



JAIN COLLEGE, J C Road, Bangalore  
Mock Paper December - 2018  
I PUC – Basic Mathematics (75)

PART – A

I. Answer any ten of the following questions: 1X10=10

1. Give the canonical representation of 156.
2. If  $A=\{1,2,3,4\}$   $B=\{1,2,3,4,5,6,7\}$  find  $B-A$ .
3. Simplify:  
 $a^{x+y}a^{2x-y}$
4. Solve for 'x'  
 $\log_x 625=4$
5. Find the sixth term in the AP series: 1,4,7.....
6. Solve for 'x'  
 $2(7+x)-10=16-2(x-24)$
7. Find the interest on rupees 1500 at 4% p.a for 145 days?
8. Define annuity.
9. Convert the given ratio 3:5 into percentage.
10. Express  $105^\circ$  in radian measure.
11. Find the value of  $\sin 150^\circ$
12. Find the distance from the origin to the line  $3x-4y+5=0$ .

PART – B

II. Answer any ten of the following questions: 2X10=20

13. Find the LCM by prime factorization method for 16, 24,48.
14. If the HCF of two numbers is 16 and their LCM is 160.If one of the numbers is 64.Find the other number.
15. Convert the given set from roster to rule form:  $A=\{2,3,5,7,11,13,17,19,23\}$
16. If the second term of an AP is 4 and the tenth term is 20.Find the 15<sup>th</sup> term.
17. Solve the linear inequalities  $5x-3>3x+1, x \in R$  represent the solution on the number line.
18. Prove that  $\log \sqrt{\frac{a}{b}} + \log \sqrt{\frac{b}{c}} + \log \sqrt{\frac{c}{a}}=0$
19. Find the two numbers whose sum is 64 and difference is 16.
20. Ram and shyam went up a hill at a speed of 20kmph.Both of them came tumbling down the same distance at a speed of 30kmph.Find the average speed for the round trip.
21. Rekha purchased 3 varieties of cooking oil,5kg of oil at rupees100 per kg,6kg of oil at rupees 110 per kg and 9kg of oil at rupees 120 per kg. What is the average price of the oil per kg?
22. Find the value of:  $\cos^2 30^\circ + \cos^2 45^\circ + \cos^2 60^\circ$
23. Find the value of K if the distance between  $(2k,5)$  and  $(-k,-4)$  is  $\sqrt{90}$ .
24. Find the equation of the locus of the point which moves such that the square of its distance from  $(2,3)$  is 3.
25. Show that the line joining  $(2,-3)$  and  $(-5,1)$  is parallel to the line joining  $(7,-1)$  and  $(0,3)$ .
26. Show that the given points are collinear:  $A(a,a+b), B(b,c+a), C(c,a+b)$

PART – C

III. Answer any ten of the following questions: 3X10=30

27. Prove that  $\sqrt{3}$  is an irrational number.
28. If  $A=\{a,b,c,d\}$   
 $B=\{b,d,f,g\}$   
 $U=\{a,b,c,d,e,f,g,h\}$   
Find a)  $A \times B$   
b)  $(A \cap B) \times A$
29. Prove that:  $\left(\frac{x^b}{x^c}\right)^{b^2+c^2+bc} \left(\frac{x^c}{x^a}\right)^{c^2+a^2+ca} \left(\frac{x^a}{x^b}\right)^{a^2+b^2+ab} = 1$

30. Solve:  $\log_2 x + \log_4 x = 3$
31. Solve and plot the inequalities graphically:  $2x + y \geq 8$  and  $x + y \geq 10$ .
32. If  $\alpha$  and  $\beta$  are the roots of the equation  $x^2 + 3x + 7 = 0$ , find the value of  $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$
33. A 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.
34. The average age of A and B is 18 years, average age of B and C is 17 years and that of C and A is 20 years. Find the age of A.
35. Find the amount of rupees 500 lent for 5 years at 16% p.a compound interest compounded quarterly.
36. Find the three numbers in G.P whose sum is 39 and product of their extremes is 1.
37. A number 'x' is mistakenly divided by 10 instead of being multiplied by 10 what is the percentage error in the result?
38. Evergreen suppliers buy a machine for rupees 20000. The rate of depreciation is 10%. Find the depreciated value of the machine after three years. Also find the amount depreciated. What is the average rate of depreciation?
39. Prove that:  $\frac{1}{1 + \sin A} + \frac{1}{1 - \sin A} = 2 \sec^2 A$
40. Derive equation of straight line in slope point form.

**PART – D**

**IV. Answer any six of the following questions:**

**5X6=30**

41. In a class of 100 students, 35 play football, 45 play basket ball, 35 play indoor games, 10 play Football and basket ball, 15 play basket ball and indoor games. 5 play football, basketball and indoor games. If 15 do not play any games then find. How many play football and indoor games?
42. Using log tables find the values of:  $\frac{5.634 \times 25.645}{12.72}$
43. Find the sum of the series:  $5 + 55 + 555 + \dots + n$  terms
44. A certain number is 4 times the sum of the digits. If 18 is added to the number, the digits get interchanged. Find the numbers.
45. Jason invested an amount of rupees 12000 at the rate of 10% p.a. Simple interest and another amount at the rate of 20% p.a. Simple interest. The total interest earned at the end of one year and the total amount invested became 14% p.a. Find the total amount invested.
46. A person purchases a house for rupees 25 lakhs with rupees 5 lakh as down payment. The rest of the amount he loans from a bank which offered 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. How much he has to pay each year? [hint: The annuity deferred is 2 years]
47. Obtain the root of the equation  $x^3 - 2x^2 - 2x + 3 = 0$  by inspection and solve using synthetic division method.
48. A person spent 30% of his wealth and thereafter rupees 20000, and further 10% of the remainder. If 29250 is still remaining. What is the total wealth amount?
49. Find x if:  $\frac{x \sin^2 300^\circ \sec^2 240^\circ}{\cos^2 255^\circ \operatorname{cosec}^2 240^\circ} = \cot 135^\circ \times \tan 315^\circ$
50. Find the equation of the straight line passing through the point of intersection of  $2x + 4y = 3$  and  $x + 5y = 1$  and making equal and positive intercepts on the co-ordinate axes.

**PART – E**

**V. Answer any one of the following questions:**

**1X10=10**

51. a) Prove that the lines:  
 $X + y + 4 = 0$   
 $2x + 3y + 7 = 0$   
 $3x + y + 6 = 0$  are concurrent and also find the point of contact. (4)
- b) What is the future value of rupees 1000 deposited annually for 12 years gathering a compound Interest at 16% p.a. (4)
- c) Form the cubic equation whose roots are 3, 5, 7? (2)

52. a) Find the sum of all numbers between 50 and 200 which are divisible by 11. (4)
- b) A manufacturer produces and sells balloons at rupees 8 per unit. His fixed cost is rupees 6500 and the variable cost per balloon is rupees 3.50 Calculate:
- i) Revenue function
  - ii) cost function
  - iii) Profit function
  - iv) Break even point (4)
- c) Find the present value of perpetuity of rupees 3000 to be received forever at 4% p.a (2)