UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BME 3093
COURSE	: INDUSTRIAL ENGINEERING
SEMESTER/SESSION	: 1-2022/2023
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 6 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) **Clarify** 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) **Sketch** a flow process chart for activities below. (10 Marks)

FLOW PROCESS CHART

Job: Stripping, Cleaning and Degreasing prior to Inspection

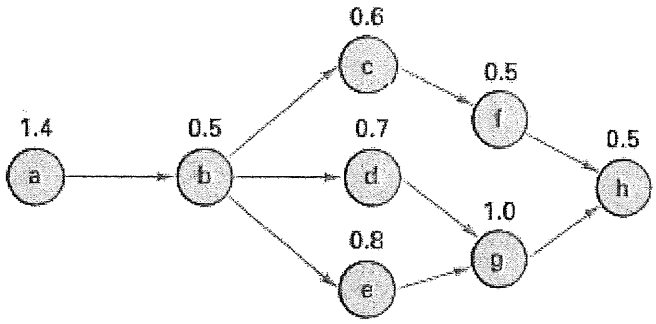
Details of method

Store in old – engine store
Engine picked up
Transported to next crane
Unloaded to floor
Picked up
Transported to stripping bay
Engine stripped
Main components cleaned and laid out
Components inspected for wear; inspection report written
Parts carried to degreasing basket

QUESTION 2

a) **Differentiate** the manufacturing and nonmanufacturing location decisions. (2 Marks)

b) A manager wants to assign tasks to workstations as efficiently as possible and achieve an hourly output of 33 1/3 units. Assume the shop works a 60-minute hour.



Apply the tasks shown in the accompanying precedence diagram (times are in minutes) to workstations using the following rules:

i. In order of most following tasks. Tiebreaker: greatest positional weight. (8 Marks)

ii. In order of greatest positional weight. Tiebreaker: most following tasks (8 Marks)

iii. **Compute** the efficiency for the assignment in part (i) and (ii). (2 Marks)

QUESTION 3

a) **Discuss** the main advantages and disadvantages of specialization from a management and a worker's perspective. (4 Marks)

b) **Outline** some reasons why methods analysis is needed and how methods analysis linked to productivity improvements. (3 Marks)

c) **Contrast** the meanings of the terms *job enlargement* and *job enrichment.* (4 Marks)

d) 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. (9 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) **Discuss** the consequences of poor forecast. (4 Marks)

b) A dry cleaner uses exponential smoothing to forecast equipment usage at its main plant. August usage was forecasted to be 88 percent of capacity; actual usage was 89.6 percent of capacity. A smoothing constant of .1 is used. (6 Marks)

i. **Prepare** a forecast for September.
ii. Assuming actual September usage of 92 percent, **prepare** a forecast for October usage.

c) In a job shop, effective capacity is only 50 percent of design capacity. and actual output is 80 percent of effective output. **Calculate** design capacity needed to achieve an actual output of eight jobs per week. (4 Marks)

d) **Give examples** on some ways a company can reduce the need for inventories. (4 Marks)

e) Briefly **explain** how scheduling and productivity related. (6 Marks)

f) The following table contains information concerning four jobs that are awaiting processing at a work center. Assume the list is by order of arrival. **Determine** the processing sequence that would result from each of these priority rules:

i. FCFS (2 Marks)
ii. SPT (2 Marks)
iii. EDD (2 Marks)

Job	Job time (days)	Due Date (days)
A	14	20
B	10	16
C	7	15
D	6	17

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

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