B.Com. (Hons) DEGREE EXAMINATION,NOVEMBER 2018
II Year III Semester
Core Major- Paper IX
BUSINESS MATHEMATICS

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

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

Answer **ALL** the questions

1. In a survey of 5000 persons, it was found that 2,800 read Indian Express and 2,300 read statesman while 400 read both papers. How many read neither indian Express nor Statesman?
2. Find $\mathbf{x}:\mathbf{y}$ **if** $\mathbf{2x+9y}:\mathbf{3x+4y} = \mathbf{3}:\mathbf{4}$.
3. If $\frac{\mathbf{a}}{\mathbf{3}}=\frac{\mathbf{b}}{\mathbf{4}}=\frac{\mathbf{c}}{\mathbf{7}}$ show that $\frac{\mathbf{a+b+c}}{\mathbf{c}}=\mathbf{2}$.
4. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20th term.
5. Differentiate $\mathbf{e^x}\ \mathbf{c}os\mathbf{3x}\ \mathbf{s}in\mathbf{4x}$ with respect to x.
6. Find the compound Interest on Rs. 1000 for 2 years at 10% per annum.
7. Differentiate $\frac{\mathbf{x}\mathbf{l}og\mathbf{x}}{\mathbf{e^x}}$.
8. Add the binary numbers 11101 and 1001.
9. Given that $\mathbf{f}(\mathbf{x})=\mathbf{2x+3},\ \mathbf{g}(\mathbf{x})=\mathbf{5x+m}$, find m so that $\mathbf{fog} = \mathbf{gof}$.
10. If ${}^{\mathbf{36}}\mathbf{C_r}={}^{\mathbf{36}}\mathbf{C_{r+4}}$, find the value of r.

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

Answer any **FIVE** questions

11. If $\mathbf{A}=\{\ \mathbf{1},\mathbf{2}\},\ \mathbf{B}=\{\ \mathbf{2},\mathbf{3}\}\ \mathbf{a}nd\ \mathbf{C}=\{\mathbf{3},\mathbf{4}\}$, Verify that

    (i) $A \times (B \cup C) = (A \times B)\ U\ (A \times C)$

    (ii) $A \times (B \cap C) = (A \times B) \cap (A \times C)$

12. If $\mathbf{a+b}:\sqrt{\mathbf{a}b}=\mathbf{4}:\mathbf{1}$ Prove that $\sqrt{\frac{\mathbf{a}}{\mathbf{b}}}+\sqrt{\frac{\mathbf{b}}{\mathbf{a}}}=\mathbf{4}$ and hence find the value of a : b.
13. The value of diamond varies as the square of its weight. A diamond is broken into 5 pieces, the weights of which are in the ratio 1:2:3:4:5. If the resulting loss be Rs. 85,000 find the value of the original diamond. Also calculate the value of a diamond whose weight is twice that of the original diamond.

14. The cost function for producing x units of a product is $\mathbf{C}(\mathbf{x}) = \mathbf{x^3} - \mathbf{12x^2} + \mathbf{48x} + \mathbf{11}$ (in rupees) and the revenue function is $\mathbf{R} = \mathbf{83x} - \mathbf{4x^2} - \mathbf{21}$. Find the output for which profit is maximum and find the maximum profit.
15. Find the banker's gain on a bill of Rs. 3,750 due in 8 months at 8% per annum.
16. A salesman visits 274 housewives in a town to find out their views about three products A, B and C. he finds that 157 use A, 98 use only A, 22 use all the three, 14 use A and C but not B, 39 use B and C, 48 use only B

    i) Which product is most popular according to his inquiry?

    ii) How many use product C only?

    iii) What fraction use atleast two products?

17. An examination paper consists of 12 questions divided into two parts A and B. Part A contains 7 questions and part B contains 5 questions. A candidate is required to answer 8 questions selecting atleast 3 questions from each part. In how many ways can he select the questions?
18. Differentiate $\mathbf{x^x} + \mathbf{x}^{sin\ \mathbf{x}}$.

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

PART - A - Case Study - Compulsory Question

19. a) Out of 880 boys in a school, 224 played cricket, 240 played hockey and 336 played basketball; of the total 64 played both basketball and hockey; 80 played cricket and basketball and 40 played cricket and hockey. 24 played all the three games. How many did not play any of the games and how many played only one game?

    b) If $\mathbf{f}(\mathbf{x}) = \mathbf{x+1}$, $\mathbf{g}(\mathbf{x}) = \mathbf{2x+3}$ and $\mathbf{h}(\mathbf{x}) = \mathbf{3x+4}$. Show that the composition of the function is associative.

PART - B

Answer any **ONE** questions

20. Find the maximum and minimum values of $\mathbf{y} = \mathbf{2x^3} - \mathbf{3x^2} - \mathbf{36x} + \mathbf{10}$.
21. Solve by matrix method $\mathbf{2x+4y+z=5}$ $\mathbf{x+y+z=6}$ $\mathbf{2x+3y+z=6}$.

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