

B. Com. 1st Semester (Honours) Examinations, 2020-21

Commerce

Course ID: 11212

Course Code: BCOMH/102C-2

Course Title: Business Mathematics

Time: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

Candidates are required to give their answer in their own words as far as practicable

1. Answer any five questions:

2 x 5=10

- (a) If the 5th term and 12th term of an arithmetic progression(A.P.) are 30 and 65 respectively, then find the common difference of the A.P.
- (b) Prove that $\log 6 = \log (1+2+3)$.
- (c) Find the maximum value of $y = x + \frac{1}{x}$.
- (d) If $y = x^3 + e^x$ then find the value of $\frac{dy}{dx}$.
- (e) If $A = \{1,2,3,4\}$ and $B = \{5,6,7,8\}$ then find the value $A \cup B$ and $A \cap B$.
- (f) If $A = \begin{pmatrix} 1 & 7 \\ 3 & 4 \end{pmatrix}$ then find the value of $A + A^T$.
- (g) In how many ways can letters of the word "COLLEGE" be arranged?
- (h) Which term of the series 2, 4,8,16 is 512?

2. Answer any four questions:

5x4=20

- (a) If $a^{3-x}b^{5x} = a^{5+x}b^{3x}$ then prove that $x \log \left(\frac{b}{a}\right) = \log a$.
- (b) If a , b , c are in A.P then prove that $a\left(\frac{1}{b} + \frac{1}{c}\right)$, $b\left(\frac{1}{c} + \frac{1}{a}\right)$, $c\left(\frac{1}{a} + \frac{1}{b}\right)$, are in A.P.
- (c) If $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ then find the value of $\frac{d^2y}{dx^2}$.
- (d) Find $\int \frac{1}{1+x^4} dx$. 5
- (e) Suppose $f(x) = \begin{cases} -2x + 1, & x \leq 1 \\ 3 - x, & x > 1 \end{cases}$ find the value of $\lim_{x \rightarrow 1} f(x)$, if it exists.
- (f) If $A = \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 4 \\ -1 & 1 \end{pmatrix}$ then examine $(A + B)^2 = A^2 + 2AB + B^2$

3. Answer any one question:

10x1=10

- (a) (i) If $4f(x) + 3f(-x) = 7 - 3x$ then find $f(x)$. 3
- (ii) Find the value of the determinant $\begin{vmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 2 & 3 & 4 \end{vmatrix}$. 3

- (iii) If $x = \log_a(bc)$, $y = \log_b(ca)$, $z = \log_c(ab)$ then prove that $\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1} = 1$. 4
- (b) (i) Define Power set. Find the power set of the set $X = \{1, 2\}$, 3
- (ii) If $A = \begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}$ then find A^{-1} . 2
- (iii) Solve the system of equations by Cramer's rule: $2x + y = 7$, $x + 2y = 8$. 5