Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM & ENERGY STUDIES

End Semester Examination (Online) – June, 2021

Program: MA Economics	**Semester: II**
Subject/Course: Computational Economics	**Max. Marks: 100**
Course Code: ECON 7030	**Duration: 3 Hours**

Section-A

1. **Each question will carry 5 marks**
2. **Select the correct answer(s)**

S.No.	Question	Marks	COs
1	Write the name of Five Open source softwares, which are frequently used in Economics?	5	CO 1
2	Each statement in GAMS is classified into____________________and__________________.	5	CO 1
3	Write the name of the different sets used in GAMS?	5	CO 1
4	What are the different variables used in GAMS?	5	CO 1
5	How do you express algebraic statements in GAMS? Write any five.	5	CO 1
6	Equations can be classified in to________________ and ________________ in the context of solving economic models.	5	CO 1

Section-B

1. **Each question will carry 10 marks**
2. **Instruction: Write short/ brief notes**

S.No.	Question	Marks	COs
7.	Explain the structure of GAMS Programs.	10	CO 2
8.	In the following $maxU(x,y) = \ln(x) + \ln(y)$ $subject\ to:$ $1x + 2y = 120$ Where 1 is the exogenous price of x and 2 is the price of y. estimate the model using reference utility x = 2, y = 1, Extend the model to add ***single factor*** of production and two ***production*** (let the factor of production be called labor with a price PL. One production function converts one unit of labor into	10	CO 3

	one unit of x, the other sector converts 2 units of labor into one unit ofy. Setting the labor endowment equal 120). The market clearance condition for labor is $1x + 2y = 120$. Interpret the equilibrium price for specification of labor inputs. a. If you increase the price of x from 1 to 2 and price of labour from 1 to 2, what happens to demand for x. b. Compute an equilibrium in which commodity y is defined as the numeraire.		
9.	Suppose you want to solve the simple Keynesian model shown below: $y = c + i$ $c = ay + b$ $i = 100$ Where y = income, c = consumption, I = investment, a = 0.8 and b =200. Write a GAMS code for the above model. If i change to 1000, how it is going change the solution. Interpret the results.	10	CO 3
10.	Implement The Hall and Taylor Model in GAMS. You can assume the following value of parameters of the model. **Parameters Value for the Model:** $a = 220; b = 0.7754; d = 2000; e = 1000; f = 0.8; g = 600; h = 1000; k = 0.1583;$ $m = 0.1; n = 100; q = 0.75; t = 0.1875; v = 5; \alpha = 0.4; \beta = 0.2; \mu = 0.33$	10	CO 3
11	Solve the following model in GAMS and Interpret the results. $Max \quad 109 * X_{corn} + 90 * X_{wheat} + 115 * X_{Cotton}$ $s.t. \quad X_{corn} + X_{wheat} + X_{Cotton} \leq 100 \quad (land)$ $6 * X_{corn} + 4 * X_{wheat} + 8 * X_{Cotton} \leq 500 \quad (labor)$ $X_{corn} \quad X_{wheat} \quad X_{Cotton} \geq 0 \quad (nonnegativity)$ where this is a farm profit maximization problem with three decision variables: X_{corn} is the land area devoted to corn production, X_{wheat} is the land area devoted to wheat production, and X_{cotton} is the land area devoted to cotton production. The first equation gives an expression for total profit as a function of per acre contributions times the acreage allocated by crop and will be maximized. The second equation limits the choice of the decision variables to the land available and the third to the labor available. Finally, we only allow positive or zero acreage.	10	CO 3

Section-C

1. **Each question carries 20 Marks.**
2. **Instruction: Write long answer.**

<table>
<tr>
<td>12</td>
<td>A firm produces three products. These products are processed on three different machines.
The time required to manufacture one unit of each of the three products and the daily capacity
of the three machines are given in the table below:
<table>
<tr><th rowspan="2">Machine</th><th colspan="3">Time per unit (Minutes)</th><th rowspan="2">Machine Capacity (minutes/day)</th></tr>
<tr><th>Product 1</th><th>Product 2</th><th>Product 3</th></tr>
<tr><td>M_1</td><td>2</td><td>3</td><td>2</td><td>440</td></tr>
<tr><td>M_2</td><td>4</td><td>-</td><td>3</td><td>470</td></tr>
<tr><td>M_3</td><td>2</td><td>5</td><td>-</td><td>430</td></tr>
</table>
It is required to determine the daily number of units to be manufactured for each product. The profit per unit for product 1, 2 and 3 is Rs. 4, Rs.3 and Rs.6 respectively. It is assumed that all the amounts produced are consumed in the market. Formulate the mathematical (L.P.) model that will maximize the daily profit. Solve and Interpret the result. Write the GAMS code and Output.</td>
<td>20</td>
<td>CO 4</td>
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