Total Marks: 70   Time: 3Hrs 15 Minutes

PART-A

I.Answer all questions: $1 \times 10 = 10$

1. Give the canonical representation of 385

2. If R ={ (1,2) (2,3) (3,3)} a relation defined on the set A={1,2,3} find R^{-1}

3. Simplify : $\left[\left\{\sqrt[3]{x^2}\right\}^3\right]^{1/2}$

4. Find the value of x if $log_{\sqrt{2}}x = 4$

5. IF a={1,2,3,5,7} B={7,9,11} Find B-A

6. Find the 9th term of the sequence   1, $\frac{1}{2}, \frac{1}{3}$, ……..

7. Solve for : $\frac{3x+4(x-5)}{12} = 10$

8. Convert 0.32 into percentage

9. What is the simple interest on Rs. 1000 for half year at 10% pa?

10. Express $\frac{3\pi}{4}$ in degrees

11. Define perpetuity

12. Find the slope of the line $2x + 5y - 11 = 0$

PART-B

II. Answer any 10 questions: $2 \times 10 = 20$

13. Find the sum of all divisors of $3^2 \times 5^3 \times 7^2$

14. If $f(x) = x^2$, $g(x) = x - 1$, find gof (2) and $fog(1)$

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

16. If A={1,3,5} , B={5}, C={5,7} find AX(B-C)

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

18. Solve by formula method: $5x^2 - 7x - 12 = 0$

19. Solve the inequalities $5x - 3 > 3x + 1, x \in$R and represent on the number line.

20. Sowmaya invested Rs. 1500 for 8 years and Anisha invested Rs. 7500 for 3 years at the same rate of interest .If altogether they received Rs. 1725 as interest find the rate of simple interest charged.

21. The average score of 20 boys is 60% and the average score of 30 girls id 70%. Find the combined average.

22. Prove: $(1+tan^2\theta)(1 - sin^2\theta) = 1$

23. Find the value of x if the distance between $(x, 3)$ and $(4,7)$ is 7 units.

24. If the cost price of machine is Rs. 150 and selling price is Rs.100 find the loss percentage

25. Show that the points A(4,-2) , B(2,-4) C(7,1) are collinear using slope method

PART-C

III.Answer any 10 questions: 10 X 3 = 30

26. Prove that $\sqrt{2}$ is an irrational number.

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

28. Find the number of zeros in $(0.2)^{100}$ after the decimal point and the first significant figure.

29. Prove that $\dfrac{1}{\log_2 4}+\dfrac{1}{\log_8 4}+\dfrac{1}{\log_{16}4}=4$

30. Find the sum of n terms of the G.P 0.6+0.66+0.666+-------

31. Solve : $x^3+6x^2+9x+4=0$ using synthetic division given that has an integer root between -3 and 3

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

33. Find the present value of the annuity for Rs. 3000 for 5 years at 10% P.a

34. Mr. Raju purchased 17 English books a discount sale, the average price of the book being Rs. 53. The average price of 11 English books is Rs. 71. If the average price of 6 different English story books form an increasing arithmeticprogression with last book price being Rs. 25. Find the price of the cheapest English story book

35. Show that following points are vertices of a rectangle (1,6), (-1,-2) ,(4,1) (-4,3)

36. By selling an article for Rs. 825 a man loses equal to $\dfrac{1}{3^{rd}}$ of its selling price. Find the
   i) Cost of price of the article ii) gain % or loss% if the same article is sold for Rs. 1265.

37. Find the value of x if $x.\sin 45^0 . \tan 60^0 = \dfrac{\sin 30^0 \cot 30^0}{\cos 60^0 \csc 45^0}$

38. Derive the slope –intercept form of a straight line.

Part-D

IV. Answer any six of the following. $\hfill$ 6X5=30

39. In college $\dfrac{2}{5^{th}}$of the students play basket ball and $\dfrac{3}{4^{th}}$ play volley ball. If 50 students play none of these two games and 125 play both find the numbers of students who play
   a) at least one of the two games
   b) Exactly one. Represent the result using venn diagram.

40. Evaluate $\dfrac{1.234 \,X\, 0.8921}{43.43 \,X0\, .0092}$ using logarithm table.

41. If α and β are the roots of the equation $3x^2-4x-15=0$ then find the value of $\dfrac{\alpha^2}{\beta}+\dfrac{\beta^2}{\alpha}$

42. i) Find compound interest on Rs.7500 at 14% for 14 years while interest is calculated half yearly .
   ii)Form a quadratic equation whose roots 2+√3 and 2-√−3

43. Find the equation of the medians of the triangle formed by the points (-1,3) (-3,5) and (7,-9)

44. Find the future value of an annuity of Rs. 5000 12% p.a for 6 years.

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 new profit is at the rate of 20% , find the original cost of the radio.

46. Prove that : $\dfrac{\tan A}{1-\cos A}+\dfrac{\cot A}{1-\tan A}=$ 1+secA.cosecA.

47. Find the co-ordinates of the   vertices of the triangle given the midpoints of the sides as (4,-1) (7,9) (4,1)

48. Find the equation of a line through the intersection of the lines x-8y+11=0 , 4x-7y+3=0 and perpendicular to the line 3x+2y+5=0.

Part-E

V. Answer any one of the following. $\hfill$ 1X10=10

49 a) Find the equation of the straight line passing through the point of intersection x+2y+3=0 and 3x+4y+7=0 has a slope $-3/2$.

b) Solve for x if : $\dfrac{x.\sin^2 300.\sec^2 240.}{\cos^2 225.\csc^2 240}=\cot^2 315.\tan^2 300$

c) Find the numbers of digits in the integral part of 2^{40}

50 a) A firm finds that the perpendicular the production cost directly attributed to each product is Rs.225 and fixed costs are Rs. 10,000. If each product can be sold for Rs.35, find the
   i) Cost function $\hfill$ ii) Revenue function
   iii) Profit function $\hfill$ iv) Break-even output.

   b. The third and fifth element of a G.P are 3 and 27 respectively .Find the eighth element

   c. Find the greatest number which divides 39, 48 and 90 leaving remainder 6,4 and2 respectively

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