NBL-010-001207   Seat No. _____

B. B. A. (Sem. II) (CBCS) Examination

April/May - 2017

207 : Business Mathematics - II

(Old Course)

Faculty Code : 010

Subject Code : 001207

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instruction :   All questions are **compulsory**.

1   Differentiate w.r.t. x : (any **four**)   **14**

   (1) $x^3 \cdot 3^x \cdot \log x$.

   (2) $\dfrac{x^2 + 2x + 5}{\log x}$.

   (3) $\left(x^3 + 11x^2 + 9\right)^{7/2}$.

   (4) $\left(x^{1/3} + \dfrac{1}{x^{1/3}}\right)^3$.

   (5) $e^{\sqrt{x}} + \left(ax + b\right)^{-1}$.

2   Integrate the following : (any **four**)   **14**

   (1) $\displaystyle\int \dfrac{3x + 4}{6x + 7}\, dx$.

   (2) $\displaystyle\int \dfrac{x^2}{\left(x^3 + 2\right)^{1/4}}\, dx$.

(3) $\int \dfrac{x^2 + 8x + 15}{x + 3}\, dx.$

(4) $\int \dfrac{2^x\, e^x + e^{2x}}{e^x}\, dx.$

(5) $\int\limits_0^1 x^2\, e^{2x}\, dx.$

3 (a) If $f(x) = 3x^4 - 2x^3 + 5x^2 + 11x - 7$ find value of x such   7

   that $f''(x) = 34.$

   (b) If $y = \dfrac{1 - \log x}{x}$ then prove that $x^3 \dfrac{d^2y}{dx^2} + 2x^2 \dfrac{dy}{dx} - 1 = 0.$ 7

OR

3 (a) If $f(x) = x^4 - 4x^3 + 3x^2 + x + 1$ find $f''(0).$ 7

   (b) If $z = \dfrac{y \log x}{x}$, prove that $\dfrac{\partial^2 z}{\partial x\, \partial y} = \dfrac{\partial^2 z}{\partial y \partial x}.$ 7

4 (a) Find the amount of annuity if Rs. 5000 is deposited   7
       annually at 15% compound rate of interest for 10 years.
   (b) What amount should be invested every year so   7
       as to accumulate Rs. 1,00,000 at the end of 10 years
       if the interest is compounded annually at 11%.

OR

4 (a) A person purchases a machine on instalment basis   7
       and agrees to pay 10 instalments each of Rs. 15,000 at
       the end of every year. If the rate of interest is 12% per
       annum find the present value of machine.

   (b) A limited company purchased a machine for   7
       Rs. 4,50,000 the expected life of which is 5 years. After
       5 years, a new machine would cost them 20% more. The
       company has decided to create a sinking fund and invest
       them at 12% rate of compounded interest. Fund the
       amount to be transfered every year to this fund.

5 (a) Define following : 7

        (1) Transpose of a matrix

        (2) Symmetric matrix

        (3) Singular matrix

        (4) Inverse of matrix

        (5) Unit matrix

        (6) Orthogonal matrix

        (7) Equal matrix.

    (b) Solve the equation by matrix method : 7

$$3x + 5y + 6z = 4$$
$$x + 2y + 3z = 2$$
$$2x + 4y + 5z = 3.$$

<div align="center">

OR

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5 (a) Write Rules of Determinant. 7

    (b) Show that : 7

$$\begin{vmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} = 4a^2b^2c^2.$$

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