



AFE BABALOLA UNIVERSITY, ADO-EKITI, EKITI STATE, NIGERIA
COLLEGE OF ENGINEERING
DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING
B.ENG. CHEMICAL ENGINEERING ASSIGNMENT I

CHE 532: Process Dynamics and Control II

Session: 2019/2020

Semester: Second

Unit: 2

Duration: 7 days

Instruction(s): Answer all the questions.

Question 1 [20 Marks]

Write a MATLAB program consisting of *mfile* and Simulink to show the effect of damping factor (ζ) on the dynamic response of a second order system (Equation (1)) unto which a step input of 2.5 units is applied at time $t = 5$ s. The value of the damping factor should vary from 0.3 to 1.5 with a step size of 0.3 while the simulation time should be taken to be from 0 to 120 s with a step size of 1 s. **Only one Simulink block should be used to represent the process for all the cases.** Comment on the plots obtained.

$$G_p(s) = \frac{15}{21s^2 + 2\zeta(\sqrt{21})s + 1} \quad (1)$$