FEDERAL UNIVERSSITY OF TECHNOLOGY, OWERRI
SCHOOL OF HEALTH TECHNOLOGY
DEPARTMENT OF BIOMEDICAL TECHNOLOGY
2015/2016 RAIN SEMESTER EXAMINATION

RSE: Medical Robotics & Computer Assisted surgery **COURSE CODE: BMT 546**

Instruction: Answer questions I – II in section A **Date: 21/09/2016** **Time: 2hours**

Answer any two questions in section B

Section A

1. State three (3) laws that governed robot as postulated by Isaac Asimov in 1940. (3marks)
2. State five (5) advantages of employing robots in medical professions. (5marks)
3. (i) The name of first bionics arm is called..... (1mark)
   (ii) The above 3(i) was created by who ..... and which year ..... (2marks)
4. State (i) the first robotics system employed in surgical procedure. (1mark)
   (ii) What purpose was 4(i) above used for (1mark)
   (iii) Why was its use stopped? (1mark)
5. What do you understand by virtual fixture? (1mark)
6. Distinguish between the two (2) types of virtual fixtures (2mark)
7. What is impedance? (3mark)
8. What is the input function of (i) admittance- type and (ii) impedance - type of GVFs? (1mark)
9. What do you understand by robotic force control (2mark)
10. Outline four (4) advantages of force control in a robot (2mark)
11. State two (2) conditions that make the position control to be effective. (4mark)

(Total: 30marks)

Section B

(a) What is medical robotics (5marks)
(b) Discuss three roles of robots in healthcare (15marks)

(Total: 20marks)

(a) Derive an information flow in a computerized integrated surgery (12marks)
(b)(i) Define a rigid body (4marks)
(ii) If P and Q are anytwo points on a rigid body, derive an expression to describe its motion (4marks)

(Total: 20marks)

(a) What are the motivation for medical robotics (12marks)
(b) Given an object described as subset O of R^3.
(i) Represent its rigid motion (4marks)
(ii) Represent its rigid displacement (4marks)

(Total: 20marks)