

**GOVERNMENT OF KARNATAKA**  
**DEPARTMENT OF SCHOOL EDUCATION (PRE-UNIVERSITY BOARD)**  
**I PUC MODEL QUESTION PAPER (2024-2025)**  
**BASIC MATHEMATICS (75)**

**TIME: 3 Hours**

**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 18 marks, Part - D carries 20 marks and Part - E carries 10 marks.
- iii. Write the question number properly as indicated in the question paper.

**PART-A**

**I. Answer ALL the multiple-choice questions:**

**10 × 1 = 10**

1. The conjugate of  $z = -1 - i$  is  
a)  $1 - i$                       b)  $-1 + i$                       c)  $1 + i$                                       d)  $-i$
2. If  $A \subset B$  then  $A \cup B$  is  
a)  $A$                                       b)  $\emptyset$                                       c)  $B$                                       d) *None of these*
3. Simplify :  $5^{(5^0)} + (5^2)^0$ .  
a) 6                                      b) 0                                      c) 26                                      d) 2
4. The value of  $\log_5 125$  is  
a) 1                                      b) 0                                      c) 2                                      d) 3
5. Geometric mean of 2 and 8 is  
a) 5                                      b) 4                                      c) 3                                      d) 2
6. If  $\alpha$  and  $\beta$  are the roots of the quadratic equation  $3x^2 - 6x + 4 = 0$ , then  $\alpha + \beta =$   
a)  $-2$                                       b)  $-4/3$                                       c) 2                                      d)  $4/3$
7. The solution of  $2(x - 1) < x + 5$  is  
a)  $(7, \infty)$                                       b)  $(-7, \infty)$                                       c)  $(-\infty, 7)$                                       d)  $(-\infty, -7)$
8. If  $R = 12\%$ , what is the doubling period as per rule of 72  
a) 6 years                                      b) 7 years                                      c) 8 years                                      d) 5 years



## PART-B

### IV. Answer any SIX questions.

$6 \times 2 = 12$

17. Find the numbers of positive divisors of 960
18. Give an example of a relation which is symmetric but not reflexive and not transitive
19. If  $f: Z \rightarrow Z, f = \{(1,1), (2,3), (0, -1)\}$  defined by  $f(x) = ax + b$ , determine  $a$  and  $b$
20. How many terms of AP  $-3, -5, -7, \dots$  amount to  $-120$ ?
21. Insert 3 H.M's between  $\frac{1}{4}$  and  $\frac{1}{12}$
22. The sum of three consecutive numbers is 186. Find the numbers?
23. Find all pair of consecutive even integers which are greater than 5 and their sum must be less than 23
24. If  $\sin x + \sin^2 x = 1$ , then Prove that:  $\cos^2 x + \cos^4 x = 1$
25. Find the slope and x-intercept of the line  $5x - 7y + 11 = 0$

## PART-C

### V. Answer any SIX questions.

$6 \times 3 = 18$

26. Find the greatest integer which divides 42, 52, 86 leaving remainder 6, 4, 2 respectively.
27. Write all the proper subsets of  $\{2, 3, 4\}$
28. Simplify:  $\frac{2^{n+1} + 2^{n-1}}{2^n + 2^{n+2}}$
29. If  $\alpha$  and  $\beta$  are the roots of the equation  $2x^2 - 5x + 7 = 0$  then evaluate  $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$ .
30. Solve:  $\frac{5-2x}{3} < \frac{x}{6} - 5, x \in \mathbb{R}$ , Represent on a number line.
31. A person deposits ₹10000 in a bank. If the bank offers compound interest at the rate of 5% for the first 3 years, 7% for the next 2 years and 8% from the sixth year onwards. What is the amount after 10 years?
32. The average height of 12 girls in a class is 4 feet and the average height of 8 boys is 5 feet. Find the combined average height of the class.
33. P.T:  $\sec^6 x - \tan^6 x = 1 + 3 \tan^2 x \sec^2 x$
34. Find the equation of the locus of points such that the sum of its distance from  $(0,3)$  and  $(0,-3)$  is 8.

## PART-D

### VI. Answer any FOUR questions.

4 × 5 = 20

35. In a certain college with 500 students, 300 take milk and 251 take tea. Assuming that every student takes at least one of the two, find how many will take both milk and tea, milk only and tea only. Represent through a Venn diagram
36. Using log table find  $\frac{\sqrt{6.43 \times 0.5789}}{(13.46)^{3/2}}$
37. A certain two digit number is 4 times the sum of the digits. If 18 is added to the number, the digits get interchanged. Find the numbers
38. A machine depreciates at 10% of its value at the beginning of the year. The cost and the scrap value realized at the time of sale being ₹23240 and ₹9000 respectively. For how many years the machine was put to use?
39. A person repaid his loan in 10 equal annual installments starting from the beginning of the first year. If each installment was ₹6000 and compound interest charged was 12% p.a. What was the amount borrowed.
40. Ram Singh purchased two camels for ₹18000 and ₹15000 respectively. He sold them at a loss of 15% and gain of 19% respectively. Find the selling price of each of the camels. Also find the overall loss or gain percent in the transaction.
41. Find the image of the point (2,4) on the line  $x + y - 10 = 0$

## PART-E

### VII. Answer the following questions.

42. Find the sum to 'n' terms of the series  $4 + 44 + 444 + \dots$  (6 marks)

(OR)

Show that the points (2, -2), (8, 4), (5, 7) and (-1, 1) the vertices of a rectangle.

43. If the sale price per unit is ₹3, the variable cost per unit is ₹2 and the fixed cost is ₹4500 find the Cost function, Revenue function, Profit function and Break Even Point. (4 marks)

(OR)

If  $\tan A = \frac{12}{13}$  and  $270^\circ < A < 360^\circ$  find the value of  $\frac{3 \sin A - 2 \cos A}{9 \cos A + 4 \sin A}$