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AAT-010-001207 Seat No. _____

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

April / May – 2016

207 : Business Mathematics : Paper-II

(New Course)

Faculty Code : 010

Subject Code : 001207

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

Instructions : (i) Write answers of all questions in main answer sheet.

(ii) Que. 1 carries 20 marks.

(iii) Q. 2 to Q. 6 each carry 10 marks.

1 M.C.Q.'s : **20**

(1) If $f(x) = 3x^2 + 5x + 7$ then $f'(2) =$ _____.

(A) 15 (B) 17

(C) 29 (D) 31

(2) If $y = \sqrt{x}$ then $\frac{dy}{dx} =$ _____.

(A) $\frac{1}{\sqrt{x}}$ (B) $\frac{1}{2\sqrt{x}}$

(C) $2\sqrt{x}$ (D) $\sqrt{x}$

(3) If $y = \log 5$ then $\frac{dy}{dx} =$ _____.

(A) $\frac{1}{5}$ (B) 0

(C) $5 \log 5$ (D) 5

(4) If $y = e^{3x}$ then $\frac{dy}{dx} =$ ____.

(A) $3e^{x}$ (B) $3e^{3x}$

(C) $3e^{3}$ (D) e^{3x}

(5) If $z = f(x, y) = x^2 + 2xy + 3y^2$ then $\frac{\partial z}{\partial x} =$ ____.

(A) $2x + y$ (B) $2y + x$

(C) $2x + 2y$ (D) $-2x + y$

(6) If $z = e^{x+y}$ then $\frac{\partial z}{\partial y} =$ _____.

(A) $x e^{x+y}$ (B) $y e^{x+y}$

(C) e^{x+y} (D) $-xe^{x+y}$

(7) If $y = 5x^2 + 2x - 3$ then $\frac{d^2y}{dx^2}$ at $x = 1$ = _____.

(A) 12 (B) 2

(C) 10 (D) 0

(8) _____ is used for obtaining maximum utility.

(A) Simple derivative (B) Integration

(C) Partial derivative (D) None of these

(9) $\int e^{5x+2} dx =$ _____.

(A) e^{5x+2} (B) $5e^{5x+2}$

(C) 0 (D) $\frac{e^{5x+2}}{5} + c$

(10) $\int \frac{1}{3x+4} dx =$ _____.

(A) $\log(3x+4) + c$ (B) $\frac{(3x+4)^3}{3} + c$

(C) $\log(3x) + c$ (D) $\frac{\log(3x+4)}{3} + c$

(11) $\int_{-1}^{1} x^2 dx =$ _____.

(A) $\frac{1}{3}$ (B) $-\frac{1}{3}$

(C) 0 (D) $\frac{2}{3}$

(12) $\int \frac{\log x}{x} dx =$ _____.

(A) $(\log x)^2 + c$ (B) $2(\log x)^2 + c$

(C) $\log x + c$ (D) $\frac{(\log x)^2}{2} + c$

(13) In matrix if AB=BA–I then B is said to be _____

(A) inverse matrix (B) symmetric matrix

(C) unit matrix (D) orthogonal matrix

(14) In a square matrix whose determinant is not equal to zero is said to be _____ matrix.

(A) non-singular (B) singular

(C) square (D) none of these

(15) If any two rows or columns are identical in all respects then the value of the determinant is _____.

(A) zero (B) negative

(C) change in sign only (D) none of these

(16) If any two rows of a determinant are interchanged, the value of new determinant is _____.

(A) changed only in sign (B) remains same

(C) 0 (D) none of these

(17) When interest is calculated on the principal only for the entire period is called _____.

(A) compound interest (B) simple interest

(C) annuity (D) none of these

(18) At what percent rate of simple interest a sum will be doubled itself in 25 years ?

(A) 8% (B) 5%

(C) 4% (D) 6%

(19) Simple interest and compound interest are _____ for first year.

(A) $>$ (B) $<$

(C) $\neq$ (D) $=$

(20) If Rs. 1000 is deposited for 2 years at 10% interest what is the difference between simple interest and compound interest ?

(A) 10 (B) 200

(C) 210 (D) 20

2 (a) Write the rules of determinant. **5**

(b) Solve the following equations by Cramer's rule : **5**

$$x + 2y + 3z = 14$$
$$2x + y + z = 7$$
$$5x + 2y + z = 12$$

OR

2 (a) Define the following : **5**

(i) Transpose of a matrix

(ii) Symmetric matrix

(iii) Inverse of a matrix.

(b) If $A=\begin{bmatrix} 6 & 3 \\ 4 & 5 \end{bmatrix}$ find A^{-1} and verify that $A \cdot A^{-1} = I$. **5**

3 Attempt any two : **10**

(1) If $y=\left(\frac{1+x}{1-x}\right)^2$ prove that $\left(1-x^2\right)\frac{dy}{dx}=4y$.

(2) If $y=\frac{x^2+2x+3}{(x+1)^2}$ find $\frac{dy}{dx}$.

(3) If $y=\log\left[\frac{1+x^2}{1-x^2}\right]$ find $\frac{dy}{dx}$.

(4) If $x^y=y^x$ find $\frac{dy}{dx}$.

4 Attempt any two : **10**

(1) $\int \frac{x+5}{(x+1)(x+2)}dx$

(2) $\int_0^1 \frac{x^2+4x+3}{x+1}dx$

(3) $\int x e^{5x}dx$

(4) $\int \frac{e^{7x}}{\sqrt{e^{7x}+1}}dx$

5 (a) If $z = \log\left(x^2 + y^2\right)$, prove that $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$. 5

(b) The utility function is $u = 24x + 48y - x^2 - y^2$ and the budget equation is $x + 3y = 14$. Find the values of x and y so that the consumer gets maximum utility. 5

OR

5 (a) Obtain maximum and minimum values of $y = x^3 - 9x^2 + 24x + 2$. 5

(b) If $y = \frac{\log x}{x}$ prove that $\frac{d^2 y}{dx^2} = \frac{2\log x - 3}{x^3}$. 5

6 (a) What is Annuity ? Find the formula for annuity. 5

(b) The accumulations in a provident fund are invested at the end of every year to earn 10% interest. A person contributes $12\frac{1}{2}\%$ of his salary to which the employer adds equal amount every month. Find how much the accumulations will amount at the end of 30 years if the fixed monthly salary of the person is Rs. 2000. 5

OR

6 (a) Explain the terms : 5

(i) Effective rate of interest

(ii) Sinking fund.

(b) A person deposits Rs. 25,000 for 4 years at 12% rate of compound interest. If interest is calculated monthly, find the amount of compound interest. 5