K15U 0387

Reg. No. : ....

Name : ....

I Semester B.A. Degree (CCSS – Supple./Improv.) Examination, November 2015
Complementary Course in Economics
1C01 ECO : MATHEMATICS FOR ECONOMIC ANALYSIS – I
(2012-13 Admn.)

Time : 3 Hours

Max. Weightage : 30

PART – A

I. Objective type questions. **Each** bunch carries **1** weightage.

1) If $y = e^{2x}$, $\frac{dy}{dx}$ is

a) e^x b) $2e^x$

c) e^{2x} d) none

2) If $f(x) = x^3 - 2x + 1$ and $g(x) = x^2 + 7x + 2$ value of f(–1) g(0) is

a) 4 b) –4 c) 0 d) 2

3) $\underset{x \to 3}{\text{Lt}} \left(\frac{x^2 - 9}{x - 3} \right)$ is equal to

a) 3 b) 0

c) 6 d) 1

4) Derivative of a constant is

a) constant b) 1

c) zero d) none

(Weightage : 1)

P.T.O.

II. 5) Graph of $x^2 = 4y$ is

a) straight line
b) parabola
c) hyperbola
d) circle

6) The demand for sugar is $P = 15 - \frac{1}{5}x$, then marginal revenue function is

a) $-\frac{1}{5}$
b) $15 - \frac{1}{5}x$
c) $15x - \frac{1}{5}x^2$
d) $15 - \frac{2}{5}x$

7) $\frac{d}{dx}(3x^4 + 5x^3 + 10)$ is

a) $12x^3 + 15x^2 + 10$
b) $12x^3 + 15x^2$
c) $7x^4 + 8x^3$
d) none

8) The demand function is

a) monotonic decreasing
b) monotonic increasing
c) neither (a) nor (b)
d) both (a) and (b)

(Weightage : 1)

PART – B

III. Short answer questions. Answer **any 10** questions. **Each** carries **one** weightage.

9) Define cubic function.

10) Find the slope of the line $5x + 2y - 3 = 0$.

11) Define homogeneous function.

12) State Euler's theorem.

13) Define derivative of a function.

14) If the cost function is $C(x) = 4x - 6$ and the revenue function is $R(x) = 9x - x^2$ where x is the number of units produced then find the profit function.

15) Evaluate $\underset{x \to 0}{Lt}\left(\frac{3x^2+4x^3}{2x}\right)$

16) Using L.Hospital's rule; evaluate $\underset{x \to 0}{Lt}\frac{x^2+x^3}{2x}$.

17) Define the following :

a) Cubic function

b) Exponential function

c) Logarithmic function

d) Quadratic function.

18) When is total revenue maximum ?

19) Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ if $z = 3x^2y + 5xy^2$.

20) Define exponential function. **(10×1=10)**

PART – C

IV. Short essay. Answer **any 5** questions.

21) If $y = \frac{1+x}{1-x}$, prove that $\frac{d^2y}{dx^2} = \frac{4}{(1-x)^3}$.

22) Draw the cost curve for the function governed by $C = \frac{1}{10}x^2 + 5x + 2000$ when x is the number of tons of sugar produced and C is the total cost.

23) What is equilibrium price and quantity given by $Q_d = 2 - 0.2\,P$ and $Q_s = 0.2 + 0.07\,P$?

24) What are the properties of homogeneous function ?

25) Given $R(x) = 9x - x^2$ and $C(x) = 4x - 6$, find the break even point.

26) Find the marginal cost, marginal revenue and equilibrium price for the function $C(x) = x^2 + 2x$ and $P = 15 - 2x$.

27) What are the properties of limits ? Illustrate with examples.

(Weightage 5×2=10)

PART – D

V. Long essay. Answer **any 2** questions. **Each** question carries **4** weightage.

28) A monopolist has the total cost function given by $C = 1000 + 2x + \frac{x^2}{90}$ where C is the cost and x is the output. Find the level of output at which average cost is minimum.

29) Differentiate :

a) $4x^3 + 3x^2 - 2x + 7$

b) $x \log x$

c) $\frac{(3x+1)(x-2)}{(x-1)(3x+2)}$

d) $\frac{a^x}{x^2}$

30) What are the application of partial derivatives in economics ? Illustrate with examples.

31) Define homogeneous function. For the following functions, show that if f(x, y) is homogeneous of degree h and k^{th} derivative of f(x, y) is homogeneous of degree (h – k)

a) $f(x, y) = x^2y^2 + xy^3$

b) $f(x, y) = ax^2y + bxy^2$

c) $f(x, y) = x^2 + xy - 3y^2$.

(Weightage 4×2=8)