**BLUE PRINT 2022 - 2023**

**I PUC : BASIC MATHEMATICS**

Time : 3Hrs 15Mins Max.Marks : 100

| Sl. No | Name of the Chapters | Part A 1M | | Part B 2M | Part C 3M | Part D 5M | Part E 4/4/2 | Total Marks | Total Teaching Hours |
|---|---|---|---|---|---|---|---|---|---|
| | | MCQ /FUB | VSA | | | | | | |
| **Unit 1** | **ALGEBRA(64 Hours)** | | | | | | | | |
| 1 | Number Theory | 1 | - | 2 | 1 | - | | 8 | 8 |
| 2 | Sets, Relations and Functions | - | 1 | - | 2 | 1 | | 12 | 16 |
| 3 | Theory of Indices | 1 | - | 1 | 1 | - | | 6 | 4 |
| 4 | Logarithms | 1 | - | - | 1 | 1 | 1(2M) | 11 | 6 |
| 5 | Progressions | 2 | - | 1 | - | 1 | 1(4M) | 13 | 12 |
| 6 | Theory of Equations | 1 | 1 | 2 | 1 | 1 | | 14 | 12 |
| 7 | Linear Inequalities | - | - | 1 | 1 | - | | 5 | 6 |
| **Unit 2** | **COMMERCIAL ARITHMETIC (28 Hours)** | | | | | | | | |
| 8 | SI and CI | 1 | - | 1 | 1 | 1 | | 11 | 8 |
| 9 | Annuities | - | 1 | - | - | 1 | 1(2M) | 8 | 6 |
| 10 | Averages | 1 | - | 1 | 1 | - | | 6 | 4 |
| 11 | Percentages, Profit and Loss | 2 | - | 1 | 1 | - | | 7 | 6 |
| 12 | Linear Functions | - | 1 | - | - | - | 1(4M) | 5 | 4 |
| **Unit 3** | **TRIGONOMETRY (10 Hours)** | | | | | | | | |
| 13 | Angles and Trigonometric Ratios | 1 | 1 | - | 1 | 1 | | 10 | 6 |
| 14 | Standard angles and Allied Angles | 1 | - | 1 | - | - | 1(4M) | 7 | 4 |
| **Unit 4** | **ANALYTICAL GEOMETRY (18 Hours)** | | | | | | | | |
| 15 | Coordinate system in a Plane | 1 | - | 1 | 1 | 1 | | 11 | 5 |
| 16 | Locus and its equation | - | - | 1 | - | - | | 2 | 3 |
| 17 | Straight Lines | 2 | - | - | 1 | 1 | 1(4M) | 14 | 10 |
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# I PUC MODEL QUESTION PAPER(2022 – 2023)

# SUBJECT : BASIC MATHEMATICS

# SUBJECT CODE :75

**Time : 3 hrs 15 mins**

**Maximum marks : 100**

**Instructions :**

1. **This question papers has 5 parts A,B,C,D and E.**
2. **Part A carries 20 marks, Part B carries 18 marks, Part C carries 27 marks, Part D carries 25 marks and Part e carries 10 marks.**
3. **Use graph sheet to answer question number 40 in Part C.**

## PART A

**I. Answer all the TWENTY questions :** **1 × 20 = 20**

1. The real and imaginary parts of the complex number 4 – i is _____

a) 4, 1 b) –4, 1

c) 4, –1 d) – 4, –1

2. The value of $(5)^{5^0} + (5^2)^0$ in its simplest form is _____

a) 5 b) 25

c) 1 d) 6

3. The exponential form of $\log_9 81 = 2$ is _____

a) $9^2 = 81$ b) $2^9 = 81$

c) $\frac{81}{9} = 2$ d) $\frac{2}{81} = 9$

4. The sum to infinity of the G. P $1, \frac{1}{2}, \frac{1}{4}, \ldots\ldots$ is _____

a) 1 b) 2 c) $\frac{1}{2}$ d) $\infty$

5. SI on Rs.18000 for 4 years at $12\frac{1}{2}\%$ p.a. is given by _____

a) Rs 9000 b) Rs 8640

c) Rs 90,000 d) Rs 2250

6. $\frac{4}{5}$ is _____ percent of 125.

a) 64% b) 6.4%

c) 0.64% d) 6%

7. The degree measure of $\frac{3\pi}{5}$ is _____

a) $135^\circ$ b) $144^\circ$

c) $18^\circ$ d) $108^\circ$

8. The coordinates of the reflection of the point (2,4) with respect to x-axis is _____

a) (–2, –4) b) (2, –4)

c) (–2, 4) d) (2, 0)

9. The slope of a line whose angle of inclination $60^\circ$ is _____

a) $\frac{1}{2}$ b) $\frac{1}{\sqrt{3}}$

c) $\infty$ d) $\sqrt{3}$

10. The distance between the two parallel lines with equations x + 2y + 3 = 0 and x + 2y – 7 = 0 is _____

a) $\frac{10}{\sqrt{5}}$ b) $\frac{10}{5}$

c) $\frac{-10}{\sqrt{5}}$ d) $-\frac{10}{5}$

**II. Choose the correct answer from the brackets below and fill up the blanks from questions 11 to 15.**

**(58.6, 200, 1, 34, 3)**

11. The $12^{th}$ term of the AP 1, 4, 7, ..... is _____

12. If $\frac{x}{2}+\frac{2x}{3}=\frac{7}{2}$ , then the value of x will be _____

13. The marks of 10 students in a class are 88, 71, 35, 30, 46, 92, 67, 53, 76 and 28. Then their average marks will be _____

14. By selling a book at ` Rs.250, there is a profit of ` Rs.50. Then the cost price of the book is _____

15. The value of $\sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$ is _____

III.

16. If A = {1, 3, 5}, B = { 5 }, then find the elements of A × B will be _____

17. Form the quadratic equation whose roots are 1 & 2.

18. Write the formula to find future value of Annuity Immediate.

19. Find the break-even output for a certain cost function C(x) =450 + 1.5x & revenue function R(x) = 3x.

20. Simplify $(1-\sin^2 A).\sec^2 A$

# PART B

**Answer any NINE questions : 2× 9 = 18**

21. Find the greatest integer which divides 42, 52 & 86 leaving remainder 6, 4 & 2 respectively.

22. Find the LCM of 16, 20, 24 by factorisation method.

23. Simplify : $\frac{2^{7b-2a}\ 8^{2a-b}}{16^{a+b}}$

24. Insert 3 geometric means between -4 and -64.

25. If $\alpha$ and $\beta$ are roots of the equation $2x^2 + 4x + 1 = 0$, find the value of $\alpha^2\beta + \beta^2\alpha$

26. The sum of 2 consecutive numbers is 151. Find the numbers.

27. Solve $3(1-x) < 2(x+4),\ x \in R$. Also represent the solution on the number line.

28. Samarth bought a phone for Rs.1800. If it depreciates at 15% p.a. find its worth after 3 years.

29. The average age of 12 boys is 8 years. Another boy 21 years joins the group. Find the average age of the new group.

30. A student has to score 50% marks to pass. He gets 100 marks & yet fails by 50 marks. Find the maximum marks.

31. If A = 30°, then verify sin2A = 2sinA.cosA

32. Find the other end of the diameter of a circle having centre at origin and one end of diameter as
(–3, 6)

33. Find the equation to the locus of a point moving in a plane such that the square of its distance from (2, 3) is 3 units.

## PART C

**Answer any NINE questions :** **3× 9 = 27**

34. Find the number of positive divisors and sum of positive divisors of 672.

35. If A = {1, 2, 3, 4}, B = {3, 4, 5, 6} & C = {4, 5, 6, 7, 8}, then verify
$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

36. Show that the relation ' is congruent to' is an equivalence relation on the set of all triangles in a plane.

37. Solve : $2^{2x} - 6(2^x) + 8 = 0$

38. Prove that : $\log_4 8.\log_2 32.\log_{16} 4 = \frac{15}{4}$

39. The age of father is 5 times that of his son's age. 3 years ago father's age was 8 times that of his son's. Find their present ages.

40. Solve graphically the system of inequalities : $x + y \le 6$ and $x + y \ge 4$

41. In what time will` Rs.800 amount to Rs.882 at 10% p.a. interest compounded half yearly.

42. A batsman finds that by getting a duck ( 0 Runs) in $11^{th}$ innings of his test matches, his average runs of previous ten innings decreased by 5 runs. What is his average after the $11^{th}$ innings?

43. The cost of a TV increased by 20% and then decreased by 5%. Find the percentage increase in the original cost.

44. Prove that $\frac{\cos A}{1+\sin A}+\frac{1+\sin A}{\cos A}=2\sec A$

45. Find the area of the quadrilateral whose vertices are (1, 2), (6, 2), (5, 3) & (3, 4) taken in an order.

46. Find the ratio in which the line segment joining (2, 3) & (4, 1) is divided by the line x – 3y + 5 = 0

# PART D

**Answer any FIVE questions : 5× 5 = 25**

47. In a certain college with 500 students, 300 drink coffee and 250 drink tea. Find the no. of students drinking (a) only coffee (b)only tea & (c)both coffee and tea.

48. Evaluate using logarithmic tables : $\frac{0.5679\times 0.0789}{0.0073\times 0.123}$

49. Find the sum of all integers between 100 and 300 which are divisible by 7.

50. Solve using synthetic division : $x^3 + 6x^2 + 9x + 4 = 0$, given that there exists at least one integral root between –3 and 3.

51. A person borrowed 65000 at 8% p.a. SI for 4 years and lent out the money for 10% CI for 4 years. How much did the person gain.

52. If Samhita wants Rs. 25000 after 8 years, how much should she invest in an annuity due each year at 6% p.a.

53. If x = ar sinA.cosB, y =br sinA.sinB and z = cr cosA, then prove that $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=r^2$

54. Show that the points (3, 2), (0, 5), (–3. 2) & (0, –1) are the vertices of a square. Also find its area

55. Find the equation of a line passing through the point (5, 2) and cutting off intercepts which are equal in magnitude but opposite in sign.

# PART E

**Answer the following :** **10× 1 = 10**

56. Find the sum to n terms of the series 5 + 55 + 555 + ..... (4)

OR

Prove that $\sin480°\cos690° + \cos780°\sin(1050°) = \frac{1}{2}$ (4)

57. Rajeev and Co., Belur finds that the production cost directly attributed to each book is `25 and the fixed cost is`10,000. If each book can be sold for `35, find

(i) cost function

(ii) revenue function

(iii) profit function and

(iv)breakeven output. (4)

OR

For what value of k are the three lines $x - 2y + 1 = 0,\ 2x - 5y + 3 = 0$ & $5x - 9y + k = 0$ concurrent?

(4)

58. Find the number of digits in the integral part of $3^{20}$. (2)

OR

Find the present value of a perpetuity of Rs.3000 to be received forever at 4% p.a.

(2)

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