

I PUC BASIC MATHEMATICS

(English Version)

- Instructions :
1. Write the question numbers legibly in the margin.
 2. Answer for the questions should be continuous.
 3. Only the first written answers will be considered for Part-A

TIME DURATION: 3hr 15 min

MAX.MARKS: 80

Instructions:

- i) The question paper has 5 Parts A, B, C, D and E. Answer all the Parts.
- ii) Part - A carries 20 marks, Part - B carries 12 marks, Part - C carries 15 marks, Part - D carries 25 marks and Part - E carries 8 marks.
- iii) Write the question number properly as indicated in the question paper.

PART-A

I. Choose the correct answer (Each question carries 1 mark):

5X1=5

1. The imaginary part of $4-7i$ is
a) -7 b) -4 c) 4 d) 7
2. If $A=\{1,2\}$ and $B=\{2,3,4\}$ then $B \times A$ is
a) $\{(1, 2), (1, 3), (1, 4), (2, 2), (2, 3), (2, 4)\}$ b) $\{(1, 2), (1, 3), (1, 4), (2, 2), (2, 4)\}$
c) $\{(1, 2), (1, 3), (1, 5), (2, 2), (2, 3), (2, 4)\}$ d) $\{(1, 2), (1, 3), (1, 4), (2, 3), (2, 4)\}$
3. The value of $(x^{\frac{1}{2}} + y^{\frac{1}{2}})(x^{\frac{1}{2}} - y^{\frac{1}{2}})$ is
a) $x-2y$ b) $x-y$ c) $y-x$ d) $y-2x$
4. A publishing house finds that the production cost directly attributed to each book is `30 and the Fixed cost is `15,000. Then cost function is
a) $C(x)=30x + 15000$ b) $C(x)=30+15000x$ c) $C(x)=30x - 15000$ d) $30-15000x$
5. The slope of the line $7x-3y$ is
a) $\frac{7}{3}$ b) $-\frac{7}{3}$ c) $-\frac{3}{7}$ d) $\frac{3}{7}$

II. Match the following

6. (i) If $f(x) = 2x+3$ then the value of $f(-1)$ a) 75000
(ii) The value of $\log \sqrt{\frac{9}{4}} - \log \frac{3}{2}$ b) -85
(iii) The 30th term of the A.P. -2, -5, -8, - - c) 0
(iv) The simple interest on `600 for 3 years at 4% p.a. simple interest d) 1
(v) The present value of a perpetuity of Rs. 3000 to be received forever at 4% p.a. e) 72
f) 750

III For question numbers 7 to 11 choose the appropriate answer from the answers given

In baskets (8, $x > 2$, 3:10, $\frac{341}{256}$ $x=2, x < 2$) 5 X 1 = 5

7. The value of x , if $(2x+4, 0) = (8, 0)$ is _____
8. The sum of the G.P. $1, \frac{1}{4}, \frac{1}{16}$ to 5 elements is _____
9. The value of Inequality in one variable $5x - 3 < 3x + 1$ ($x \in \mathbb{R}$) is _____
10. Conversion of the 30% (percentage) to ratios. is _____
11. The angle $\frac{7\pi}{3}$ radians in degrees is _____

IV. Answer the following questions. (5 X 1 = 5)

12. Find the equation of the locus of the point equidistant from $(0, 0)$ and $(1, 0)$
13. Insert a H.M between $\frac{1}{5}$ and $\frac{1}{7}$.
14. Solve: $2(7 + x) - 10 = 16 - 2x - 24$
15. In a class of 10 students, the marks obtained in Mathematics, are 88, 71, 35, 30, 46, 92, 67, 53, 76 and 28. What is the average marks?
16. Find the value of $\cos A \cdot \tan A$.

PART-B

V Answer any SIX of the following questions. (6 X 2 =12)

17. Find the number of positive divisors of the number 672
18. Find the value of $f \circ g(2)$, if $f(x) = x$ and $g(x) = x^3 + 1$
19. If $A = \{2, 3\}$, $B = \{3, 4\}$ Find the number of relations that can be defined from A to B .
20. . The fifth term exceeds the third term by 10 and the sixth term is 35. Find the A.P.
21. If α and β are roots of the equation $3x^2 - 6x + 4 = 0$, find the value of $(\alpha + \beta)\alpha\beta$.
22. Solve $3x - 2 < 2x + 1, x \in \mathbb{R}$ Also represent the solution on the number line.
23. When Geetha retired at 58, she deposited `1,00,000 in the bank which pays 18% p. a. Compound interest. How much amount will she receive when she is 70?
24. The angles of a triangle are in the ratio 3:4:5. Find them in radians.
25. $\sec^2 A + \operatorname{cosec}^2 A = \sec^2 A \cdot \operatorname{cosec}^2 A$
26. Find the locus of a point which moves so that its distances from the point $A(3, 1)$ and $B(1, 3)$ are in the ratio 2:3
27. Find the equation of the line Passing through $(3, 5)$ and making an angle 45° with the positive direction of x axis.

PART-C

VI Answer any FIVE of the following questions. (5 X 3 =15)

28. Solve $2^{2x} - 6 \cdot 2^x + 8 = 0$.
29. The sum of the first eight elements of G.P. is five times the sum of the first four terms. Find the common ratio.

30. Five years ago, Father's age was 5 times as old as his son and after 3 years he will be 3 times as old as his son. Find their present ages.
31. A manufacturer has 600 liters of a 12% solution of acid. How many litres of a 30% acid solution must be added to it so that acid content in the resulting mixture will be more than 15% but less than 18%.
32. A batsman finds that by getting out for a duck (zero runs) in the 11th inning of his test matches, his average of the previous 10 innings decreased by 5 runs. What is average after the 11th innings?
33. If the Sale price per unit is ₹3/-, the variable cost per unit is ₹2/- and the total Fixed cost is ₹4,500 find the i) Break Even quantity ii) Total Revenue function and total cost function at BEP iii) If a profit of ₹10,000 is desired the volume of output to be produced and sold.
34. Find the image of the point (2, 4) on the line $4x - 3y + 1 = 0$

PART-D

VII Answer any FIVE of the following questions.

(5 X 5 =25)

35. In a class of 150 students, it was found that 95 like burgers and 79 like pizzas. Assuming every student like at least one of the above, find the number of students who like both burgers and pizzas Show the result by Venn diagram.
36. If $f(x) = x+1$ and $g(x) = 2x^2 - 3$. Find $f \circ g(1)$, $f \circ g(3)$, $g \circ f(2)$ and $g \circ f(x)$.
37. Evaluate using log tables: $\frac{25.36 \times 0.4569}{847.5}$
38. Solve the cubic equation $x^3 + 6x^2 + 9x + 4 = 0$ using synthetic division, given that there is an integral root between -3 and 3.
39. If the difference between simple interest and compound interest for 3 years at 2.5% p.a. is Rs.625, find the sum invested.
40. Find the present value of an annuity of Rs.3000 for 12 years at 6% p.a. computed half yearly.
41. The price of a pair of trousers was decreased by 22% to ₹390. What was the original price of the trousers?
42. Show that the points (2, -1), (3, 4), (-2, 3) and (-3, -2) form a rhombus
43. Find the image of the point (2, 4) on the line $4x - 3y + 1 = 0$

PART-E

V Answer any TWO of the following questions.

(2 X 4 =8)

44. A relation R is defined on the set of integers by $R = \{ (x, y) : x - y \text{ is a multiple of a non zero integer } 5 \}$ show that R is an equivalence relation on Z.
45. Find the sum to n terms of the series: $3+33+333+3333+\dots$
46. If $\tan A = \frac{12}{13}$ and $270^\circ < A < 360^\circ$. Find the value of $\frac{3\sin A - 2\cos A}{9\cos A + 4\sin A}$