



JAIN COLLEGE, J C Road, Bangalore  
Mock Paper January - 2017  
I PUC – Basic Mathematics (75)

PART – A

I. Answer all the questions

1. Write the imaginary part of  $2+3i$
2. If  $A=\{a,b,c\}$  and  $B=\{c,d,e,f\}$  find  $A-B$ .
3. If  $f:R \rightarrow R$  is defined by  $f(x)=4x+3$ , find  $f\left(\frac{3}{4}\right)$
4. Simplify  $\left(\frac{16}{81}\right)^{\frac{-1}{4}}$
5. Evaluate  $x$  if  $\log_x 256=4$
6. Find the  $10^{\text{th}}$  term of the progression  $1,3,5,\dots$
7. Solve for  $x$ :  $2(x-3)=9+3(x-9)$
8. Convert the ratio  $0.12$  into percentage.
9. Define a Perpetuity..
10. Convert  $-150^\circ$  into radian.
11. Find the slope of the line  $||$  to the line  $3x+5y-9=0$
12. If  $\sin A = \frac{3}{5}$  and  $90^\circ < A < 180^\circ$ , find  $\cos A$

PART – B

II. Answer all the questions

13. Find the number which when divided by  $16,20,40$  leaves the remainder  $4$ .
14. If  $A=\{2,3,4\}$  write all the proper subsets of  $A$ .
15. Find the number of positive divisors of  $360$ .
16. Simplify:  
 $2(3)^{-2} + \left(\frac{1}{3}\right)^{-3} + (3)^2$
17. Solve for  $x$ :  
 $\log x + \log(x-4) - \log(x-6) = 0$
18. Form a cubic equation whose roots are:  $3,5,7$
19. Divide Rs.1600 between  $x, y, z$  so that  $y$  may have Rs.100 more than  $x$  and  $z$  shall have Rs.200 more than  $y$ .
20. Calculate the simple interest on Rs.4000, at  $4\%$  from June 27th to August 29th in the same year.
21. The average age of 10 students in 14 years among them the average age of 4 students is 12 years. Find the average age of the remaining students.
22. Find the present value of perpetuity of Rs.3000 to be received forever at  $4\%$  p.a.
23. PT  $\frac{1-\cos x}{\sin x} = \frac{\sin x}{1+\cos x}$
24. The angles of a triangle are in the ratio  $3:4:5$ . Find the angles in radians and in degrees.

PART – C

III. Answer all the questions

25. If the distance between  $(2,a)$  and  $(-1,1)$  is  $\sqrt{13}$ . Find the value of 'a'.
26. PT  $2+3\sqrt{5}$  is irrational.
27. Out of 50 people, 20 drink tea, 10 take both tea and coffee. How many take one of the two drinks? Show the result using Venn diagram.
28. PT  $\left(\frac{X^A}{X^B}\right)^{A^2+AB+B^2} \left(\frac{X^B}{X^C}\right)^{B^2+BC+C^2} \left(\frac{X^C}{X^A}\right)^{C^2+CA+A^2} = 1$
29. If  $(45)^{\frac{1}{x}} = (3)^{\frac{1}{y}} = (5)^{\frac{1}{z}}$  PT.  $X=2Y+5$
30. The father is 28 years older than the son, after 5 years the father's age will be 7 years more than twice that of the son. Find their present ages.

31. Find the difference between the compound interest and the simple interest on Rs5000 invested for 4 years at 8% p.a.
32. Solve  $x^3 - 2x^2 - 5x + 6 = 0$
33. A school runs morning and afternoon shift and employs 40 teachers. The average salary of 25 teachers working in the morning shift is Rs,2800 and the average salary of teachers working in the afternoon shift Rs.3000. Find
  - a) The average salary of the teachers in the school.
  - b) Average salary if 5 teachers are shifted from morning to the afternoon shift.
34. Find the co-ordinates of the circumcentre of the triangle formed by the points (1,1) (2,-1) and (3,2)
35. The average age of 10 students in a class increases by 4.8 months. When a boy of age 6 years is replaced by a new boy, what is the age of the new boy?
36. PT  $(1 + \tan A - \sec A)(1 + \cot A + \operatorname{cosec} A) = 2$
37. Find the third vertex of the triangle if two of its vertices are A(-2,4) and B(7,-3) and the centroid is (3,2)
38. If  $\alpha$  and  $\beta$  are the roots of the equation  $2x^2 + 5x + 5 = 0$ . Find the value of  $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$

#### PART – D

#### IV. Answer all the questions

39. If  $f = \{(1,1)(2,3)(0,-1)\}$  be a function from  $z \rightarrow z$ , is defined by:  $F(x) = ax + b$  where a,b are integers.
  - a. Determine a and b
  - b. If  $f(x) = 2x + 1, g(x) = x^2 + 2x + 1$ , find a)  $f \circ g(2)$  b)  $f \circ g(3)$
40. Using log tables find the value of:  $\frac{\sqrt{14.5} \times \sqrt[3]{8.571}}{16.751^{\frac{2}{3}}}$
41. Find the sum of all integers between 60 and 400, which are divisible by 13.
42. Two brothers have their annual income in the ratio 8:5, while their annual expenditures are in the ratio 5:3, if they save Rs.1200 and Rs.1000 per annum. Find their incomes.
43. A person purchases a house for Rs.25 lakhs with Rs.5 lakhs as payment. The rest of the amount he loans from a bank, which offers 16%p.a compound interest and has to repay the loan in 20 equal annual installments. If the first installment is paid at the end of the third year, find how much he has to pay each year?
44. Find the equation of the locus of a point which moves so that its distance from (3,2) is equal to its distance from  $2x + y = 3$
45. Evaluate using log tables:  $\frac{\sqrt{6.43} \times 0.5789}{13.46^{\frac{2}{3}}}$
46. Find the reflection of the point P(2,1) in the line  $x + y = 5$
47. If  $\sec \alpha = \frac{13}{5}$  where  $270^\circ < \alpha < 360^\circ =$  Find the value of  $\frac{2\sin \alpha - 3\cos \alpha}{4\sin \alpha + 9\cos \alpha}$
48. S.T the following points are the vertices of a rectangle (1,6) (-1,-2) (4,1) (-4,3)

#### PART – E

#### V. Answer all the questions

49. a) Find the equation of the straight line passing through the point of intersection  $x = 2y = 3 = 0$  and  $3x = 4y = 7 = 0$  and has a slope  $\frac{-3}{2}$ 
  - b)  $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = 1 + \sec A \cdot \operatorname{cosec} A$
  - c) If  $\log 5 = 0.6990$ , find the number of digits in the integral part of  $5^{23}$
50. a) Find the sum to n terms of GP  $0.6 + 0.66 + 0.666 + \dots$ 
  - b) A batsman's average score for a number of innings was 21.75 runs per innings. In the next three innings he has scored 28, 34 and 37 runs. And his average for all the innings was reversed by 1.125 runs. How many innings did he play?
  - c) A confectioner makes and sells chocolates. He sells one box of chocolates at Rs.180. The cost of manufacturing is Rs.60 per box as variable cost and Rs.2000 as the fixed cost. find:
    - 1) Revenue function
    - 2) The cost function