



First Semester Examination
2022/2023 Academic Session

February 2023

**EPE481 – Industrial Ergonomic
(Ergonomik Industri)**

Duration: 3 hours
(Masa: 3 Jam)

Please check that this examination paper consists of FOUR (4) pages of printed material before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi EMPAT (4) muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

Instructions: Answer ALL **FIVE (5)** questions.

Arahan: Jawab **LIMA (5)** soalan]

1. (a) Ergonomics is the scientific study of people at work. Identify **TWO (2)** objectives of ergonomics in the workplace.

(20 marks)

- (b) Figure Q1 (b) illustrates the operator with robotic hand machine. By referring to the figure,

- (i) Describe **THREE (3)** factors influencing anthropometry design.

(30 marks)

- (ii) Determine **THREE (3)** anthropometry data and the percentile for each data.

(30 marks)

- (iii) The operator lost focus on his work after a few hours of operation due to persistent backache. Suggest **TWO (2)** solutions to help operator resolve these issues so that he may continue to operate the machine efficiently.

(20 marks)

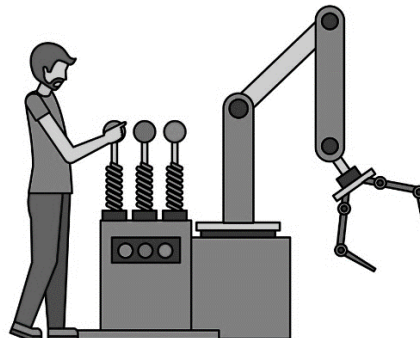


Figure Q1(b)

2. (a) (i) Describe **THREE (3)** characteristics on how a workplace could be ergonomically defined.

(30 marks)

- (ii) Explain **TWO (2)** consequences to workers if your company does not provide an ergonomic workplace.

(20 marks)

- (b) Workspace design is one of the three factors that influencing working posture.

- (i) State the other **TWO (2)** factors of working posture by illustrating using a postural triangle.

(20 marks)

- (ii) Figure Q2 (b) (ii) shows the correct posture for manual lifting task. Do you agree with the statement? Justify your decision.

(30 marks)



Figure Q2 (b) (ii)

3. (a) State **TWO (2)** negative effects on employees if the temperature in the workplace is excessively high and suggest **TWO (2)** methods for heat management and control.

(40 marks)

- (b) Identify **FIVE (5)** human senses, and explain the importance of each in maintaining a worker's ability to execute their job using an example from relevant work.

(60 marks)

4. (a) State **THREE (3)** conditions whereby the visual and auditory communication in industry could be relevant in order to ensure the message could be accepted by the targeted operators.

(20 marks)

- (b) Evaluate **TWO (2)** listed control and display products by giving the recommendation and suggestions to satisfy the ergonomics and safety features.

- (i) traditional kitchen stove and electrical thermomix devices
- (ii) automotive displays and control panel

(40 marks)

- (c) (i) Sketch an eye anatomy and label the important part of anatomy.
- (ii) Analyse **THREE (3)** criteria whereby ergonomics intervention in visual setting is important for safety usage.

(40 marks)

5. (a) Sketch a model of Human Machine Interaction (HMI) in a simple process control and highlight the interface in display and control system in particular.

(20 marks)

- (b) **Human Machine Interaction (HMI)** has been undergoing a great expansion during the last couple of year due to digitalization transformation in **Industrial Revolution 4.0 (IR4.0)**. **Human Factor Engineering (HFE)** has been used as a tool to mitigate the relationship between human and their performance to increase productivity and to comply with **Occupational Safety and Health (OSH) standard**. With the help of sketches, discuss the highlighted/bold role in macro-ergonomics in kitchen architecture.

(50 marks)

- (c) Human Machine Interaction in healthcare institution has been long debated and implemented as it is crucial and important sector in human safety. Hence, a system needs to be designed to optimize human capabilities to the new technologies. Discuss **THREE (3)** main principles to ensure the task could be carried out effectively.

(30 marks)

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