Duration: 3 hours 15 minutes   **Max. Marks: 100**

PART-A

I.   Answer any TEN questions: **10X1=10**

1. Give the canonical representation of 306
2. If A = {1,2,3,4,5} B = {1,2,3,4,5,6,7} find a relation from A to B defined by R = { (x, y) x > y}
3. If A ={1,2} and B={a, b} then find B ×A.
4. Simplify $\left(\dfrac{9}{4}\right)^{-3/2}$.
5. Convert $\log_9 81 = 2$ into exponential form.
6. Find the value of K if $\dfrac{3}{5}$, K, $\dfrac{13}{5}$ are in A.P
7. Solve for x : 2(7+x) – 10 = 16-2(x-24)
8. What percent is 64m of 12 km?
9. Define perpetuity.
10. Express $\dfrac{3\pi}{5}$ in degrees.
11. The average age of 10 boys in a class is 6 years. The sum of the ages of 9 of them is 52 years. Find the age of the 10th student.
12. Find the slope of the line joining the points A and B where A (3, - 2) and B (-2,1).

PART-B

II.   Answer any TEN questions:
10X2=20

13. Convert $\dfrac{1}{4+3i}$ in a + ib form and write real and imaginary parts.
14. Find the greatest number which when divides 989 and 1327 leaves the remainders of 5 and 7 respectively.
15. If A = {1,2,3,4} and {3,4,5,6} and U = {1,2,3,4,5,6,7,8} verify (A∪B) = A'∩B'
16. Simplify $\dfrac{(7)^{(3^0)} + (5^0)^4}{(3^2)^0 + (2^2)^1}$
17. If the second term f the G.P is 6 and 5th term is 162, then find the G.P
18. If α and β are the roots of the equation 3x² – 6x + 4 = 0 find the values of   i) $\alpha^2 + \beta^2$ ii) $\alpha^3 + \beta^3$
19. A certain sum of money amounts to Rs24,200 in 2 years at 10% compound interest. Find the sum.
20. Solve 5x-3 < 3x+1 when x is an integer and x is a real number.
21. Ramesh has 4 Kannada, 5 English, 6 Maths books. Each Kannada bank cost Rs8.50, English Rs 10.50 and Maths Rs 15.00. Find the average cost per book of all 3 subjects.
22. If the cost price of 10 articles is equal to the selling price of 9 articles, find the gain precent?
23. Prove that $\dfrac{1}{Sec\,A + \tan A} = SecA - \tan A$.
24. Evaluate cosec (1305)⁰.
25. Find the equation of the locus of the point which moves such that its distance from (1, 2) is 3.

PART-C

III.   Answer any TEN questions:
10X3=30

26. In a group of 600 people, 150 students were found to be taking tea, 225 like coffee, 100 like both tea and coffee. Find out how many were taking neither tea nor coffee? Represent using venn diagram.
27. Show that the relation "congruent to" on the set of all triangles is an equivalence relation.
28. Find the HCF of $\dfrac{8}{9}, \dfrac{32}{81}, \dfrac{16}{27},$
29. Prove that $\dfrac{1}{\log_2 4} + \dfrac{1}{\log_8 4} + \dfrac{1}{\log_{16} 4} = 14$
30. The sum of four numbers which are in A.P is 28 and 10 times the least number is 4 times the greatest. Find the numbers.
31. Solve the system of linear inequalities graphically $x + y \leq 6$ and $x + y \geq 4$.
32. A batsman finds by getting out for a duck(0 runs) in the 11th innings of his test matches, his average of the previous innings is decreased by 5 runs. What is his average after the 11th innings?
33. Ritu's salary was increased by 10% and then again by 5%. If the present salary is Rs 9,240. What was Ritu's previous salary?
34. The cost of a refrigerator is Rs 27,000. If it depreciates at the rate of 8% p.a. Find its value after 4 years.
35. Prove that $\dfrac{1}{1+\cos A} + \dfrac{1}{1-\cos A} = 2 \cos ec^2 A$.
36. Three consecutive vertices of a parallelogram are A (3,0) B(5,2) and C(-2,6). Find the fourth vertex.
37. Derive the slope-intercept form of a straight line.
38. Find the distance between two parallel lines 3x+4y+5=0. and 6x+8y+20=0.

PART-D

IV. **Answer any SIX of the following:** **6X5=30**

39. Let f = {(1,1) (2,3) (0,-1)} be a function from Z to Z defined by f(x)=ax + b for some integers a and b
    i) determine a and b
    ii) If f(x) = 2x+1, g(x) = x^2 +2x+1 find a) fog(2)   b) g of(3).

40. Evaluate $\dfrac{5.634 \times 25.64}{12.72}$ using log tables.
41. Find the sun of all even integers from 40 to 160.
42. Find an integral root between -3 and 3by inspection then using synthetic division solve the equation $x^3-2x^2-5x+6=0$.
43. The difference between simple interest and compound interest on a certain sum of money invested for 3 years at 6% p.a is 110.16. Find the sum.
44. Calculate the future value of the annuity immediate of Rs 1000 p. a for 12 years at 16% p.a. compounded quarterly.
45. A radio is sold at a profit of 25% cost price and selling price are both increased by Rs 100. If the new profit is at the rate of 20% find the original cost of the radio.
46. Find the ratio in which the line segment joining the point (4,9) and (3,-6) divided by x-axis. Also find the coordinates of the point of division.
47. Find the equation of the straight line which passes through the point of intersection of 2x-3y = 4 and 2x+2y=1 and perpendicular to x+4y =8.
48. Find the area of a quadrilateral whose verticals are (1,2) (6,2) (5,3) and (3,4) taken in as order.

PART-E

V. **Answer any one of the following:** **1X10=10**

49. a) Show that 3x-y+4=0, 2x-7y=5 and 5x+6y-1=0 are concurrent , also find the point of concurrence.

       (4+4+2)

    b) A confectioners makes and sells biscuit. He sells one pack of biscuit at Rs 80. His cost of manufacturing is Rs 40 per packet as variable cost and Rs 3000 as fixed cost. Find the
    i) Revenue function   ii) Cost function   iii) Profit function
    iv) If he limits his production to 100 packets can he make profit?
    v) What will be the number of boxes he must sell to make a profit so that he does not incur loss?

c) Find the number of zeros between the decimal point and the first significant figure in $(0.7)^{55}$.

50) a) Find x if $x = \sec 30^0 \tan 60^0 + \sin 45^0 \csc 45^0 + \cos 30^0 \cot \dfrac{\pi}{3}$ (4+4+2)

b) Find the sum to 'n' terms of the G.P 0.7+0.77+0.777+….. to n terms.

c) The HCF of two numbers is 16 and their LCM is 160. If one of the number is 64, then find the other number.

****