

The Open University of Sri Lanka  
Faculty of Engineering Technology  
Department of Textile and Apparel Technology



Study Programme	: Bachelor of Technology Honours in Engineering/ Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	: TTX6239/ TAX6539 Ergonomics
Academic Year	: 2017/18
Date	: 16 <sup>th</sup> January 2019
Time	: 0930-1230hrs

### General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Eight (8)** questions in **Four (4)** pages.
3. This is a Closed Book Test (CBT).
4. Write down your Index Number in all the pages of answer scripts.
5. Answer the question one (Q1), which is compulsory and five (05) more questions from Q2 to Q8. Question one (Q1) carries 25 marks and questions two (Q2) to eight (Q8) carry fifteen (15) marks each.
6. Answer for each question should commence from a new page. If a question has many parts, all the parts should be answered in the chronological order under the same question.
7. Write down the answered question numbers in the answer book.
8. Do not answer more than six (06) questions.
9. Answers should be in clear hand writing.
10. Do not use red colour pens to write the answers.

Compulsory Question

- (Q1) (a) Give two (02) study areas of Biomechanics in relation to ergonomics. (02 marks)
- (b) State the three (03) machine components of the human -machine system. (03 marks)
- (c) Write down three (03) major functions of the skeletal system of a human body. (03 marks)
- (d) Write down three (03) factors of the Environment, which affect the maximal aerobic capacity. (03 marks)
- (e) Write down the three (03) major types of task performances found in the industry. (03 marks)
- (f) List three (03) methods, which can be used to select workers to an organisation. (03 marks)
- (g) Write down two (02) common control types used in industrial machines. (02 marks)
- (h) List three (03) major design principles of work, which are widely used to avoid job monotonous in work organizations. (03 marks)
- (i) Mention the three (03) task requirements which influence the workspace design. (03 marks)

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

- (Q2) (a) Briefly explain following terminologies used in ergonomics.
- (i) Anthropometry
  - (ii) Cumulative Trauma Disorders
  - (iii) Occupational illnesses (06 marks)

- (b) With providing suitable examples, briefly explain the use of the knowledge of the following subject areas applying in ergonomics.
- (i) Physics
  - (ii) Biological Sciences
  - (iii) Engineering and Technology (09 marks)
- (Q3) (a) What do you understand by the term "Metabolism"? (03 marks)
- (b) Briefly describe three (03) factors, which determine the metabolic rate of an individual worker. (06 marks)
- (c) Briefly explain the methods you can use to prevent stress and fatigue at work places. (06 marks)
- (Q4) (a) Define the following two (02) terms.
- (i) Human performance
  - (ii) Human performance Technology (04 marks)
- (b) Briefly explain the four (04) major steps of the process of the Human Performance Technology (HPT). (06 marks)
- (c) Write suitable job analysis for a merchandiser of a garment manufacturing plant. (05 marks)
- (Q5) (a) Write a comprehensive note on the desirable thermal conditions of a work place. (08 marks)
- (b) Explain how you determine whether the noise level at the work place is harmful or not to the employees. (07 marks)

(Q6) (a) Describe a suitable method, which can be used to assess the vibration level at a work place. (05 marks)

(b) With the help of suitable diagrams, briefly explain the distribution of light in downward and upward directions.

(i) Direct

(ii) Semi Direct

(iii) Semi Indirect

(iv) Indirect

(v) Mixed diffuse (10 marks)

(Q7) Giving suitable examples, describe the effects of shift work on workers in the following areas.

(i) Physiological conditions and Psychological problems

(ii) Domestic and Social factors

(iii) Work performance (15 marks)

(Q8) (a) Giving examples, describe the three (03) classes of variables, which influence the working posture of a human being at the work place. (09 marks)

(b) Briefly explain the three (03) design philosophies used by ergonomists in designing machines, tools and equipment. (06 marks)