

**INTERNATIONAL INDIAN SCHOOL DAMMAM**  
**Preliminary Examination 2017-2018**  
**Subject : Mathematics**  
**Class : X**

Time allowed : 3 hours

Maximum marks : 80

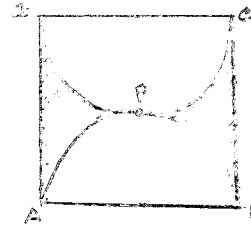
**SET A**

**General Instructions:**

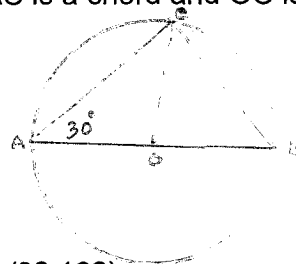
- (i) All questions are compulsory
- (ii) The question paper consists of 30 questions divided into four sections – **A, B, C** and **D**
- (iii) Section **A** contains **6** questions of **1** mark each, Section **B** contains **6** questions of **2** marks each, Section **C** contains **10** questions of **3** marks each and Section **D** contains **8** questions of **4** marks each.

**SECTION-A (6 x 1 = 6marks)**

1. Find the value of **q** so that the quadratic equation  $qx(x-3)+9=0$  has two equal roots.
2. Find the Perimeter of the shaded region in figure, if ABCD is a square of side 14cm and APB and CPD are semicircles.



3. PQR is a triangle right angled at P and M is a point on QR such that  $PM \perp QR$ . Show that  $PM^2 = QM.MR$
4. In the adjoining figure AB is a diameter, AC is a chord and OC is a radius of a circle such that  $\angle BAC = 30^\circ$ . Find  $\angle OCB$ .

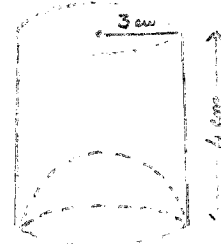


5. Given that  $\text{LCM}(26, 169) = 338$ , find  $\text{HCF}(26, 169)$
6. Find  $x$ , if  $2\text{cosec}^2 30^\circ + x\sin^2 60^\circ = 14$

**SECTION-B (6 x 2 = 12marks)**

7. Find the value of  $k$ , so that  $3k + 7, 2k + 5, 2k + 7$  are in A.P

8. Find the distance of the point P(1,2) from the mid point of the line segment joining A(3,5) and B(5,7)
9. Prove that  $\sqrt{3}$  is irrational.
10. Find the capacity in terms of  $\pi$  of a cylindrical vessel with a hemispherical portion raised upward at the bottom having radius 3 cm and height 4cm.



11. Solve for x:  $x^2 - (\sqrt{2} + 1)x + \sqrt{2} = 0$ .
12. ABCD is a trapezium in which  $AB \parallel CD$  and its diagonals intersect each other at the point O. Show that  $\frac{AO}{BO} = \frac{CO}{DO}$

**SECTION – C (10 x 3 = 30marks)**

13. Find the values of **a** and **b** for which the following system of equations has infinitely many solutions.

$$(2a - 1)x - 3y = 5 \text{ and } 3x + (b-2)y = 3$$

**OR**

Solve for x and y

$$\frac{x+1}{2} + \frac{y-1}{3} = 9 \text{ and } \frac{x-1}{3} + \frac{y+1}{2} = 8$$

14. The sum of the squares of three consecutive positive integers is 50. Find the integers.
15. The area of an equilateral triangle is  $49\sqrt{3} \text{ cm}^2$ . Taking each angular point as center, circles are drawn with radius equal to half the length of the side of the triangle. Find the length of the side of the triangle and the total area of sectors included in the triangle.
16. If  $x + a$  is a factor of the polynomial  $x^2 + px + q$  and  $x^2 + mx + n$ . Prove that

$$a = \frac{n-q}{m-p};$$

**OR**

Two zeroes of the polynomial  $p(x) = 2x^4 - 3x^3 - 3x^2 + 6x - 2$  are  $\sqrt{2}$  and  $-\sqrt{2}$ . Find the remaining zeroes of  $p(x)$  if any.

17. If A, B and C are interior angles of a triangle ABC, then show that

$$\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$$

18. Prove that the parallelogram circumscribing a circle is a rhombus.

OR

Two tangents TP and TQ are drawn to a circle with center O from external point T. Prove that  $\angle PTQ = 2\angle OPQ$

19. The following table shows the ages of the patients admitted in a hospital during a year.

Age(in year)	Below 15	Below 25	Below 35	Below 45	Below 55	Below 65
Cumulative Frequency	6	17	38	61	75	80

Find the mode of the above data.

OR

Using the above data find the mean by using step-deviation method.

20. Use Euclid's division lemma to show that the cube of any positive integer is of the form  $9m$ ,  $9m + 1$  or  $9m + 8$

21. The 2<sup>nd</sup>, 31<sup>st</sup> and the last term of an AP are  $7\frac{3}{4}$ ,  $\frac{1}{2}$  and  $-6\frac{1}{2}$  respectively. Find the first term and the number of terms.

22. Three unbiased coins are tossed. What is the probability of getting

- (i) Two Heads
- (ii) At least two heads
- (iii) One head or two heads.

**SECTION – D ( 8 x 4 = 32marks)**

23. Find the value of x if,

$$4\left(\frac{\sec^2 59^\circ - \cot^2 31^\circ}{3}\right) - \frac{2}{3}\sin 90^\circ + 3\tan^2 56^\circ \times \tan^2 34^\circ = \frac{x}{3}$$

OR

Prove that,  $\frac{\cot \theta}{\operatorname{cosec} \theta + 1} + \frac{\operatorname{cosec} \theta + 1}{\cot \theta} = 2 \sec \theta$

24. Draw a triangle ABC with  $BC = 7\text{cm}$ ,  $\angle B = 45^\circ$  and  $\angle C = 60^\circ$ . Then construct another triangle whose sides are  $\frac{3}{5}$  times the corresponding sides of  $\triangle ABC$ .
25. Prove that, the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

**OR**

In an equilateral triangle ABC, D is a point on side BC such that  $BD = \frac{1}{3} BC$ .  
Prove that  $9AD^2 = 7AB^2$

26. Convert the following data to a less than type, distribution and draw its ogive. Also find median from the graph

CLASS	100-120	120-140	140-160	160-180	180-200
Frequency	12	14	8	6	10

27. From the top of a building 60m high, the angles of depression of the top and bottom of a vertical lamp post as observed to be  $30^\circ$  and  $60^\circ$  respectively.  
Find  
(i) Horizontal distance between the building and the lamp post  
(ii) The height of the lamp post.
28. The three vertices of a parallelogram ABCD are  $A(3,-4)$ ,  $B(-1, -3)$  and  $C(-6,2)$ .  
Find the coordinates of vertex D and the area of parallelogram ABCD.
29. The sum of a two-digit number and the number framed by interchanging its digits is 110. If 10 is subtracted from the first number, the new number is 4 more than 5 times the sum of the digits in the first number. Find the first number.
30. A container, open at the top, and made of a metal sheet, is in the form of a frustum of a cone of height 24cm with radii of its lower and upper ends as 7cm and 14cm respectively. Find the volume of the milk which will completely fill the container and also find the area of the metal sheet used to make the container.

**OR**

A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of the base of the cone is 21cm and its volume is  $\frac{2}{3}$  of the volume of the hemisphere, calculate the height of the cone and surface area of the toy.

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