EX/PG/ECO/13/6/2017(old)

Master of Arts Examination, 2017

1st year, 1st Semester

Economics

MATHEMATICAL ECONOMICS **(OLD)**

Time : Two hours | Full Marks : 30

Answer any three questions (all questions carry equal marks)

1. Solve the following Optimal Control problem

Maximize $\int_0^1 u^2 \, dt$

subject to $\frac{dt}{dy} = y + u$

$y(0) = 1$

$y(1) = 0$

2. What do you mean by Transversality condition? What are the different Transversality Condition that may appear in solving an Optimal Control Problem. Is Transversality condition always necessary? 2+6+2

3. Distinguish between Present Value and Current Value Multiplier and the optimality conditions in each case. 10

4. Analyze the salient features of Deterministic Dynamic Programming problem. 10

5. A government space project is conducting research on a certain engineering problem that must be solved before people can fly safely to Mars. Three research teams are currently trying different approaches for solving the problem. The estimate has been made that, under the present circumstances, the probability that the respective teams – call them 1,2 and 3 - will not succeed is (0.40)(0.60)(0.80)= 0.192. Because the objective is to minimize the probability of failure, two more top scientists have been assigned to the project.

   The table below gives the estimated probability that the respective teams will fail when 0, 1or 2 additional scientists are added to that team. Only integer numbers of scientists are considered because each new scientists will need to devote full attention to one team. The problem is to determine how to allocate the two additional scientists to minimize the probability that all three teams will fail. 10

New Scientists	Probability of Failure		
	Team		
	1	2	3
0	0.40	0.60	0.80
1	0.20	0.40	0.50
2	0.15	0.20	0.30