ELIZADE UNIVERSITY, ILARA-MOKIN,
ONDO STATE, NIGERIA
DEPARTMENT OF AUTOMOTIVE ENGINEERING

SECOND SEMESTER EXAMINATIONS

2017/2018 ACADEMIC SESSION

HOD'S SIGNATURE

COURSE: ATE 306 – Automotive Mechatronics I (3 Units)

CLASS: 300 Level Automotive Engineering

TIME ALLOWED: 3 Hours

INSTRUCTIONS: Answer any other **FOUR (4)** questions

Date: July/August, 2018

Question 1 (15 MARKS)

(a) What is "Automotive Mechatronics"?
(b) What is the distortion energy failure theory?
(c) What is a mechatronic system? Show an example by a schematic layout.

Question 2 (15 MARKS)

(a) State four important measurement variables (measurands) for an automotive control system?
(b) What are automotive sensors? State 4 examples and applications.
(c) Describe the operation of any automotive function sensor.

Question 3 (15 MARKS)

(a) What are automotive actuators? How are they classified?
(b) State the types of switching and control actuator functions in the transmission system and describe one.
(c) What is the main function of a microcontroller in an automotive system? State the features of the microcontroller.

Question 4 (15 MARKS)

(a) What are the features of an automotive electrical distribution system? What are the objectives of this system?
(b) Differentiate between a normally-open (NO) and a normally closed (NC) switch/relay.
(c) Give 3 examples of electronic components that are used as switching devices in the automobile.
(d) What is a solenoid and state its function.

Question 5 (15 MARKS)

(a) What is a wiring diagram? Draw a schematic of a typical automotive wiring.
(b) Differentiate between "primary" and "secondary" wiring in an automobile.

(c) What do you understand by "color codes & circuit numbering"? Decode the following illustration: **J 2A 18 BL/Y**

(d) What is automotive *multiplexing*? Give 2 applications and state 2 advantages.

Question 6 (15 MARKS)

(a) Describe the functions of the two electrical circuits that operate an automotive starter system.

(b What is the principle and function of the automotive 'charging system'?

(c) What do you understand by the term 'sensing voltage'? Give an application.

(d) What is an electronic engine control system? Provide a schematic of this system showing all the components.