

THE OPEN UNIVERSITY OF SRI LANKA  
 POST GRADUATE DIPLOMA/ MASTERS IN TECHNOLOGY  
 FINAL EXAMINATION– 2010/2011  
 TTX7140 – HUMAN FACTORS ENGINEERING  
 DURATION – THREE HOURS



DATE: 15<sup>th</sup> MARCH 2011

TIME: 1330 - 1630 HOURS

Total number of questions = 07

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 seven (Q7) carry fifteen (15) marks each.

**Compulsory Question**

- (Q1) (a) The productivity of the garment factory XYZ was found to be below the expected level, and one manager suggested to replace the available sewing machines with machines of higher speed. He pointed out that the average speed of the available sewing machines is 2500 stitches per minute and suggested to buy sewing machines, which have the ability to sew more than 5000 stitches per minute to double the present productivity. Study his suggestion and give your comments. (15 marks)
- (b) Giving examples, briefly explain why garment manufacturing process cannot be fully automated. (10 marks)

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

- (Q2) (a) Briefly explain the importance of assessing work prior to allocating work to the workers. (05 marks)
- (b) Work systems could be divided into three (03) categories. Discuss the skill level requirements of the workers for each category. (05 marks)
- (b) Briefly discuss the requirements of an efficient production system. (05 marks)

- (Q3) Write a comprehensive note on the historical development of production systems, which are used in garment manufacture. You may use the concept of division of labour as the basis to write your answer. (15 marks)
- (Q4) (a) Briefly explain why cumulative trauma disorders are common in the garment Industry. (05 marks)
- (b) Prevention of cumulative trauma disorders could be achieved through engineering controls and administrative controls. Giving examples explain the above mentioned two control methods. (10 marks)
- (Q5) (a) How do you control the noise at work place? (04 marks)
- (b) A worker is exposed to the following noise levels during the 8 hours of work. Determine whether the worker is at risk or not. (05 marks)

Section	Noise level	Duration in hours
A	95 dBA	3
B	85 dBA	4
C	100 dBA	1

- (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  $4 \text{ ms}^{-2}$  is the threshold limit value for 8 hours of exposure.

(06 marks)

Duration of the exposure to the vibration (h)	X ( $\text{ms}^{-2}$ )	Y ( $\text{ms}^{-2}$ )	Z ( $\text{ms}^{-2}$ )
2	4	8	7
2	3	9	12
3	5	4	8
1	1	3	5

- (Q6) (a) What do you understand by the term "Anthropometry"? (03 marks)
- b) Explain why the designers need the knowledge of anthropometry when designing products for the international market. (05 marks)
- (c) Compare the seated work posture and standing work posture in all possible aspects. (07 marks)
- (Q7) Write a comprehensive note on the design features of ergonomically designed sewing machines and chairs. (15 marks)