Student's Roll No.		–			–			–				

1st SEMESTER EXAMINATION – BBA
NOV – DEC 2009

BUSINESS MATHEMATICS - I (HONOURS) BSMA3101

Saturday, December 12, 2009 09:30 am to 11:30 am

Time allowed: 2 hours

Full Marks: 50

Instructions:

- Use fountain pen or ball-point pen of blue or black ink.
- Answer in own words as far as practicable.
- Do not write anything on the Question paper other than Roll No.

ANSWER QUESTION NO. 1 AND ANY FIVE FROM THE REST

1. Answer ANY FIVE questions: (5 X 2 = 10)

   (a) Find three numbers in A.P. whose sum is 15 and product is 80.

   (b) If the roots of the equation $3x^2 + acx + c = 0$ are reciprocal to each other, find the value of 'a'.

   (c) If ${}^{20}C_{12+x} = {}^{20}C_x$ find the value of ${}^{12}C_x$.

   (d) If $\log_x 16 = 4$ find $\log_2 x$.

   (e) Prove that ${}^{n-1}C_{r-1} + {}^{n-1}C_r = {}^{n}C_r$.

   (f) Show that $x\dfrac{e^x+1}{e^x-1}$ is an even function of x.

   (g) Show that $f(x) = |x|$ has no derivative at $x = 0$.

   (h) Evaluate $\lim\limits_{x\to 0}\dfrac{\sqrt{x+1}-1}{x}$.

2. (a) The sum of the digits of three digited number is 12. The digits are in A.P. If the digits are reversed, then the number is diminished by 396. Find the number. (4)

   (b) If the roots of the equation $px^2 + qx + r = 0$ be in the ratio 2:5, show that $10q^2 = 49pr$. (4)

3. (a) The product of 3 numbers in G.P. is 729 and the sum of their squares is 819. Find the numbers. (4)

   (b) From 17 consonants and 5 vowels how many words of five letters can be formed taking 3 consonants and 2 vowels? (4)

4. (a) How many odd numbers can be formed using all the digits 0,1,2,3,4,5,6 only once? (4)

   (b) If $\log x = \dfrac{\log y}{2} = \dfrac{\log z}{3}$, prove that x, y, z are in G.P. (4)

5. (a) Find the term independent of x in the expansion $\left(x - \dfrac{2}{x^2}\right)^{15}$. (4)

   (b) Solve for x : $5^{\log x} + 3^{\log x} = 3^{\log x+1} - 5^{\log x-1}$ [base = 10]. (4)

6. (a) If $f(x) = 2x$ and $g(x) = x+1$, find $f[g(x)]$ and $g[f(x)]$. Are they equal? (4)

   (b) Evaluate: $\lim\limits_{x\to\infty} x\{\log(x+\alpha) - \log x\}$ (4)

7. (a) If $f(x) = \begin{cases} a^2x^2 - 3ax & \text{when } x \le 1 \\ 2ax - 6 & \text{when } x > 1 \end{cases}$

   find the value of a for which $f(x)$ is continuous at $x = 1$. (4)

   (b) Find by first principle the derivative of $\dfrac{1}{x\sqrt{x}}$. (4)

8. (a) $y = 1 + \frac{a}{x-a} + \frac{bx}{(x-a)(x-b)}$, show that $\frac{dy}{dx} = \frac{y}{x}\left(\frac{a}{a-x} + \frac{b}{b-x}\right)$. (4)

(b) If $y = \log\left(x + \sqrt{x^2+1}\right)$ prove that $\left(x^2+1\right)\frac{d^2y}{dx^2} + x\frac{dy}{dx} = 0$. (4)

9. (a) Show that $f(x) = |x-1|$ is continuous at $x = 1$. (4)

(b) Find $\frac{dy}{dx}$ if $x^y + xy = 7 + y$. (4)

--*-*-*-*-*-*-*-*-*-*-*