



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

EMM 410: MANUFACTURING PROCESSES II

DATE: Monday 16th April, 2012

TIME: 8.00 a.m. – 10.00 a.m.

INSTRUCTIONS

- All questions carry equal marks
- Answer any THREE questions.

- Q1. a) State and explain the three basic path control systems found in NC machines. [6 marks]
- b) State any four reasons that would necessitate surface treatment of product after manufacture. [4 marks]
- c) Give short descriptions of the following manufacturing systems:
- (i) Job shop
- (ii) Flow shop
- (iii) Project shop
- (iv) “Linked-cell” shop
- (v) Continuous process [7 marks]
- d) Explain, with examples, one technique used at arriving at different levels of automation. [3 marks]
- Q2. (a) Explain, with aid of sketch, the main features and working principle of electro-chemical machining. [11 marks]
- (b) Explain briefly the process of barreling. [4 marks]
- (c) In electro-chemical machining, why is the tool
- (i) Insulated at the sides?
- (ii) Leading edge radiused? [5 marks]
- Q3. (a) Discuss the problem of gases in arc welding that shielding aims at eliminating. [5 marks]
- (b) Using sketches differentiate between the following welding processes:

- (i) Gas tungsten arc welding
- (ii) Gas metal arc welding [8 marks]
- (c) (i) Define heat source efficiency in a welding process.
- (ii) Calculate the efficiency of heat source in oxy-acetylene welding given the following data:
- Energy collected by the wet calorimeter in 1 minute = 321.5kJ
 - Flow rate of acetylene gas = 1000l/hr
 - Heat of combustion of acetylene under standard atmosphere and pressure = 48kJ/l [7 marks]
- Q4. (a) With aid of a sketch explain briefly the main features and working principle of electrical discharge machining (EDM). [10 marks]
- (b) List any four functions of dielectric in electrical discharge machining. [4 marks]
- (c) Using a sketch, illustrate the general principle of submerged arc welding process. [6 marks]
- Q5. (a) Design a process to be used in plating plastic components for a dashboard of a modern motor vehicle. [4 marks]
- (b) Give reasons why you would adopt vibrating finishing instead of barrel finishing. [3 marks]
- (c) Distinguish between a jig and a fixture. [3 marks]
- (d) In drilling a series of holes using a jig would reduce the time to produce a piece from ½ hour to 10 minutes. If a jig is not used a skilled machinist hourly rate is shs 500, whereas if the jig is used the job can be done by a machinist who is paid at the rate of shs 300 per hour. The hourly rate a radial drill is shs 650.
- The cost of making the jig includes shs 15000 for design, shs 9 000 for material and 50 hours for machining and assembly at the rate of shs 700 per hour. It is estimated that the jig will last three years and will be used to produce 300 parts over this period. The rate of return of investment is 16 percent.
- (i) determine if the jig is justified.
- (ii) estimate the number of pieces to be produced with the jig for it to breakeven.
- State the assumptions made in your method. [10 marks]
-