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-Sup./imp.) Examination, November 2017 (2013 and Earlier Admission) Open Course 5D01MAT : BUSINESS MATHEMATICS

Time : 2 Hours <div align="right">Max. Weightage : 20</div>

PART – A

This Part consists of **two** bunches of questions carrying **equal** weightage of **one** each. **Each** bunch consists of 4 objective type questions. Answer **all** questions.

I. 1) $\dfrac{d}{dx}$ (constant) =

2) $\lim\limits_{x \to 3} \dfrac{x^2 - 9}{x - 3} =$

3) $\int \dfrac{1}{x}\, dx =$

4) If u and v are functions of x, then $\dfrac{d}{dx}(uv) =$

II. 5) Define critical points.

6) Define consumer's surplus.

7) Define nominal rate of interest.

8) Is the statement 'effective rate of interest is higher than the nominal rate of interest' true ?

<div align="right">P.T.O.</div>

PART – B

Answer **any six** questions. **Each** question carries weight 1.

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

10) Examine for continuity at $x = 2$ of the function $f(x) = \begin{cases} 5x - 4 & \text{if } 0 < x \le 1 \\ 4x^2 - 3x & \text{if } 1 < x < 2 \\ 3x - 4 & \text{if } x \ge 2 \end{cases}$.

11) Find $\dfrac{dy}{dx}$ if $x^2 + xy + 2y^2 = 28$.

12) Differentiate $\log\left(\sqrt{x}\ e^x\right)$ with respect to x.

13) Find the point of inflexion of the curve $y = (x - 2)^{1/3}$.

14) Evaluate the integral $\int \dfrac{x^2 + ax + b}{ax + b} dx$.

15) The supply function of a product is $y = 3x^2 + 6$, find the producer's surplus when 10 units are supplied.

16) The demand function of a product is $p - 10e^{-x} = 0$. Find the consumer's surplus when the market price is $p = 1$.

17) Evaluate $\int\limits_0^1 \dfrac{1 - t}{1 + t}\, dt$.

18) What is the compound interest for Rs. 1,000 invested for 5 years at 10% per year ?

PART – C

Answer **any 4** questions. **Each** question carries weight 2.

19) Find the principal that yields a simple interest of Rs. 40 or a compound interest of Rs. 41 at the same rate of interest per annum in 2 years.

20) Mr. X deposited Rs. 10,000 in a bank for 3 years offering interest at the rate of 6% compounded – half yearly during first year, at the rate of 12% compounded quarterly during second year. Find the balance after 3 years.

21) A machine is purchased for Rs. 10,600. Depreciation is calculated at 8% per annum for the first three years and after that 10% per annum for the next 7 years, depreciation being calculated on diminishing value. Find the value of the machine after 10 years.

22) If $x^y + y^x = a^b$, find $\dfrac{dy}{dx}$.

23) If $x^5y^3 = (x + y)^8$, find $\dfrac{dy}{dx}$.

24) Evaluate $\displaystyle\int \dfrac{dx}{x(x^n + 1)}$.

25) The demand and supply functions under pure-competition are $p = 1600 - x^2$ and $p = 2x^2 + 400$ respectively. Find the consumer's and producer's surplus.

26) The total cost function (in Rupees) of x units of a product is $c(x) = x^2 + 78x + 2500$ and the demand function is $p = 600 - 8x$, when the price is Rs. p per unit. Show that the maximum net revenue (profit) is obtained when 29 units are produced. Also find the price at which profit is maximum.

PART – D

Answer **any one** question. Weight 4.

27) Using integration by parts, evaluate $\displaystyle\int \dfrac{xe^x}{(1+x)^2}\,dx$.

28) Find the consumer's surplus and producer's surplus under pure competition for demand function $p = \dfrac{8}{x+1} - 2$ and supply function $p = \frac{1}{2}(x+3)$, where p is price and x is quantity.

29) The sums of Rs. 5,000, Rs. 12,000 and Rs. 16,000 are due at the ends of 2, 5 and 7 years. It is proposed to replace this series by a single sum of Rs. 32,000 payable at the end of n years. If the rate of interest is 8% per annum compounded half yearly, determine the value of n.