M 9904

Reg. No.: .....

Name : .....

V Semester B.A./B.Sc./B.Com./B.B.A./B.B.A.T.T.M./B.B.A.R.T.M./B.B.M./
B.C.A./B.S.W./B.A. Afsal-Ul-Ulama Degree (CCSS-Reg./Supple./Imp.)
Examination, November 2015
Open Course

5D01 MAT : BUSINESS MATHEMATICS

Time: 2 Hours

Max. Weightage: 20

Instruction: Answer to all Parts.

PART-A

This Part consists of **two** bunches of questions carrying **equal** weightage of **one each**. **Each** bunch consists of **four** objective type questions. Answer **all** questions.

I. 1) The range of the function y = |x| is the

2) 
$$\lim_{x\to 0} \frac{a''-1}{x} =$$

3) 
$$\frac{d}{dx}$$
 (uvw) =

4) For points of local maxima 
$$\frac{dy}{dx} = 0$$
 and  $\frac{d^2y}{dx^2}$ 

(W = 1)

II. 5) Revenue - cost =

6) 
$$\int \frac{f'(x)}{f(x)} dx =$$

7) 
$$\int \frac{dx}{ax+b} =$$

8) If the rate of interest  $r_1$ % for the first  $n_1$  years and  $r_2$ % for the next  $n_2$  years and  $r_3$ % for the next  $n_3$  years then the amount due = (W = 1)



## PART-B

Answer any six questions in one or two sentences each. Each question carries a weightage of one.

- 9) Evaluate  $\lim_{x\to 1} \frac{x^3-1}{x-1}$ .
- 10) Show that  $f(x) = 3x^2 + 2x 1$  is continuous at x = 2.
- 11) Differentiate with respect to x

$$4x^2 - 7x + 8 - \frac{4}{\sqrt{x}} + \frac{6}{\sqrt{b}}$$

- 12) Find  $\frac{dy}{dx}$  if  $y = x^n e^{ax}$ .
- 13) Evaluate  $\int \sqrt{(ax+b)} dx$ .
- 14) Evaluate ∫t²e¹dt.
- 15) The demand function of a product is  $p 10 e^{-x} = 0$ . Find the consumer's surplus when the market price is p = 1.
- 16) The supply function of a product is  $y = 3x^2 + 6$ . Find the producer's surplus when 10 units are supplied.
- 17) A pressure cooker is available for Rs. 250 each or 100 cash down payment followed by Rs. 165 after 6 months. Find the rate of interest charged under the instalment plan.
- 18) Calculate the market equilibrium value for an acre of land yielding Rs. 100 per annum after all expenses, indefinitely into the future. The market rate of interest is 10% p.a. (W = 6×1=6)

## PART-C

Answer any 4 questions. Each carries wt: 2.

- 19) Evaluate  $\int (2x+3) \log (x^2+3x+4) dx$ .
- 20) Find the curve whose slope is  $\frac{dy}{dx} = \frac{2y}{x}$ ; x > 0, y > 0 and which passes through the point (1, 1).



- 21) If  $y = x^{\log x}$ , find  $\frac{dy}{dx}$ .
- 22) Evaluate  $\lim_{x\to 0} \frac{\sqrt{1+x} \sqrt{1-x}}{x}$ .
- 23) A function is defined under  $f(x) = \begin{vmatrix} \frac{e^{1/x^2}}{x^2} \\ \frac{e^{1/x^2}}{x^2 1} \\ 1 & \text{if } x = 0 \end{vmatrix}$  when  $x \neq 0$ .

Examine the continuity at x = 0.

- 24) If  $y = \sqrt{1 x^2}$  show that  $(1 x^2)y_2 xy_1 = \frac{x}{y_1}$ .
- 25) Find the total revenue between 0 to 10 units of output (x) from the marginal revenue given by HR =  $3\left(\frac{x^2}{20}\right) 10x + 100$ .
- 26) A machine is purchased for Rs. 10,600. Depreciation is calculated at 8% per annum for the first 3 years and after that 10% per annum for the next seven years, depreciation being calculated on diminishing value. Find the value of the machine after a period of 10 years. (W = 4×2=8)

## PART-D

Answer any one. Wt-4.

- 27) If  $xy = ax^2 + \frac{b}{x}$  show that  $x^2y_2 + 2(xy_1 y) = 0$ .
- 28) A firm has revenue function given by R = 8D where R is gross revenue and D is the quantity sold and production cost function is given by  $C = 1,50,000 + 60 \left(\frac{D}{900}\right)^2$ . Find the total profit function and the number of units to be sold to get the maximum profit.
- 29) Find the producer's and consumer's surplus under perfect competition, given the demand function  $x = \frac{25}{4} \frac{p}{8}$  and supply function p = 5 + x (where p is the price and x is quantity). (W = 1×4=4)