

## SUMMATIVE ASSESSMENT - II 10th Mathematics 2012

Time allowed : 3 hours

Maximum Marks : 80

Question numbers 1 to 10 carry 1 mark each. For each of the question numbers 1 to 10, four alternative choices have been provided, of which only one is correct. Select the correct choice.

- The roots of the quadratic equation  $x^2 + 5x - (\alpha + 1)(\alpha + 6) = 0$ , where  $\alpha$  is a constant, are
  - $\alpha + 1, \alpha + 6$
  - $(\alpha + 1), -(\alpha + 6)$
  - $-(\alpha + 1), (\alpha + 6)$
  - $-(\alpha + 1), -(\alpha + 6)$
- The value of  $a_{30} - a_{20}$  for the A.P. 2, 7, 12, 17, ... is
  - 100
  - 10
  - 50
  - 20
- In Figure 1, point P is 26 cm away from the centre O of a circle and the length PT of the tangent drawn from P to the circle is 24 cm. Then the radius of the circle is

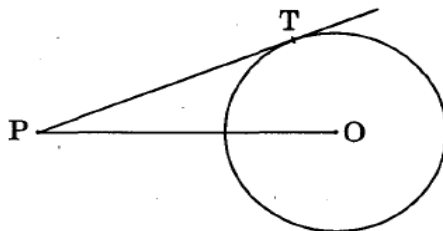
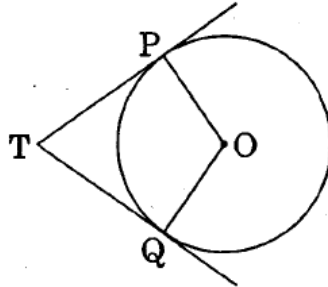


Figure 1

- |           |           |
|-----------|-----------|
| (A) 25 cm | (B) 26 cm |
| (C) 24 cm | (D) 10 cm |

4. In Figure 2, TP and TQ are two tangents to a circle with centre O such that  $\angle POQ = 110^\circ$ . Then  $\angle PTQ$  is equal to



*Figure 2*

- |                 |                |
|-----------------|----------------|
| (A) $55^\circ$  | (B) $70^\circ$ |
| (C) $110^\circ$ | (D) $90^\circ$ |
5. If the area of a circle is numerically equal to twice its circumference, then the diameter of the circle is
- |                 |             |
|-----------------|-------------|
| (A) 4 units     | (C) 8 units |
| (B) $\pi$ units | (D) 2 units |
6. A solid is hemispherical at the bottom and conical (of same radius) above it. If the surface areas of the two parts are equal, then the ratio of its radius and the slant height of the conical part is
- |           |           |
|-----------|-----------|
| (A) 2 : 1 | (C) 1 : 4 |
| (B) 1 : 2 | (D) 4 : 1 |
7. At some time of the day, the length of the shadow of a tower is equal to its height. Then the sun's altitude at that time is
- |                |                |
|----------------|----------------|
| (A) $30^\circ$ | (C) $90^\circ$ |
| (B) $60^\circ$ | (D) $45^\circ$ |

8. The line segment joining the points  $A(-2, -3)$  and  $B(2, -1)$  is divided by the y-axis in the ratio

- (A) 1 : 2      (C) 1 : 1  
(B) 2 : 1      (D) 1 : 3

9. The area (in square units) of the triangle formed by the points  $A(a, 0)$ ,  $O(0, 0)$  and  $B(0, b)$  is

- (A)  $ab$       (C)  $\frac{1}{2} a^2 b^2$   
(B)  $\frac{1}{2} ab$       (D)  $\frac{1}{2} b^2$

10. The probability of throwing a number greater than 2 with a fair die is

- (A)  $\frac{2}{3}$       (B)  $\frac{5}{6}$   
(C)  $\frac{1}{3}$       (D)  $\frac{2}{5}$

## SECTION B

*Question numbers 11 to 18 carry 2 marks each.*

11. For what value of  $k$  does the quadratic equation  $(k - 5)x^2 + 2(k - 5)x + 2 = 0$  have equal roots ?

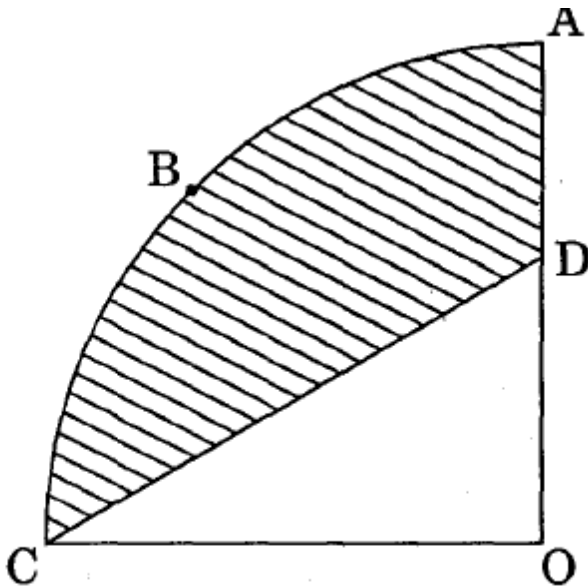
12. How many two-digit numbers are divisible by 7 ?

**OR**

If  $\frac{1}{x+2}$ ,  $\frac{1}{x+3}$  and  $\frac{1}{x+5}$  are in A.P., find the value of  $x$ .

13. If  $d_1, d_2$  ( $d_2 > d_1$ ) be the diameters of two concentric circles and  $c$  be the length of a chord of a circle which is tangent to the other circle, prove that  $d_2^2 = c^2 + d_1^2$ .
14. Draw a line segment of length 7.6 cm and divide it in the ratio 3 : 2.
15. In Figure 3, OABC is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the shaded region.

[Use  $\pi = \frac{22}{7}$ ]



*Figure 3*

16. The dimensions of a metallic cuboid are 100 cm × 80 cm × 64 cm. It is melted and recast into a cube. Find the surface area of the cube.
17. Find a relation between  $x$  and  $y$  such that the point  $P(x, y)$  is equidistant from the points  $A(1, 4)$  and  $B(-1, 2)$ .
18. Two different dice are thrown at the same time. Find the probability that the sum of the two numbers appearing on the top of the dice is 7.

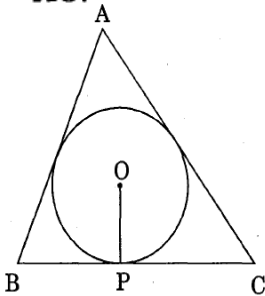
**SECTION C** Question numbers 19 to 28 carry 3 marks each.

19. Find the roots of the following quadratic equation :

$$\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$$

20. Find the sum of first  $n$  terms of an A.P. whose  $n^{\text{th}}$  term is  $5n - 1$ . Hence find the sum of first 20 terms.

21. In Figure 4, a triangle ABC is drawn to circumscribe a circle of radius 10 cm such that the segments BP and PC into which BC is divided by the point of contact P, are of lengths 15 cm and 20 cm respectively. If the area of  $\Delta ABC = 525 \text{ cm}^2$ , then find the lengths of sides AB and AC.



*Figure 4*

22. Draw a line segment AB of length 7 cm. Taking A as centre, draw a circle of radius 3 cm and taking B as centre, draw another circle of radius 2 cm. Construct tangents to each circle from the centre of the other circle.

**OR**

Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then construct another triangle whose sides are  $\frac{3}{4}$  times the corresponding sides of the isosceles triangle.

23. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding minor segment and hence find the area of the major segment. [Use  $\pi = 3.14$ ]



24. From a solid cylinder of height 14 cm and base diameter 7 cm, two equal conical holes each of radius 2.1 cm and height 4 cm are cut off. Find the volume of the remaining solid.

**OR**

The radii of the circular ends of a solid frustrum of a cone are 18 cm and 12 cm and its height is 8 cm. Find its total surface area.

[Use  $\pi = 3.14$ ]

25. A ladder of length 6 m makes an angle of  $45^\circ$  with the floor while leaning against one wall of a room. If the foot of the ladder is kept fixed on the floor and it is made to lean against the opposite wall of the room, it makes an angle of  $60^\circ$  with the floor. Find the distance between these two walls of the room.
26. Find the area of the quadrilateral ABCD whose vertices are A(3, -1), B(9, -5), C(14, 0) and D(9, 19).
27. Find the coordinates of the points which divide the line segment joining A(2, -3) and B(-4, -6) into three equal parts.

**OR**

Show that the points A(3, 5), B(6, 0), C(1, -3) and D(-2, 2) are the vertices of a square ABCD.

28. Cards marked with numbers 5, 6, 7, ..., 74 are placed in a bag and mixed thoroughly. One card is drawn at random from the bag. Find the probability that the number on the card is a perfect square.

**SECTION D** *Question numbers 29 to 34 carry 4 marks each*

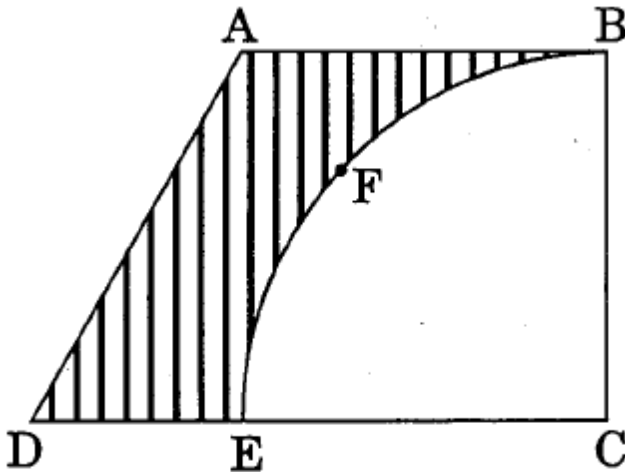
29. Two water taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

**OR**

Solve the following equation for  $x$  :

$$\frac{1}{x+1} + \frac{2}{x+2} = \frac{5}{x+4}, \quad x \neq -1, -2, -4$$

30. In an A.P., if the 6<sup>th</sup> and 13<sup>th</sup> terms are 35 and 70 respectively, find the sum of its first 20 terms.
31. Prove that the lengths of tangents drawn from an external point to a circle are equal.
32. From a thin metallic piece, in the shape of a trapezium ABCD in which  $AB \parallel CD$  and  $\angle BCD = 90^\circ$ , a quarter circle BFEC is removed (Figure 5). Given  $AB = BC = 3.5$  cm and  $DE = 2$  cm, calculate the area of the remaining (shaded) part of the metal sheet. [Use  $\pi = \frac{22}{7}$ ]



*Figure 5*

33. Water is flowing at the rate of 6 km/h through a pipe of diameter 14 cm into a rectangular tank which is 60 m long and 22 m wide. Determine the time in which the level of the water in the tank will rise by 7 cm. [Use  $\pi = \frac{22}{7}$ ]

**OR**

A hollow sphere of internal and external diameters 4 cm and 8 cm respectively is melted to form a cone of base diameter 8 cm. Find the height and the slant height of the cone.

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

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