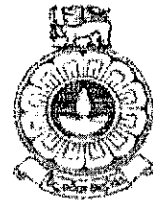


THE OPEN UNIVERSITY OF SRI LANKA
 DEPARTMENT OF TEXTILE AND APPAREL TECHNOLOGY
 BACHELOR OF TECHNOLOGY HONOURS IN ENGINEERING/
 BACHELOR OF INDUSTRIAL STUDIES HONOURS
 TTX6239 - ERGONOMICS
 FINAL EXAMINATION - 2016/2017
 DURATION: 03 HOURS



Date: 08th November 2017

Time: 0930 -1230 hrs

Total number of questions = 08

Number of questions to be answered = 06

Answer question one (Q1) and five (05) other questions

Question one (Q1) carries 25 marks and questions two (Q2) to eight (Q8) carry fifteen (15) marks each.

Compulsory Question

- (Q1) (a) Give two (02) study areas of applied psychology in relation to ergonomics. (02 marks)
- (b) State the three (03) components of the local environment of the human - machine system. (03 marks)
- (c) Write down two (02) major types of muscles found in a human body. (02 marks)
- (d) Write down three (03) factors of the nature of work, which affect the maximal aerobic capacity. (03 marks)
- (e) Write down the three (03) phases of the memory. (03 marks)
- (f) List three (03) dimensions of job description index. (03 marks)
- (g) Write down three (03) commonly used visual display instruments in industrial machines. (03 marks)
- (h) List three (03) major design philosophies used by ergonomists to design machines and equipment. (03 marks)
- (i) What is the measuring unit of sound? (01 mark)
- (j) Mention two (02) reasons for the occurrence of cumulative trauma disorders at work places. (02 marks)

Answer any five (05) questions from the following seven (07) questions

- (Q2) (a) Discuss the major contents of the following areas of ergonomics.
- (i) Biological ergonomics
 - (ii) Physiological ergonomics
 - (iii) Psychological ergonomics
 - (iv) Environmental ergonomics
 - (v) Organisational ergonomics (10 marks)
- (b) Giving examples, explain how the subject knowledge of mathematics can be used in applying ergonomics. (05 marks)
- (Q3) (a) Write a short note on the basic components of physical fitness of human beings. (06 marks)
- (b) Giving suitable examples, describe the use of structural anthropometric data and functional anthropometric data to design work places, machines, equipment etc. (09 marks)
- (Q4) (a) Giving examples, describe three (03) major types of task performances. (06 marks)
- (b) What do you understand by "Job analysis"? (03 marks)
- (c) Prepare a job description for a production manager of a manufacturing plant. You can select any type of manufacturing to write your answer. (06 marks)
- (Q5) (a) Explain how the engineering control techniques and administrative control techniques can be employed to reduce the effect of noise at work places. (08 marks)
- (b) Giving examples, describe how the bad designing of lighting at work places affects the health of the employees as well as the manufacturing process and products. (07 marks)

- (Q6) (a) Giving examples explain the situations, where segmental vibration and whole body vibration occurred at work places. (04 marks)
- (b) Describe the effect of vibration on the health of the workers, who are severely subjected to vibration at work places. (04 marks)
- (c) The component accelerations and the durations of the exposure of a worker to vibrations are given below. Determine whether the worker is at risk or not. The threshold limit for 8 hours of exposure to vibration is 4 ms^{-2} . (07 marks)

Duration of the exposure to the vibration (h)	X (ms^{-2})	Y (ms^{-2})	Z (ms^{-2})
2	2	3	7
3	3	2	2
2	5	4	1
1	1	3	3

- (Q7) (a) With the aid of suitable diagrams, describe the oxygen consumption profiles for prolonged work and intermittent work. (06 marks)
- (b) Clearly explain the concepts of metropolitan and continental shift rotational methods, which are widely used in shift scheduling. (06 marks)
- (c) Prepare a shift rotational plan by using the continental shift rotational method for a month has 30 days. (03 marks)
- (Q8) (a) Describe three (03) major task requirements, which are used in designing work spaces. (09 marks)
- (b) Write a short note on the recommendations for sitting postures and standing postures. (06 marks)