B.Com(Hons) DEGREE EXAMINATION,APRIL 2020
II Year III Semester
Business Mathematics

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer **ALL** the questions

1. Write down the set A to all odd natural numbers less than 10 in tabulation method
2. If X={3,6,9,12} Y={1,2,3,4,5,6} and $f : X \to Y$ is given by $f(x) = \frac{1}{3}x + 1$. Represent f as set as ordered pairs.
3. If $\frac{a}{3} = \frac{b}{4} = \frac{c}{7}$ show that $\frac{a+b+c}{c} = 2$
4. If x varies as y and $x = 8$ when $y = 15$; find x when $y = 10$
5. Find the number of permutations of the letters of the word ALABAMA?
6. Expand $(2x + y)^5$
7. Differentiate $y = 3e^x + 2logx + \frac{1}{x^2}$ w.r.to x.
8. Differentiate $x^2 sinx$ w.r.to x.
9. Convert 29 into binary number.
10. Find x, y and z if $\begin{pmatrix} x+3 & 3x-2y \\ 3x-z & 5 \end{pmatrix} = \begin{pmatrix} 2 & -7+2y \\ y+4 & 5 \end{pmatrix}$

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

11. If A={0,1,3,5} B={1,2,4,7} C={1,2,3,5,8} Prove that $(A \cap C) \cup B = (A \cup B) \cap (C \cup B)$
12. Given $f(x) = x + 3$; $g(x) = 2x + 7$; $h(x) = x^2$ check whether $(fog)oh = fo(goh)$
13. The monthly incomes of two persons are in the ratio 6:7 and their monthly expenditure are in the ratio 11:13. If each saves Rs.50 per month, find their monthly incomes.
14. A locomotive engine without a train can go 24km an hour and its speed is diminished by a quantity which varies as the square root of the number of wagons attached. With 4 wagons its speed is 20km per hour. Find the greatest number of wagons with which the engine can move.

15. Find the sum of all natural numbers between 100 and 1000 which are divisible by 13.
16. Differentiate $\frac{logx}{x^2}$ w.r.to x.
17. Find Maximum and Minimum values for $y = x^3 - 2x^2 + x + 4$.
18. The difference between true and Banker's discounts on a bill due after six months at 4% interest p.a. is Rs. 20. Find
    (i) the true discount
    (ii)the Banker's discount
    (iii) the face value of the bill

Section C $(2 \times 15 = 30)$ Marks

PART - A - Case Study - Compulsory Question

19. In a graduate course of 200 students of a college, records indicate 80 students have taken physics, 90 have taken biology, 35 have taken chemistry, 32 have taken both biology and physics, 23 have taken both chemistry and physics, 10 have taken both biology and chemistry, and 8 have taken all the three subjects. How many have not taken any of the three subjects? How many have taken only one subject?

PART - B

Answer any **ONE** questions

20. Solve by matrix inversion method

    $x + y + 2z = 4$
    $2x - y + 3z = 9$
    $3x - y - z = 2$

21. Let the cost function of a firm be given by the following equation $C(x) = 300x - 10x^2 + \frac{1}{3}x^3$ where $C(x)$ stands for cost function and x for output. Calculate

    i) Output at which marginal cost is minimum
    ii) Output at which average cost is equal to marginal cost

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