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07 OCT 2020

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	: 2019/2020
Date	: 07th October 2020
Time	: 0930-1230hrs
Duration	: **3 hours**

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. Write down your Index Number in all the pages of answer scripts.
4. 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.
5. Answers to each question should commence on a new page. If a question has many parts, all the parts should be answered in the chronological order under the same question.
6. Write down the answered question numbers in the answer book.
7. Answers should be in clear hand writing.
8. Do not use red colour pens to write the answers.

Compulsory Question

(Q1) (a) Give two (02) study areas in discipline of body systems in relation to ergonomics. (02 marks)

(b) State the three (03) human components of the human -machine system. (03 marks)

(c) State three (03) types of muscles found in human body. (03 marks)

(d) Name three (03) types of anthropometric data used for designing machines, tools and equipment. (03 marks)

(e) State three (03) dimensions of "Job Description Index" used to measure the job satisfaction. (03 marks)

(f) Give four (04) desirable thermal conditions used in designing comfortable workplaces. (04 marks)

(g) List three (03) design philosophies used to design workplaces for human beings. (03 marks)

(h) Mention four (04) luminaire used in designing lighting along with the percentage light emission in downward direction. (04 marks)

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

(Q2) (a) Explain in your own words, what you understand by the term "Ergonomics". (03 marks)

(b) Write a comprehensive note on the use of the knowledge of various subjects in applying ergonomics. You should include details of six subject areas in your answer. (12 marks)

(Q3) Write short notes on the following in relation to biological ergonomics.

(i) Functions of the skeletal system of human beings (05 marks)

(ii) Components of physical fitness of human beings (05 marks)

(iii) Use of anthropometric data of human beings in designing work places (05 marks)

(Q4) (a) Describe the nature of "Prolong work" and "Intermittent work" by providing oxygen consumption profiles. (06 marks)

(b) Giving examples, explain the following terms in relation to performance. (06 marks)

(i) Skill based performance

(ii) Rule based performance

(iii) Knowledge based performance

(c) Briefly explain, what do you understand by the process "Change management" in human performance technology. (03 marks)

(Q5) (a) Discuss various techniques, which can be used to improve the thermal environment of workplaces. (05 marks)

(b) Write a comprehensive note on the noise controlling techniques, which can be employed at workplaces. (10 marks)

(Q6) (a) Giving two examples for each, describe the following terms in relation to work organization. (09 marks)

(i) Job rotation

(ii) Job enlargement

(iii) Job enrichment

(b) Describe the following techniques used in shift rotation. (06 marks)

(i) Continental rotation

(ii) Metropolitan rotation

(Q7) (a) Compare the morning, afternoon, and night work shifts in all aspects. (09 marks)

(b) Write a short note on the factors, which should be considered when designing controls for machineries. (06 marks)

(Q8) (a) Discuss the main three (03) task requirements, which must be considered in workspace designing. (09 marks)

(b) Briefly describe the situations, where the following workstations can be effectively employed in manufacturing industries. (06 marks)

(i) Seated workstations

(ii) Standing workstations