

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA, NIGERIA
SCHOOL OF ELECTRICAL ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHATRONICS ENGINEERING
SECOND SEMESTER 2017/2018 B.Eng. DEGREE EXAMINATION
COURSE : MCE 220 FUNDAMENTALS OF MECHATRONICS
INSTRUCTION: Attempt All Questions
TIME ALLOWED: 2 Hours

Question One

- a.) In clear terms, justify the synergistic integration in mechatronics as it applies in the development of products and services. (6 Marks)
- b.) Discuss, in brief the advantages of Mechatronics based systems over non- mechatronics based systems. (6 Marks)
- c.) A group of an undergraduate student of mechatronics engineering are designing a bomb-detecting robot. What are the features of the bomb-detecting robot and recommend the categories of sensors required to actualize the project.(8 Marks)

Question Two

- a) Briefly discuss the key Elements and Disciplines involved in Mechatronics. (6 Marks)
- b) Identify and describe the basic classes of Mechatronics products stating at least one example in each instance. (8 Marks)
- c) State the reasons why it is necessary for us to build control systems. (6 Marks)

Question Three

- a.) In quest to develop a control systems there are some important variables put into consideration. Identify any two (2) of these and explain in brief. (6 Marks)
- b.) A rice cooker and an air conditioner are examples of different type of control systems. In clear terms, identify the type of control system these devices belong; the differences between the two type of control systems; and one (1) advantage and disadvantage of each type of control system. (8 Marks)
- c.) With the aid of a diagram identify the transient response; steady state response and steady state error of a basic control system. (6 Marks)

Question Four

- a.) Explain in brief you understand by Artificial Intelligence (6 Marks)
- b.) List and briefly explain the two types of Artificial Intelligence (6 Marks)
- c.) Is a self-Driving Car a robot? Explain. (8 Marks)

Question Five

- a.) Mechatronics can help in the management and increase of farm yield largely, explain? (8 Marks)
- b.) Identify any three areas of application of mechatronics system in agriculture.(6 Marks)
- c.) Group the followings into Mechanical systems, Electronic systems and Information technology. Automation; Mechanical elements; Software engineering ;Precision mechanics; Microelectronics; Artificial intelligence; Sensors and actuators. (6 Marks)