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**SSC PUBLIC EXAMINATIONS 2024 - 25**  
**MATHEMATICS**  
**(ENGLISH VERSION)**

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**Time : 3 Hours 15 Minutes**

**Max. Marks : 100**

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**Instructions :**

1. In the duration of 3 hours 15 minutes, 15 minutes of time is allotted to read the question paper.
  2. All answers shall be written in the answer booklet **only**.
  3. Question paper consists of 4 Sections and 33 questions.
  4. Internal choice is available in section - IV **only**.
  5. Answers shall be written neatly and legibly.
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**SECTION - I**

**12 × 1 = 12 M**

**Note :** i) Answer all the questions in one word or phrase.

ii) Each question carries 1 mark.

1. Find the prime factorization of 30.
2. **Assertion :** Sum of the zeroes of a Quadratic polynomial

$$2x^2 + 3x - 4 \text{ is } \frac{-3}{2}.$$

**Reason :** Sum of the zeroes of a Quadratic polynomial

$$ax^2 + bx + c \text{ is } \frac{c}{a}.$$

**Now, choose the correct answer from the following.**

- A) Both Assertion and Reason are true, Reason is supporting the assertion.
  - B) Both Assertion and Reason are true but Reason is not supporting the assertion.
  - C) Assertion is true, but the Reason is false.
  - D) Assertion is false, but the reason is true.
3. The general form of linear equation in two variables is .....
  4. If  $n^{\text{th}}$  terms of an A.P is  $a_n = 2n - 6$  then

**Match the following.**

- |            |      |
|------------|------|
| i) $a_2$   | p) 0 |
| ii) $a_3$  | q) 2 |
| iii) $a_4$ | -2   |
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Choose the correct answer.

- A) i - p, ii - r, iii - q
- B) i - r, ii - q, iii - p
- C) i - r, ii - p, iii - q
- D) i - q, ii - r, iii - p

5. **Statement-I** : All similar triangles are congruent.

**Statement-II** : All right angled isosceles triangles are similar.

Now, choose the correct answer.

- A) Both statements are true.
  - B) Statement I is true and Statement II is false.
  - C) Statement I is false and statement II is true.
  - D) Both statements are false.
6. A person standing 20 meters away from the base of a building observes that the angle of elevation to the top of the building is  $45^\circ$  then the height of the building is .....
7. How many tangents can a circle have ?
8. Draw a rough figure of cylinder with height h cm and base radius r cm.
9. If  $p(E) = 0.05$ , what is the probability of 'not E' ?
10. Zero of the polynomial of  $ax + b$  is ( )
- A)  $\frac{b}{a}$
  - B)  $\frac{a}{b}$
  - C)  $\frac{-a}{b}$
  - D)  $\frac{-b}{a}$
11. If  $4 \cot A = 3$  then  $\tan A =$  ( )
- A)  $\frac{3}{5}$
  - B)  $\frac{4}{5}$
  - C)  $\frac{4}{3}$
  - D)  $\frac{3}{4}$
12. If  $x = \frac{1}{x}$  then the roots are ( )
- A) 1
  - B) -1
  - C) A, B
  - D) None
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**SECTION - II****8 × 2 = 16 M****Note :** *i) Answer all the questions.**ii) Each question carries 2 marks.*

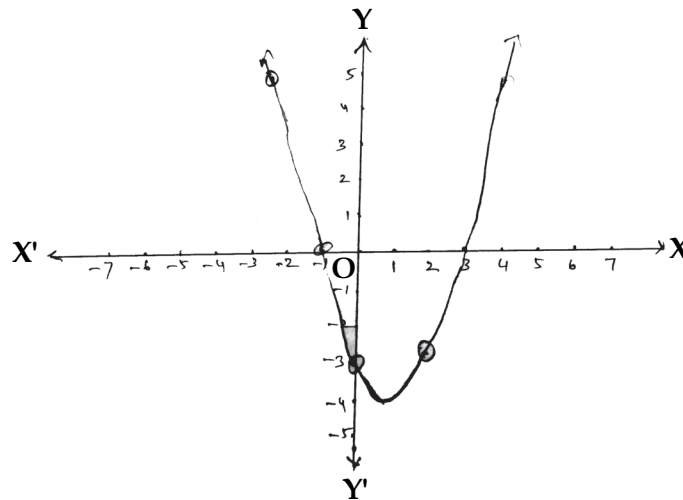
13. Find the volume of a cylinder with radius of base 6 cm and height 7 cm.
14. Find a Quadratic polynomial whose sum and product of the zeroes are 3 and 2 respectively.
15. Check whether the following are Quadratic Equations or not.
  - i)  $(x - 2)^2 + 1 = 2x - 3$
  - ii)  $x(x + 1) + 8 = (x + 2)(x - 2)$
16. Give an example for
  - i) Similar figures
  - ii) non similar figures
17. Find the coordinates of mid point of the line segment joining  $(\cos 0, 0)$  and  $(0, \sin 90^\circ)$
18. Express the ratios  $\cos A$  and  $\tan A$  in terms of  $\sin A$ .
19. Draw a diagram for the following situation.

A boy observed the top of an electric pole at an angle of elevation of  $60^\circ$  when the observation point is 8 meters away from the foot of the pole.
20. Calculate the length of tangent from a point 15 cm. away from the centre of a circle of radius 9 cm.

**SECTION - III****8 × 4 = 32 M****Note :** *i) Answer all the questions.**ii) Each question carries 4 marks.*

21. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting
    - i) a king of black colour
    - ii) a red face card.
  22. Write the formula to find the mode of a grouped data and explain the terms involved in it.
  23. A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of  $\pi$ .
  24. Find two numbers whose sum is 27 and product is 182.
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25. Prove that  $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$
26. Find the sum of odd numbers between 0 and 50.
27. Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre.
28. Due to heavy storm an electric wire got bent as shown in the figure. It followed a mathematical shape. Answer the following questions below.



- a) Name the shape in which the wire is bent.
- b) How many zeroes are there for the polynomial (Shape of the wire)
- c) The zeroes of the polynomial are
- d) Sum of the zeroes of the polynomial

**SECTION - IV****5 × 8 = 40 M**

*Note :* i) Answer all the questions.

ii) Each question carries 8 marks.

iii) There is an internal choice for each question.

29. a) Prove that  $2 + 5\sqrt{3}$  is irrational.

**OR**

- b) 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.

30. a) Find the area of a rhombus if its vertices are  $(-4, -7)$ ,  $(-1, 2)$ ,  $(8, 5)$  and  $(5, -4)$  taken in order.

**OR**

- b) A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find
- the area of that part of the field in which the horse can graze.
  - the increase in the grazing area if the rope was 10 m long instead of 5 m.
31. a) A box contains 100 discs which are numbered from 1 to 100. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number (ii) a perfect square (iii) a number divisible by 5. (iv) a number divisible by 10.

**OR**

- b) The angles of depression of the top and bottom of an 8 m tall building from the top of a multi-storeyed building are  $30^\circ$  and  $45^\circ$  respectively. Find the height of the multi-storeyed building and the distance between the two buildings.
32. a) The distribution below gives the weights of 30 students of a class. Find the median weight of the students.

Weight (in kg)	40 – 45	45 – 50	50 – 55	55 – 60	60 – 65	65 – 70	70 – 75
No. of Students	2	3	8	6	6	3	2

**OR**

- b) If the sum of first 7 terms of an A.P is 49 and that of 17 terms is 289, find the sum of first  $n$  terms.
33. a) Solve the following pair of linear equations graphically.

$$2x + y - 5 = 0$$

$$3x - 2y - 4 = 0$$

**OR**

- b) Form the pair of linear equations in the following situation and find their solution graphically.
- 3 pens and 4 pencils together cost ₹ 44 whereas 4 pens and 3 pencils together cost ₹ 47.
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