24/3/2018

Doon University, Dehradun
Mid-term Examination, 2018
School of Social Science
MSc Semester – 2nd (Economics)
Course – SSEI -152
Mathematical Economics-II

Time Allowed: 2hrs | Maximum Marks: 30

Section - A (5x2 = 10 Marks)

Attempt all questions

1. Obtain the product:

$$\begin{bmatrix} 2 & 1 & 0 \\ 3 & 2 & 1 \\ 1 & 0 & 1 \end{bmatrix} X \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 0 & 1 & 2 \\ 3 & 1 & 0 & 5 \end{bmatrix}$$

2. If A=$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and I=$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, show that
   A^2-(a+d) A=(bc-ad)I
3. Find $h'(x)$ when $h(x) = (x^2 - x).(5x^4 + x^2)$
4. Find $y' when\ y = \sqrt{x^2 + 1}$
5. Find $\int (7x^7 + 9x^6 - 8x + 2)dx$

Section - B

Attempt any **two** questions (2x4=8 Marks)

1. A company is marketing 4 different types of pumps. Although the four models have the same rating, the principal difference between them lies in the combination of accessories produced. For example one type may not have automatic shut off control and another may be without mounting brackets. Five parts are required in various quantities depending upon the model and the following tabulation shows the requirements.

Pump Model	Parts required				
	A	B	C	D	E
I	1	2	0	5	2
II	0	3	0	1	5
III	1	1	4	2	2
IV	1	2	4	5	5

What will be requirements of the parts A,B,C,D,E if the company has to supply 3 model I pump, 5 model II pumps, 2 model III pumps, and 10 model IV pumps? If the cost of parts A,B,C,D,E be Rs.30, Rs.12, Rs.5, Rs.4 and Rs.7 respectively, find the amount spent on purchasing the parts.

2. $\begin{bmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{bmatrix} = 2(a+b+c)^3$

3. Find $\frac{\partial^2 u}{\partial x^{2'}} \frac{\partial^2 u}{\partial x \partial y'} \frac{\partial^2 u}{\partial y \partial x'} \frac{\partial^2 u}{\partial y^2}$ for the function:

$u = ax^3 + hx^2y + by^3$

Section-C

Attempt any **Two** questions (2x6=12marks)

1. Given the input matrix and the final-demand vector

$A = \begin{bmatrix} 0.05 & 0.25 & 0.34 \\ 0.33 & 0.10 & 0.12 \\ 0.19 & 0.38 & 0 \end{bmatrix} \quad d = \begin{bmatrix} 1800 \\ 200 \\ 900 \end{bmatrix}$

   a. Explain the economic meaning of the elements 0.33, 0, and 200.
   b. Explain the economic meaning of the third-column sum.
   c. Explain the economic meaning of the third-row sum.
   d. Write out the specific input-output matrix equation for this model

2. Differentiate:

   (a) $\frac{1}{\sqrt{x^2+a^2}+\sqrt{x^2+b^2}}\ w.r.t.x$

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

3. Solve the following linear equations using matrix:

$5x - 6y + 4z = 15$

$7x + 4y - 3z = 19$

$2x + y + 6z = 46$