

**15E & 16E**

Total No. of Printed Pages : 7

Question Booklet Sl. No.

3520150**MATHEMATICS**

(English Version)

Time : 3 Hours 15 Minutes

Max. Marks : 100

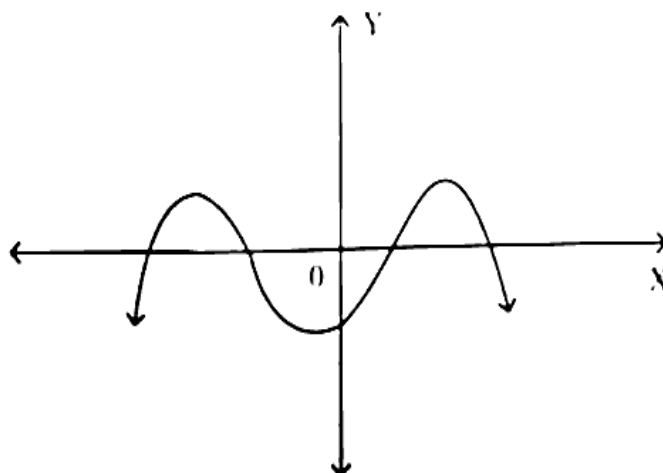
Instructions :

- 1) In the duration of 3 hours 15 minutes, 15 minutes of time is allotted to read the question paper.
- 2) All the 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.

SECTION – I**(12×1=12)**

- Note :**
- 1) Answer all the questions in one word or a phrase.
 - 2) Each question carries 1 mark.

1. What is the HCF of 37 and 49?
2. $\mathbb{N} = \{1, 2, 3, \dots\}$. This set is a/an _____ set. (Finite Infinite)
3. Find the number of zeroes of the polynomial $p(x)$, whose graph is given.





4. Which of the following equations is not a linear equation?

(A) $5 + 4x = y + 3$

(B) $x + 2y = y - x$

(C) $3 - x = y^2 + 4$

(D) $x + y = 0$

5. Statement – I : $2x^2 - x = 5$ is a quadratic equation.

Statement – II : General form of the quadratic equation is $ax^2 + bx + c = 0$, where $a \neq 0$.

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. Match the following :

i. $\tan \theta$

p. $\frac{1}{\cos \theta}$

ii. $\sec \theta$

q. $\frac{1}{\sin \theta}$

iii. $\operatorname{cosec} \theta$

r. $\frac{\sin \theta}{\cos \theta}$

Choose the correct answer.

(A) $i \rightarrow r$, $ii \rightarrow p$, $iii \rightarrow q$

(B) $i \rightarrow r$, $ii \rightarrow q$, $iii \rightarrow p$

(C) $i \rightarrow p$, $ii \rightarrow q$, $iii \rightarrow r$

(D) $i \rightarrow q$, $ii \rightarrow r$, $iii \rightarrow p$



7. Distance between the two points (2, 0) and (6, 0) is _____ units.
8. The n^{th} term of G.P. is $a_n = a.r^{n-1}$. Here, 'r' represents _____.
9. Two _____ are not always similar.
- (A) Line segments
- (B) Triangles
- (C) Circles
- (D) Squares
10. Number of tangents drawn from the external point to the circle is _____.
11. What is the length of the edge of the cube whose volume is 64 cm^3 ?
- (A) 4 cm
- (B) 16 cm
- (C) 5 cm
- (D) 6 cm
12. Which of the following cannot be the probability of an event?
- (A) 0.3
- (B) - 1.5
- (C) 15%
- (D) $\frac{2}{7}$



SECTION - II

Note : 1) Answer all the questions.

2) Each question carries 2 marks.

13. Check whether 3 and -2 are the zeroes of the polynomial $p(x) = x^2 - x - 6$.
14. 5 pencils and 7 pens together cost ₹ 50, whereas 7 pencils and 5 pens together cost ₹ 46. Represent this information in the form of pair of linear equations in variables x and y .
15. Check whether $(x - 2)^2 + 1 = 2x - 3$ is a quadratic equation.
16. Find the centroid of the triangle whose vertices are (3, -2), (-2, 8) and (0, 4).
17. A flag pole 4 m tall casts 6 m shadow. At the same time, a nearby building casts a shadow of 24 m. How tall is the building?
18. Calculate the length of the tangent drawn from a point 15 cm away from the centre of a circle of radius 9 cm.
19. A solid toy is in the form of right circular cylinder with hemispherical shape at one end and a cone at the other end. Draw a rough diagram of this solid toy.
20. Express $\sin 81^\circ + \tan 81^\circ$ in terms of trigonometric ratios of angles between 0° and 45° .

SECTION - III

(8×4=32)

Note : 1) Answer all the questions.

2) Each question carries 4 marks.

21. If $x^2 + y^2 = 25xy$, then prove that $2\log(x + y) = 3\log 3 + \log x + \log y$.

22. Draw the Venn diagrams of $A \cup B$, $A \cap B$, $A - B$ and $B - A$ (Here A, B are non-empty sets)
23. Solve the pair of linear equations $3x + 2y = 11$ and $2x + 3y = 4$.
24. Find the roots of the quadratic equation $2x^2 + x - 1 = 0$.
25. Find the volume and surface area of a sphere of radius 2.1 cm. (Take $\pi = \frac{22}{7}$).
26. Simplify $(1 - \cos\theta)(1 + \cos\theta)(1 + \cot^2\theta)$.
27. A die is thrown once. Find the probability of getting
 i) a prime number
 ii) an odd number.
28. Write the formula to find the median of a grouped data and explain the terms involved in it.

SECTION - IV

(5×8=40)

- Note :** 1) Answer all the questions.
 2) Each question carries 8 marks.
 3) There is an internal choice for each question.

29. a) Prove that $\sqrt{7}$ is irrational.

OR

- b) ABC is a right triangle right angled at C. Let $BC = a$, $CA = b$, $AB = c$ and let p be the length of perpendicular from C on AB. Prove that

i) $pc = ab$

ii) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.



30. a) If $A = \{1, 3, 4, 5, 7\}$, $B = \{2, 4, 5, 6\}$, $C = \{4, 5, 8, 9\}$, $D = \{1, 3, 7, 8\}$, then find

- i) $A \cup B$
- ii) $B \cap D$
- iii) $A \cap D$
- iv) $C - D$

OR

b) A sum of ₹ 700 is to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is ₹ 20 less than its preceding prize, find the value of each of the prizes.

31. a) Find the co-ordinates of the points of trisection of the line segment joining $(4, -1)$ and $(-2, -3)$.

OR

b) The table below shows the daily expenditure on food of 25 households in a locality.

Daily Expenditure (in Rupees)	100 – 150	150 – 200	200 – 250	250 – 300	300 – 350
No. of Households	4	5	12	2	2

Find the mean daily expenditure on food by a suitable method.

32. a) Two poles of equal heights are standing opposite to each other on either side of the road, which is 120 feet wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distance of the point from the poles.

OR

b) One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting :

- i) a face card
- ii) a spade
- iii) the queen of diamonds
- iv) the king of hearts.

33. a) Draw the graph of the polynomial $p(x) = x^2 - x - 12$ and find its zeroes.

OR

b) Construct a triangle of sides 4 cm, 5 cm and 6 cm. Then, construct a triangle similar to it, whose sides are $\frac{3}{4}$ of the corresponding sides of the first triangle.

