THE OPEN UNIVERSITY OF SRI LANKA

DEPARTMENT OF TEXTILE AND APPAREL TECHNOLOGY

BACHELOR OF TECHNOLOGY / INDUSTRIAL STUDIES

TTX6239 - ERGONOMICS

FINAL EXAMINATION - 2012/2013

DURATION: THREE (03) HOURS

DATE: 10th August 2013   TIME: 1330 TO 1630 HOURS

Total number of questions = 08

Number of questions to be answered = 06

Answer question one (Q1), which is compulsory and five (05) more questions.

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

Compulsory Question

(Q1)   (a)   What do you mean by the terms "Job rotation" and "Job enrichment".

(04 marks)

(b)   What are controls and displays in machines?   .   (04 marks)

(c)   State four (04) conditions, which may lead to the stress at work places.

(04 marks)

(d)   Define the following terms " Luminous Flux", "Luminous Intensity" related to

lighting.   (04 marks)

(e)   State four (04) factors, which affect the maximum aerobic capacity. Give

one example for each factor you have mentioned.   (04 marks)

(f)   Briefly explain the reasons for the occurrence of "cumulative trauma

disorders".   (03 marks)

(g)   What do you understand by the term "Body clock factor"?   (02 marks)

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

(Q2)   Write short notes on followings:

(a)   Benefits of the application of ergonomic concepts to organisations.

(05 marks)

(b)   A model of a "Human – Machine" system.   (05 marks)

(c)   Major areas of the study of ergonomics.   (05 marks)

(Q3) (a) Describe the major functions of a skeletal system of human beings.

(05 marks)

(b) What do you understand by the term "Physical fitness" ? (02 marks)

(c) Giving examples, describe the basic components of the physical fitness.

(08 marks)

Q4) (a) What do you understand by the term "Anthropometry"? (03 marks)

(b) By giving examples, write a comprehensive note on the use of anthropometric data for designing of tools, equipment, machines and work places. (12 marks)

(Q5) (a) With the aid of suitable diagram, describe the model of the human information processing. (05 marks)

(b) List the three (03) categories of task performances. Giving examples describe each of the above mentioned categories. (06 marks)

(c) Briefly describe the two (02) phases of the personal selection process.

(04 marks)

(Q6) (a) A worker, who works in a textile mill , is subjected to the following noises during the morning shift. The duration of the morning shift is eight hours. Show that the worker is at risk.

Section	Noise Level	Duration in hours
Carding	90 dBA	1
Ring Spinning	105dBA	2
Warp preparation	85 dBA	1
Weaving	110 dBA	3
Printing	70 dBA	1

(07 marks)

(b) Prepare a suitable work plan (non risky) for the above mentioned worker by allocating different working hours in the sections given above. The worker should work at least one hour in each section. After doing necessary calculations, prove that the worker is not at risk. (08 marks)

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Q7) (a) A worker, who works in a textile mill, is subjected to different vibration levels during the two hour period given below. By using the following data, determine whether the worker is at risk or not.

Duration of the exposure to the vibration (hours)	Component acceleration (ms^{-2})		
	X	Y	Z
1/4	7	4	5
3/4	4	3	1
1/2	2	1	9
1/2	6	1	4

(09 marks)

(b) Describe the two (02) shift rotational methods, which are widely used for organising shift work. (06 marks)

Q8) (a) Compare and contrast seated work places and standing up work places in all aspects. (09 marks)

(b) Giving examples, describe characteristics of an ergonomically designed work place. (06 marks)