

Bachelor of Arts Examination 2019
(2nd year, 3rd semester)
Economics (Honours)
Mathematical Methods in Economics II

Time: 2 Hours

Full Marks: 30

Answer any three questions: _

10 × 3 = 30

- 1) a) State the condition for the existence of a unique solution in a system of simultaneous equations? 1
 b) For a Leontief open static input-output model, the input coefficient matrix and the final demand vector are given as:

$$A = \begin{bmatrix} 0.2 & 0.1 & 0.6 \\ 0.5 & 0 & 0.1 \\ 0.1 & 0.6 & 0.2 \end{bmatrix} \quad d = \begin{bmatrix} 3 \\ 4 \\ 2 \end{bmatrix}$$

 Find out the equilibrium outputs for different industries. 7
 c) What will be the effect on the equilibrium output of the first and third industry for a change in the final demand for the second industry? 2
- 2) a) Solve the following differential equation:
 $3y^4tdy+(y^5+2ty^2)dt=0.$ 6
 b) For a growth model given as (all variables have their usual meanings): $Q=f(K,L),$
 $\lambda Q=f(\lambda K,\lambda L)$
 $f_K>0$ and $f_L>0$
 $f_{KK}<0$ and $f_{LL}<0$
 $K'=αQ$ and $L'/L=λ,$
 Find out whether equilibrium, defined by $(K/L)'=0,$ is stable or not. 4
- 3) Consider the following macro economic model (all variables have their usual meanings) :
 $Y_t=C_t+I_t+G_t$
 $C_t=γ Y_{t-1}$
 $I_t=α (C_t- C_{t-1})$
 $G_t=βt^2$
 Find out the time path for income Y_t 10
- 4) Consider the following market model (all variables have their usual meanings) :
 $Q_t^d=α-βP_t; \alpha, \beta >0$
 $Q_t^s=-γ+δP_t; \gamma, \delta >0$
 $\Delta P_t=j(Q_t^d-Q_t^s)$
 What condition should be imposed on j to make the time path for P stable? 10
- 5) Consider the following inflation-unemployment interaction model (all variables have their usual meanings) :
 $p=α-βU-T+gΠ$
 $Π'=j(p-Π)$
 $U'=-k(m-p)$
 Analyse the nature and stability of the time paths for U and $Π$ using phase diagrams. 10