

THE OPEN UNIVERSITY OF SRI LANKA  
 POST GRADUATE DIPLOMA/ MASTERS IN TECHNOLOGY  
 FINAL EXAMINATION– 2012/2013  
 TTX7140 – HUMAN FACTORS ENGINEERING  
 DURATION – THREE HOURS



DATE: 06<sup>th</sup> August 2013

TIME: 1330 - 1630 HOURS

Total number of questions = 07

Number of questions to be answered = 06

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

Question one (Q1) carries 25 marks and questions two (Q2) to seven (Q7) carry fifteen (15) marks each.

**Compulsory Question**

- (Q1) (a) "Application of ergonomics gives positive results to any apparel manufacturing organization" Give your comments. (10 marks)
- (b) Giving examples, explain why sewing process can not be fully automated. (10 marks)
- (c) Explain, why the application of ergonomics is more appropriate for labour intensive industries. (5 marks)

**Answer any five (05) from the following six (06) questions**

- (Q2) (a) Write a comprehensive note on different types work systems used in organizations. (05 marks)
- (b) State and describe the performance prerequisites of the workers to face the challenges at work systems. (05 marks)
- (c) Briefly explain how do you use the knowledge of "phases of biological activities of humans" to design work for individual workers. (05 marks)
- (Q3) (a) Describe the important characteristics of an efficient production system. (06 marks)

(b) Giving suitable examples describe the historical development of manufacturing systems. (09 marks)

(Q4) (a) Giving examples, write a comprehensive note on different types of cumulative trauma disorders, which may occur among sewing machine operators in the apparel industry. (08 marks)

(b) Explain how do you prevent / control the occurrence of cumulative trauma disorders of sewing machine operators in the apparel industry. (07 marks)

(Q5) a) A worker, who works in a manufacturing plant, is subjected to the following noises during an eight hour shift. The operator works in five different sections during the eight hour period. Prove that the worker is at risk.

Section	Noise Level	Duration in hours
A	80dBA	1
B	75 dBA	1
C	95 dBA	2
D	100dBA	3
E	85 dBA	1

(08 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. (07 marks)

(Q6) (a) Giving examples, describe the importance of the use of anthropometric data for designing tools, equipment and machines ergonomically. (05 marks)

- (b) Write a comprehensive note on the factors you should consider when selecting sewing machines and chairs for sewing machine operators in the apparel industry. (05 marks)
- (c) Giving examples, describe the advantages of the use of displays and controls in machines. (05 marks)

- (Q7) (a) A worker, who works in a textile mill, is subjected to different vibration levels during a two hour period as given below. By using the provided data, determine whether the worker is at risk.

Duration of the exposure to the vibration (hours)	Component acceleration ( $\text{ms}^{-2}$ )		
	X	Y	Z
1/4	2	8	4
3/4	4	6	7
1/2	6	1	7
1/2	3	2	2

(08 marks)

- (b) Describe how do you control / minimize vibration related issues at your organization. (07 marks)