



K16U 1973

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 UI Ulama Degree (CCSS – Supple./Imp.)  
Examination, November 2016  
(2013 and Earlier Admissions)  
Open Course  
5D01 MAT : BUSINESS MATHEMATICS

Time : 2 Hours

Max. Weightage : 20

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) Evaluate  $\int \frac{1}{x} dx$ .

2)  $\frac{d}{dx} (x^n) =$

3)  $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} =$

4) If u and v are functions of x,  $\frac{d}{dx} \left( \frac{u}{v} \right) =$

II. 5) Define "Critical Points".

6) What is "Depreciation" ?

7) Define "Points of inflexion".

8) Is the statement "Nominal rate of interest  $\leq$  effective rate of interest" true ?



## PART - B

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

9. If  $y = \sqrt{x+y}$ , find  $\frac{dy}{dx}$ .
10. Evaluate  $\lim_{h \rightarrow 0} \frac{\sqrt{x+h} - \sqrt{x}}{h}$ .
11. Examine for continuity at  $x = 2$  for the function  
 $f(x) = 3x + 5, 1 \leq x < 2$   
 $= 8, x = 2$   
 $= 4x - 1, 2 < x \leq 3.$
12. Differentiate  $\frac{\log x}{x^2}$  with respect to  $x$ .
13. Find the points of local minima of the function  $x^3 - 3x^2 + 4$ .
14. Evaluate  $\int_0^{\frac{1}{2}} \frac{1}{\sqrt{x^2-1}} dx$ .
15. If the supply function is  $p = \sqrt{9+x}$  and the quantity sold is 7, find the producer's surplus.
16. The demand function of a product is given by  $p - 10e^{-x} = 0$ . Find the consumer's surplus when the market price is  $p = 1$ .
17. Evaluate  $\int_1^e x \log x dx$ .
18. What is the compound interest for Rs. 1,000 invested for 5 years at an interest rate of 10% per year ?



PART – C

Answer **any 4** questions. **Each** carries wt. 2.

19. A man wishes to borrow Rs. D. He goes to the money lender and is told that the interest rate is  $r\%$  per annum payable in advance and that Rs. D are to be paid back at the end of one year. Show that the effective rate of interest is  $\frac{100r}{100-r}\%$ .
20. A machine costing Rs. 80,000 would reduce to 20,000 in 8 years. Find the rate of yearly depreciation, given that depreciation is calculated using diminishing balances method.
21. A sum of money is put at compound interest for two years at 20% per annum. It would fetch Rs. 482 more if the interest were payable half yearly than if it were payable yearly. Find the sum.
22. Find  $\frac{dy}{dx}$  if  $x^y y^x = k$  if  $k$  is a constant.
23. Evaluate  $\int \frac{dx}{x(x^4 + 1)}$ .
24. Determine consumer's surplus and producer's surplus under pure competition for the demand function  $p = 36 - x^2$  and supply function  $p = 6 + \frac{x^2}{4}$ , where  $p$  is the price and  $x$  is the quantity.
25. A tour operator charges Rs. 136 per passenger for 100 passengers upto a discount of Rs. 4 for each 10 passengers in excess of 100. Determine the number of passengers that will maximize the amount of money the tour operator receives.
26. For a certain establishment the total cost function  $C$  and the total revenue function  $R$  are given by  $C = x^3 - 12x^2 + 48x + 11$  and  $R = 83x - 4x^2 - 21$ , where  $x$  is the output. Obtain the output for which profit is maximum and the maximum profit.



## PART - D

Answer **any one**. Wt.= 4.

27. Using integration by parts evaluate  $\int (\cos^{-1} x)^2 dx$ .
28. The sums of Rs. 2,000, Rs. 3,000 and Rs. 4,000 are due at the ends of 2, 4 and 8 years respectively. It is proposed to replace this series of payments by a single sum of Rs. 9,000 payable at the end of  $n$  years. If the rate of interest is 10% per annum effective, find the value of  $n$ .
29. A company suffers a loss of Rs. 1,000 if its product does not sell at all. Marginal revenue and marginal cost functions for the product are given by  $MR = 50 - 4x$ ,  $MC = -10 + x$ . Determine the total profit function, break even points and profit maximising level of output.