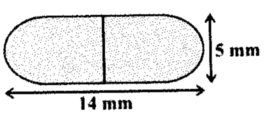
32. A chord of a circle of radius 10cm subtends a right angle at the centre. Find the area of the minor segment and the area of the major segment (Use $\pi = 3.14$).

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.

33. 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.

34. 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.



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

35. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

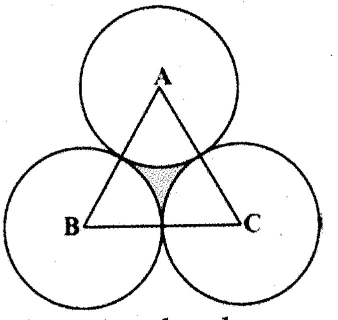
36. As observed from the top of a 100m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.($\sqrt{3}=1.732$)

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.

37. 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.

38. 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. $(use\ \pi = 3.14\ and\ \sqrt{3} = 1.73205)$



39. Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle.

OR

Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q.

40. 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.

End of the Question Paper