



UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE : BME 4113
COURSE : ENGINEERING ERGONOMICS
SEMESTER/SESSION: 1-2023 / 2024
DURATION : 3 HOURS

Instructions:

1. This booklet contains six (6) questions. Answer all questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise up your hands and ask the invigilator.

NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 4 PRINTED PAGES INCLUDING COVER PAGE

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Answer all questions.

QUESTION 1

- a) **Determine** all factors that could enhance working performance. (10 marks)
- b) **Explain** one factor from Q 1(a) above (4 marks)

QUESTION 2

- a) **Interpret** the differences in between controlled and less controlled research in ergonomics studies. (6 marks)
- b) **Classify** four (4) principles human participants should be ethically protected in research. (8 marks)

QUESTION 3

The NIOSH Lifting Equation is used to assess manual material handling risks associated with lifting tasks in the workplace.

- a) **Identify** three (3) criteria considered in establishing RWL (Recommended Weight Limit.) (3 marks)
- b) What can you interpret from LI (Lifting Index) value? Briefly **explain**. (12 marks)

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QUESTION 4

The relationship between heart and energy expenditure rate for static and dynamic work is shown in Figure 1 below

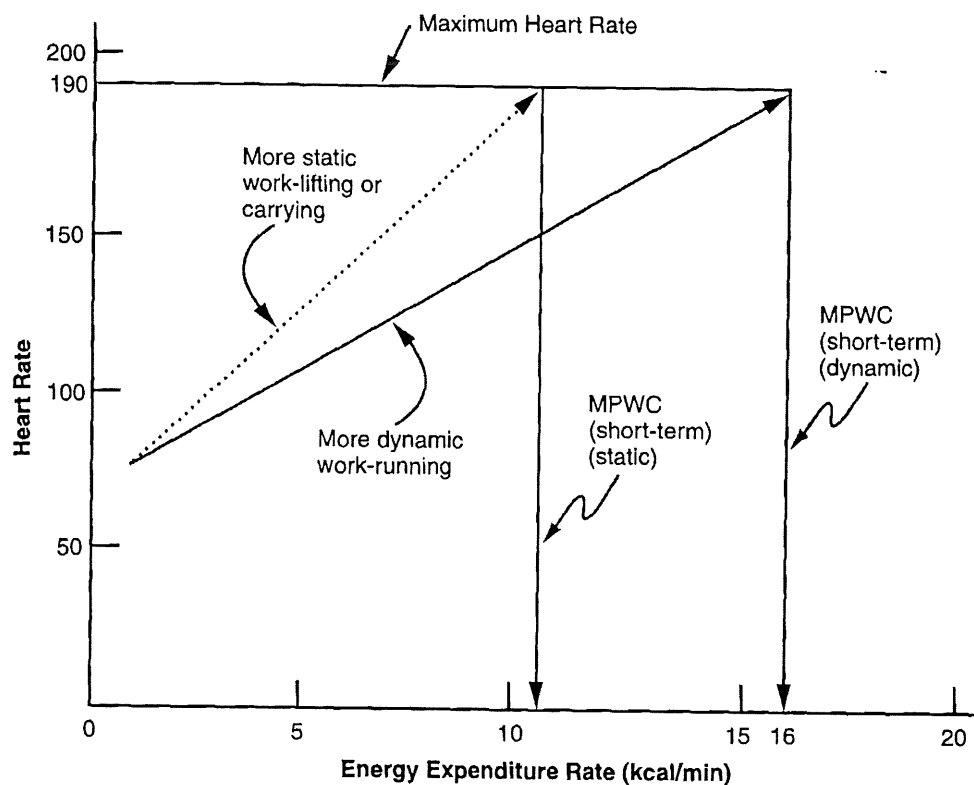


Figure 1 : Energy Expenditure Rate versus Heart Rate

- Identify the value of energy expenditure and maximum heart rate for static and dynamic activity. (8 marks)
- Given the average energy expenditure of healthy individual male = 15.0 kcal/min and female = 10.5 kcal/min. Explain the ability of the physical work male and female for short term static and dynamic. (14 marks)

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QUESTION 5

- a) Rest period is a fraction of total work time. **Identify** factors that should be considered when applying the work-rest scheduling. (6 marks)
- b) **Differentiate** why dynamics and static activities could cause whole-body fatigue. (8 marks)

QUESTION 6

- a) **Determine** three (3) human variability that could influence ergonomics design (6 marks)
- b) **Identify** in sequence the systematic approach the use of anthropometric data in design. (15 marks)

-----End of question-----

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| Criteria | Marks |
|---|-------|
| All question answered will be marked according to the answer scheme | /100 |