



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

SECOND SEMESTER EXAMINATION FOR DIPLOMA MECHANICAL
ENGINEERING(PRODUCTION OPTION)

PRODUCTION LINE PROCESSES

DATE: 5/8/2016

TIME: 8:30 – 10:30 AM

INSTRUCTIONS:

Answer question ONE and any other TWO questions

1.
 - a)
 - i) Define a robot (3 marks)
 - ii) Explain the four conditions that qualify a machine to be a robot. (12 marks)
 - iii) Explain the three laws of robotics (9 marks)
 - b) With the aid of a diagram explain the cartesian/ rectilinear/ gantry robot type. (6 marks)
2. Explain the following basic components of a robot system;
 - (a) Actuators (5 marks)
 - (b) Manipulator link (5 marks)
 - (c) Controller (5 marks)
 - (d) Power conversion unit (5 marks)
3. (a) Differentiate between internal and external robotic sensors (6 marks)

- (b) Explain the following types of robotic sensors
 - (i) Smart sensors (5 marks)
 - (ii) Multi – stimuli touch sensors (5 marks)
 - (iii) Slip (4 marks)
- 4. Explain any four industrial applications of robots (20 marks)
- 5. (a) Illustrate the following types of robots;
 - (i) Cylindrical
 - (ii) Spherical
 - (iii) SCARA (15 marks)
- (b) Explain the lead through method of robot programming. (5 marks)