



UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE	: BME 3093
COURSE	: INDUSTRIAL ENGINEERING
SEMESTER/SESSION	: 1-2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 4 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 your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO
THIS BOOKLET CONTAINS 5 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

- a) Process engineering is concerned with the design of the actual process to be used in the manufacture of the product. **Explain** all the steps needed for the process. (6 Marks)
- b) **Discuss** the considerations in selection of an equipment or process. (4 Marks)
- c) Select an assembled item that you can disassemble that has 8 to 15 parts (e.g., stapler, pencil sharpener, toy truck or car, or similar item). **Prepare** a product structure tree that has at least three levels for the item. (10 Marks)
- d) **Produce** a route sheet for manufacturing mechanical part (you can select your part and use your engineering judgement to analyze the manufacturing process). Your part must have at least 5 processing steps. (10 Marks)

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QUESTION 2

- a) The owner of a fast-food franchise has exclusive rights to operate in a medium-sized metropolitan area. The owner currently has a single outlet open, which has proved to be very popular, and there are often waiting lines of customers. The owner is therefore considering opening one or more outlets in the area. **Outline** the key factors the owner should investigate before making a final decision. (8 Marks)

- b) **Determine** which location has the highest composite score. (6 Marks)

Factor	Weight	East #1	East #2	West
Initial cost	8	100	150	140
Traffic	10	40	40	30
Maintenance	6	20	25	18
Dock space	6	25	10	12
Neighborhood	4	12	8	15

- c) **Find** the reason why product layouts are atypical in service environments. (2 Marks)

- d) **Explain** how a layout can help or hinder productivity. (4 Marks)

QUESTION 3

- a) Some Japanese firms have a policy of rotating their managers among different managerial jobs. In contrast, American managers are more likely to specialize in a certain area (e.g., finance or operations). Discuss the advantages and disadvantages of each of these approaches. Which do you prefer? **Justify** your answer. (10 Marks)
- b) A work operation consisting of three elements has been subjected to a stopwatch time study. The recorded observations are shown in the following table. By union contract, the allowance time for the operation is personal time 5%, delay 5%, and fatigue 10%. **Determine** the standard time for the work operation. (10 Marks)

Job Elements	Observations (Minutes)						Performance Rating (%)
	1	2	3	4	5	6	
A	0.1	0.3	0.2	0.9	0.2	0.1	90
B	0.8	0.6	0.8	0.5	3.2	0.7	110
C	0.5	0.5	0.4	0.5	0.6	0.5	80

QUESTION 4

- a) Think of a specific product such as a camera. If you were to measure human performance in using this device, what criteria would be important? **Identify** and denote how you would measure each criterion. (10 Marks)
- b) What are some methods for improving the safety of tools and machines at the point of operation? **Discuss** the role of ergonomics with respect to each method. (6 Marks)
- c) **Demonstrate** the importance of housekeeping in most industrial facilities and how do 5S programs fit into this picture (6 Marks)
- d) **Discuss** ergonomic issues that might arise for each form of protective equipment. (8 Marks)

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

