

THE OPEN UNIVERSITY OF SRI LANKA
 DEPARTMENT OF TEXTILE AND APPAREL TECHNOLOGY
 BACHELOR OF TECHNOLOGY / INDUSTRIAL STUDIES
 TTX6239 - ERGONOMICS



FINAL EXAMINATION - 2011/2012

DURATION: THREE (03) HOURS

DATE: 10th MARCH 2012

TIME: 0930 TO 1230 HOURS

Total number of questions = 08

Number of questions to be answered = 06

Answer question one (Q1), which is compulsory 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) Ergonomics is a broad concept and it covers many disciplines. Write a short note on the disciplines of ergonomics. (04 marks)
- (b) State two (02) major components of a Human - Machine system and give two (02) examples for each of those components. (04 marks)
- (c) What do you understand by the term "Physical fitness"? (03 marks)
- (d) How do you differentiate the two terms "Stress" and "Fatigue"? (04 marks)
- (e) Briefly explain the two (02) phases of personal selection process. (04 marks)
- (f) What do you understand by the term "Job enrichment"? (03 marks)
- (g) Explain why displays and controls are used in machineries. (03 marks)

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

- (Q2) (a) Describe the following terms used in ergonomics
- (I) Anthropometry
 - (II) Cumulative trauma disorders
 - (III) Awkward posture
 - (IV) Occupational illness (08 marks)
- (b) Giving examples, write a short note on the benefits of the application of ergonomics in manufacturing organisations. (07 marks)

- (Q3) (a) Compare and contrast "Prolong work " and "Intermittant work" in all aspects. (05 marks)
- (b) With the aid of suitable diagrams, explain the oxygen consumption profiles for prolong work and intermittant work. (05 marks)
- (c) Explain the methods , which could be used to prevent stress and fatigue of workers in manufacturing organisations. (05 marks)
- (Q4) Giving examples, write short notes on the following three (03) topics.
- (a) Different forms of memories. (05 marks)
- (b) Different types of task performances. (05 marks)
- (c) Different methods of personnel selection. (05 marks)
- (Q5) (a) Write a compresensive note on the possible methods of controlling the thermal environment in manufacturing organisations. (08 marks)
- (b) A worker is exposed to the following noise levels during 8 hours of work per day. Determine whether the worker is at risk or not. (07 marks)

Section	Noise level	Duration in hours
A	95 dBA	2
B	85 dBA	4
C	90 dBA	2

- (06) (a) Classify the vibrations into two (02) categories and explain them briefly. (04 marks)
- (b) Explain the methods, which could be used to control the vibration at manufacturing organisations. (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 value 4 ms^{-2} is the threshold limit value for 8 hours of exposure. (07 marks)

Duration of the exposure to the vibration (h)	X (ms ⁻²)	Y(ms ⁻²)	Z(ms ⁻²)
4	3	6	4
1	8	7	02
1	4	5	8
2	1	3	7

- (Q7) (a) Briefly describe the two (02) commonly used shift work rotation methods in manufacturing organisations. (05 marks)
- (b) Compare and contrast the three (03) shift schedules in all aspects. (05arks)
- (c) Describe the effect on circadian rhythms of the workers, who work in all three (03) shift works. (05 marks)
- (Q8) (a) Giving ergonomic guidelines, explain how do you design followings:
- (I) Seated work stations (06 marks)
 - (II) Standing work stations (06 marks)
- (b) Briefly explain the advantages of using ergonomic guidelines to design above work places. (03 marks)