

**Goa Board**  
**Class X Mathematics**  
**Term II**  
**Sample Paper - 4**

**Time: 3 hrs****Total Marks: 90****General Instructions:**

1. All questions are **compulsory**.
2. The question paper consists of **34** questions divided into **four sections A, B, C, and D**.  
**Section A** comprises of **8** 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** and **Section D** comprises of **10** questions of **4 marks each**.
3. Question numbers **1 to 8** in **Section A** are multiple choice questions where you are to select **one** correct option out of the given four.
4. Use of calculator is **not** permitted.

**Section A**  
**(Questions 1 to 8 carry 1 mark each)**

1. Five male and three female candidates are available for selection for the post of manager in a company. The probability that a male candidate is selected is
  - A.  $\frac{1}{4}$
  - B. 1
  - C.  $\frac{5}{8}$
  - D.  $\frac{3}{8}$
2. If A(1, 2), B(4, y), C(x, 6) and D(3, 5) are the vertices of a parallelogram taken in order, then the values of x and y are:
  - A. 6 and 5
  - B. 6 and 3
  - C. 2 and 3
  - D. 5 and 2
3. Consider the A.P. 2, 6, 10,... For this arithmetic progression 210 is the
  - A. 50<sup>th</sup> term
  - B. 52<sup>nd</sup> term
  - C. 53<sup>rd</sup> term
  - D. 54<sup>th</sup> term

4. The length of a minute hand of a wall clock is 7 cm. What is the area swept by it in 30 minutes?
- A. 3 sq units
  - B. 77 sq units
  - C. 154 sq units
  - D. 38.5 sq units
5. In a circle of radius 7cm, tangent PQ is drawn from point P such that  $PQ = 24$  cm. If O is the centre of the circle, then the length of OP is:
- A. 30 cm
  - B. 28 cm
  - C. 25 cm
  - D. 31 cm
6. The ratio of the volume of a cube to that of a sphere which will exactly fit inside the cube is:
- A.  $\pi : 8$
  - B.  $\pi : 2$
  - C.  $8 : \pi$
  - D.  $6 : \pi$
7. A kite is flying, attached to a thread which is 165 m long. The thread makes an angle of  $30^\circ$  with the ground. The height of the kite from the ground, assuming that there is no slack in the thread is
- A. 80 m
  - B. 81.5 m
  - C. 82.5 m
  - D. 84 m
8.  $(x^2 + 1)^2 - x^2 = 0$  has
- A. Four real roots
  - B. Two real roots
  - C. No real roots
  - D. One real root

**Section B**  
**(Questions 9 to 14 carry 2 marks each)**

9. The height of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.
10. Find the co-ordinates of the vertices of a  $\Delta ABC$  with  $A(1, -4)$  and the mid-points of the sides through A being  $(2, -1)$  and  $(0, -1)$ .
11. Show that the tangents at the end points of a diameter of a circle are parallel.
12. Two circular pieces of equal radii and maximum area, touching each other are cut out from a rectangular card board of dimensions  $14 \text{ cm} \times 7 \text{ cm}$ . Find the area of the remaining card board. (Use  $\pi = \frac{22}{7}$ )
13. Determine the  $10^{\text{th}}$  term from the end of the A.P. - 4, 9, 14, ......., 254.
14. Find the value of k, if the point  $P(0, 3)$  is equidistant from  $(3, k)$  and  $(k, 6)$ .

**Section C**  
**(Questions 15 to 24 carry 3 marks each)**

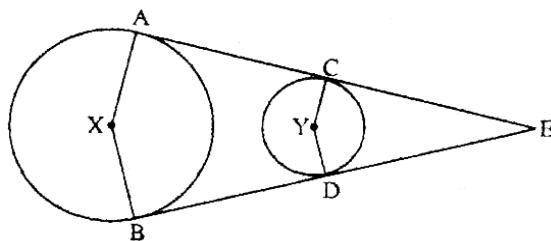
15. The area of a triangle is 5 sq units. Two of its vertices are  $(2, 1)$  and  $(3, -2)$  and the third vertex lies on  $y = x + 3$ . Find the co-ordinates of the third vertex.
16. If the roots of the equation  $(a - b)x^2 + (b - c)x + (c - a) = 0$  are equal then prove that  $2a = b + c$ .
17. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of  $60^\circ$ . Also, write the steps of construction.
18. The  $m^{\text{th}}$  term of an A.P. is n and the  $n^{\text{th}}$  term is m. Find the sum of  $(m + n)$  terms.
19. Two pillars of equal height are on either side of a road 100 m wide. The angles of elevation of the top of the pillars are  $60^\circ$  and  $30^\circ$  at a point on the road between the pillars. Find the height of the pillars.
20. The  $26^{\text{th}}$ ,  $11^{\text{th}}$  and the last term of an A.P. are 0, 3 and  $-\frac{1}{5}$ , respectively. Find the common difference and the number of terms.

**21.** One card is drawn from a well shuffled pack of 52 cards. Calculate the probability of getting

- i. A king or a queen
  - ii. Neither a heart nor a red king

**22.** In the given figure two circles with centres X and Y are shown. The common tangents AC and BD meet at E.

Prove that:



**23.** An iron pole consisting of a cylindrical portion 110 cm high and of base diameter 12 cm is surmounted by a cone 9 cm high and having the same diameter. Find the mass of the pole, given that 1 cu cm of iron has 8 gm mass (approx.)

**24.** The point P divides the join of  $(2, 1)$  and  $(-3, 6)$  in the ratio  $2 : 3$ . Does P lie on the line  $x - 5y + 15 = 0$ ?

## **Section D**

**(Questions 25 to 34 carry 4 marks each)**

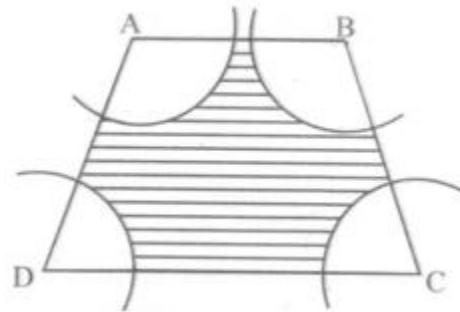
**25.** Prove that the lengths of tangents drawn from an external point to a circle are equal.

**26.** A factory produced 1100 cars in the third year and 2700 cars in the 11<sup>th</sup> year. Assuming that the production increases by a fixed number every year, find the production of cars in the 20<sup>th</sup> year and total cars produced in first 20 years? Inspite of increasing sale and huge profit, there is great dissatisfaction in the workers. As a part of management, what will you do to satisfy the workers and to get the best out of them?

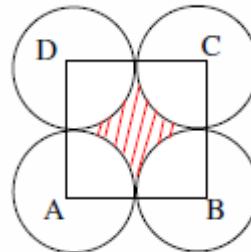
**27.** A vertical tower stands on a horizontal plane and is surmounted by a vertical flagstaff of height  $h$ . At a point on the plane, the angles of elevation of the bottom and the top of the flagstaff are  $\alpha$  and  $\beta$  respectively. Prove that the height of the tower is

$$h \frac{\tan \alpha}{\tan \beta - \tan \alpha}.$$

- 28.** By increasing the list price of a book by Rs. 10, a person can buy 10 less books for Rs. 1200. Find the original list price of the book.
- 29.** The internal and external diameters of a hollow hemispherical vessel are 24 cm and 25 cm respectively. Find the cost of painting the vessel all over at the rate of 5 paise per  $\text{cm}^2$ .
- 30.** A circle is touching the side BC of  $\Delta ABC$  at P and touching AB and AC produced at Q and R respectively. Prove that  
 $AQ = \frac{1}{2} (\text{perimeter of } \Delta ABC)$ .
- 31.** In the given figure, ABCD is a trapezium with  $AB \parallel DC$ ,  $AB = 18 \text{ cm}$ ,  $DC = 32 \text{ cm}$  and perpendicular distance between AB and DC = 14 cm. Arcs of equal radii of 7 cm with centres A, B, C and D have been drawn. Find the area of the shaded region of the figure.



- 32.** A cylindrical container whose diameter is 12 cm and height is 15 cm is filled with ice-cream. Ice-cream is distributed to ten children in equal cones having hemispherical tops. If the height of conical portion is twice the diameter of its base, find the diameter of the ice-cream cone.
- 33.** In the given figure, points A, B, C and D are the centres of four circles, each having a radius of 1 unit. If a point is chosen at random from the interior of square ABCD, what is the probability that the point will be chosen from the shaded region?



34.  $PQRS$  is the diameter of a circle of radius 6 cm. The lengths  $PQ$ ,  $QR$  and  $RS$  are equal.

Semi-circles are drawn on  $PQ$  and  $QS$  as diameters as shown in figure. Find the perimeter and area of the shaded region.

