



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

(MANUFACTURING ENGINEERING)

SET 407: ERGONOMICS

DATE: Tuesday 20th December, 2011

TIME: 8.00 a.m. – 10.00 a.m.

INSTRUCTIONS

Answer any THREE questions.

Question One

- a) Define anthropometry. [2 marks]
- b) Explain the difference between the two types of anthropometric measurement, structural and functional measurements and give two examples of each. [5 marks]
- c) Describe the applications of clearance and reach dimensions in workstation design. [4 marks]
- d) Explain the three basic design philosophies utilized in ergonomics. [9 marks]

Question Two

- a) Define the following Man-machine systems:
 - i. Manual system
 - ii. Mechanical system
 - iii. Automated system. [6 marks]
- b) Explain the functions of Man and machines
 - i. Which are performed better by man?
 - ii. Which are performed better by machine? [14 marks]

Question Three

- a) State the three physical characteristics of light. [3 marks]
- b) Explain the following types of reflection

- i. Spread reflection
 - ii. Specular reflection
 - iii. Diffused reflection [5 marks]
- c) Explain any four physiological factors that affect visual ability. [12 marks]

Question Four

- a) What are the two primary attributes of sound which are of great importance to ergonomists and safety professionals? [3 marks]
- b) Explain three of the ergonomic noise control techniques and give three examples of each. [12 marks]
- c) Name and describe the two types of hearing loss due to long-term exposure to occupational noise environments. [5 marks]

Question Five

- a) With an appropriate diagram show the maximum work area, normal work area and work position of a workplace design. [5 marks]
- b) Explain the Human musculoskeletal (muscles and bones) system. [10 marks]
- c) Explain the main factors which the capacity of human body to use energy and apply forces depends on. [5 marks]

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