

I PUC
ANNUAL EXAMINATION FEBRUARY - 2026
SUBJECT: MATHEMATICS (35)

Instructions:

- 1) The question paper has five parts namely A, B, C, D and E. Answer all the parts.
- 2) PART A has 15 MCQ's, 5 Fill in the blanks of 1 mark each.

Time: 3 Hours

Max .Marks: 80

PART – A

I. Answer ALL the Multiple-Choice Questions

15 x 1 = 15

1. The interval form of the set $\{x / x \in R, -5 \leq x < 10\}$
(a) $[-5, 10]$ (b) $[-5, 10)$ (c) $(-5, 10)$ (d) $(-5, 10]$
2. A function $f(x)$ is defined by $f(x) = 2x - 6$ then $f(0) =$
(a) -6 (b) 0 (c) 6 (d) 2
3. The range of the function $f(x) = \cos x$ is
(a) $[-\infty, \infty]$ (b) $[-1, 1]$ (c) $(-1, 1)$ (d) $(-\infty, \infty)$
4. The additive identity of $5+3i$ is
(a) $5-3i$ (b) $-5-3i$ (c) 0 (d) 1
5. The modulus of the complex number $5-i$ is
(a) $\sqrt{25}$ (b) $\sqrt{26}$ (c) $\sqrt{24}$ (d) 26
6. The solution of $-2x \geq -10$ is when $x \in N$ is
(a) $\{1, 2, 3, 4, 5\}$ (b) $\{1, 2, 3, 4\}$ (c) $\{5, 6, 7, 8, \dots\}$ (d) $\{ \}$
7. The total number of terms in the expansion of $(x+y)^{150} + (x-y)^{150}$ after simplification is
(a) 75 (b) 76 (c) 83 (d) none of these
8. Match List I with List II

List I	List II
A) $\sin 60^\circ$	i) 1
B) $\cot 45^\circ$	ii) -1
C) $\cos 180^\circ$	iii) $\frac{\sqrt{3}}{2}$

- (a) A-i, B-ii, C-iii
(b) A-iii, B-i, C-ii
(c) A-ii, B-iii, C-i
(d) A-i, B-iii, C-ii

9. The equation of the line parallel to X-axis and passing through (3,-4) is
 (a) $x = 4$ (b) $y = -4$ (c) $x = 3$ (d) $y = 3$

10. The ninth term of the sequence whose n^{th} term is $a_n = n(n+1)$ is

- (a) 27 (b) 29 (c) 15 (d) 90

11. **Statement 1:** The perpendicular distance from the point $P(6, 7, 8)$ to ZX - plane is 7 units

Statement 2: The shortest distance of the point $P(a, b, c)$ from X - axis is $\sqrt{b^2 + c^2}$ units

- (a) Statement 1 is true and statement 2 is false
 (b) Statement 1 is false and statement 2 is false
 (c) Statement 1 is true and statement 2 is true, Statement 2 is not a correct explanation for Statement 1
 (d) Statement 1 is true and statement 2 is true, Statement 2 is a correct explanation for Statement 1

12. The length of latus rectum of the hyperbola $\frac{x^2}{36} - \frac{y^2}{16} = 1$ is

- (a) $\frac{16}{3}$ (b) 12 (c) 8 (d) $\frac{16}{5}$

13. The derivative of $x^3 - 4x$ with respect to 'x' at $x = 0$ is

- (a) 0 (b) -1 (c) -4 (d) 3

14. The median of the observations 3, 9, 5, 3, 12, 10, 18, 4, 7, 19, 21 is

- (a) 7 (b) 9 (c) 10 (d) 11

15. The probability of drawing spade card from a well shuffled deck of 52 cards is

- (a) $\frac{1}{4}$ (b) $\frac{3}{13}$ (c) $\frac{1}{13}$ (d) $\frac{10}{13}$

II. Fill in the blanks by choosing the appropriate answer from those given in the bracket

$\{20, \frac{3}{4}, \frac{2}{3}, 2, 1, 21\}$

5 x 1 = 5

16. If $A = \{2, 4, 6, 8\}$ and $B = \{6, 8, 10\}$, then $n(A-B) =$ _____

17. If ${}^{15}C_r = {}^{15}C_{3+r}$ then, $r =$ _____

18. If $Z = 4 + 2i$ then $\overline{Z} \cdot Z =$ _____

19. The slope of the line $-3x + 4y + 50 = 0$ is _____

20. The second term in the expansion of $(\sqrt{2} + 1)^5$ is _____

PART - B

III. Answer the any SIX questions

6 x 2 = 12

21. If $A = \{3, 5, 7, 9, 11\}$, $B = \{7, 9, 11, 13\}$ and $C = \{15, 17\}$ then, find $A \cap (B \cup C)$.
22. In a circle of diameter 40 cm, the length of the chord is 20 cm. Find the length of the minor arc of the chord.
23. Prove that $\sin^2 \frac{\pi}{6} + \cos^2 \frac{\pi}{3} - \tan^2 \frac{\pi}{4} = -\frac{1}{2}$.
24. Solve the inequality for real x , $5x - 3 > 3x - 5$. Show the graph of the solutions on number line.
25. Express $(1 + i)^4$ in the standard format.
26. Using Binomial theorem evaluate $(99)^4$.
27. In a G.P, the third term is 24 and the 6th term is 192. Find the 10th term.
28. Evaluate $\lim_{x \rightarrow 1} \frac{x^{15} - 1}{x^{10} - 1}$.
29. Given $P(E) = \frac{1}{4}$ & $P(F) = \frac{1}{2}$ and $P(E \text{ and } F) = \frac{1}{8}$. Find $P(E \text{ or } F)$.

PART - C

IV. Answer the any SIX questions

6 x 3 = 18

30. Draw the Venn diagram for i) $A \cup B$, ii) $A - B$ and iii) $(A \cap B)'$.
31. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{2, 4, 6, 8\}$ and $B = \{2, 3, 5, 7\}$. Verify that $(A \cup B)' = A' \cap B'$.
32. Prove that $\sin 3x = 3 \sin x - 4 \sin^3 x$.
33. In how many ways can the letters of the word ENGINEERING be arranged if all the vowels are together.
34. Find the acute angle between the lines $\sqrt{3}x + y = 1$ and $x + \sqrt{3}y = 1$.
35. Find the coordinates of the focus, axis of the parabola, the equation of the directrix and the length of the latus rectum for parabola $x^2 = 16y$.
36. Show that the points $P(-2, 3, 5)$, $Q(1, 2, 3)$ and $R(7, 0, -1)$ are collinear.
37. How many terms of the G.P $3, \frac{3}{2}, \frac{3}{4}, \dots$ are needed to give the sum $\frac{3069}{512}$?
38. Find the derivative of $\sin x$ from first principles.

PART - D

4 x 5 = 20

V. Answer the any FOUR questions

39. Define Modulus function. Draw the graph of it. Also find its domain and range.

40. Show that $\frac{\cos 4x + \cos 3x + \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = \cot 3x$

41. A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of

- i) Exactly 3 girls ii) at least 2 girls iii) at most 3 girls

42. Prove geometrically that length of perpendicular from a point (x_1, y_1) to a line $ax + by + c = 0$ is

$$\frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$$

43. Find the mean deviation about mean for the following data:

Marks obtained	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of students	2	3	8	14	8	3	2

44. Prove geometrically that $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$ where x is measured in radians.

45. Three coins are tossed once. Find the probability of getting

- (i) 3 heads (ii) Exactly two heads
(iii) No head (iv) At most two tails.

PART - E

10 x 1 = 10

VI. Answer the any ONE questions

46. Prove geometrically that $\cos(x + y) = \cos x \cdot \cos y - \sin x \cdot \sin y$. Also deduce that

$$\cos 2x = \cos^2 x - \sin^2 x$$

[6 Marks]

OR

Define Hyperbola. Derive the equation of the Ellipse (with proper choice of coordinate axes) in its

$$\text{standard form as } \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

47. Differentiate $y = \frac{\sin x + \cos x}{\sin x - \cos x}$ w.r.t. 'x'

[4 Marks]

OR

Find the sum of the sequence 7, 77, 777, ... to n terms