



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)

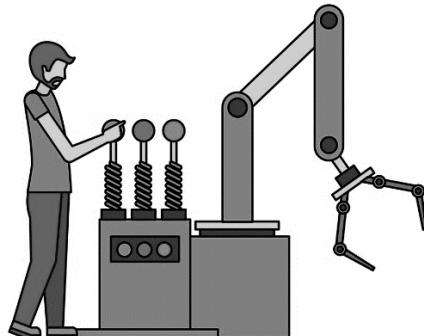


Figure Q1(b)

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)