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) $\lim\limits_{x \to 0} \dfrac{a^n - 1}{x} =$

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

4) For points of local maxima $\dfrac{dy}{dx} = 0$ and $\dfrac{d^2y}{dx^2}$ **(W = 1)**

II. 5) Revenue – cost =

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

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

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)**

P.T.O.

PART – B

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

9) Evaluate $\lim\limits_{x\to 1} \dfrac{x^3 - 1}{x - 1}$.

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 $\dfrac{dy}{dx}$ if $y = x^n\, e^{ax}$.

13) Evaluate $\int \sqrt{(ax + b)}\, dx$.

14) Evaluate $\int t^2 e^t dt$.

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 $\dfrac{dy}{dx} = \dfrac{2y}{x}$; $x > 0, y > 0$ and which passes through the point (1, 1).

21) If $y = x^{\log x}$, find $\dfrac{dy}{dx}$.

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

23) A function is defined under $f(x) = \begin{vmatrix} \dfrac{e^{1/x^2}}{e^{1/x^2} - 1} & \text{when } x \neq 0. \\ 1 \text{ if } x = 0 \end{vmatrix}$

Examine the continuity at $x = 0$.

24) If $y = \sqrt{1-x^2}$ show that $(1-x^2)y_2 - xy_1 = \dfrac{x}{y_1}$.

25) Find the total revenue between 0 to 10 units of output (x) from the marginal revenue given by $HR = 3\left(\dfrac{x^2}{20}\right) - 10x + 100$.

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 $xy = ax^2 + \dfrac{b}{x}$ 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 $C = 1,50,000 + 60\left(\dfrac{D}{900}\right)^2$. 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 $x = \dfrac{25}{4} - \dfrac{p}{8}$ and supply function $p = 5 + x$ (where p is the price and x is quantity).

(W = 1×4=4)