MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

FACULTY OF ENGINEERING

CHEMICAL AND PROCESSING ENGINEERING DEPARTMENT

INDUSTRIAL MANAGEMENT AND ORGANIZATION

CODE: HCHE 522

SESSIONAL EXAMINATIONS

SEPTEMBER 2021

DURATION: 3 HOURS

EXAMINER: MR G. CHARIS

INSTRUCTIONS

1. Answer only **four** questions adding up to 100 marks.
2. Write legibly.

Question 1

Your company has been consulted for the setting up of a methanol manufacturing plant in Mutare.

a. There are three locations that have been proposed, with the weights and location ratings shown in Table 1.

Table 1

Factors	Factor rating	Location rating		
		Location 1	Location 2	Location 3
Labor availability	7	6	7	5
Facility of transportation	5	5	4	5
Closeness to suppliers	4	3	4	3
Basic amenities such as power, water, education, housing	8	7	6	8
Land availability	5	5	3	4
Tax benefits	3	3	2	3
Preference of the owner	4	3	4	4
Climate conditions	5	4	5	3

Determine the best location for this plant. [10]

b. Discuss any other 2 facility location methods and their application scenarios. [10]

c. Briefly explain how you would undertake the recruitment process for this plant. [5]

Question 2

a. Today's contemporary management perspectives are a variable blend of classical and behavioural approaches of yesteryear. Discuss the validity of this statement with examples of present day organisations. [10]

b. Explain how you would apply a mix of any three contentment theories in managing plant floor workers in an ethanol manufacturing plant in a difficult economy. [15]

Question 3

The following are excerpts on the solvency of a mining company.

"We are still digesting the shocking news which we woke up to on the weekend of the 8th of October; "BCL, mine placed under provisional liquidation".

The news which we have been dreading to hear all along finally came. We all knew that BCL, just like any other mine have been facing challenges mainly due to the depressed commodity prices on the international market. We never thought it would come to this level. One thing which is certain is that the closure of the mine will send ripple effects not only in the mining town of Selibe Phikwe, Francistown and surrounding areas but the whole economy of Botswana. Francistown will be affected even more as Tati Nickel Mine, a subsidiary of BCL has also been closed. Palapye and surrounding areas will also feel the pinch as the Morupule coal mine will be affected given than BCL was the major consumer of Morupule coal."

"A decline in the quality of copper over the years, which was made worse by the recent slump in commodity prices, has made the burden of keeping the mine operational unbearable for the government," Kebonang told Reuters. However, there have been allegations of gross incompetence on the part of management, which led to a lot of copper value reporting to the tailings. Some former workers said proper engineering principles were violated frequently and unnecessary expenditures were incurred, reducing the chances of the company making profits.

a. Discuss, with reference to the responsibility of various levels of management, which management functions could have been neglegcted, contributing to the liquidation of the company. [10]
b. Which fiduciary obligations were mostly violated and how? [5]
c. With reference to total quality management, explain how you would have run such a company and avoided the pitfalls in a) and b). [10]

Question 4

You have opened a large steel scrap recycling company that uses an electrical arc furnace and produces steel ingots and bars.

a. Explain how you would define quality in this case and the costs of quality you may have to incur as a company. [10]
b. Explain, with an illustration, how you would apply the Quality Function Deployment (QFD) matrix to this company. [15]

Question 5

a. Study the network shown in Fig. 1 for a project X.

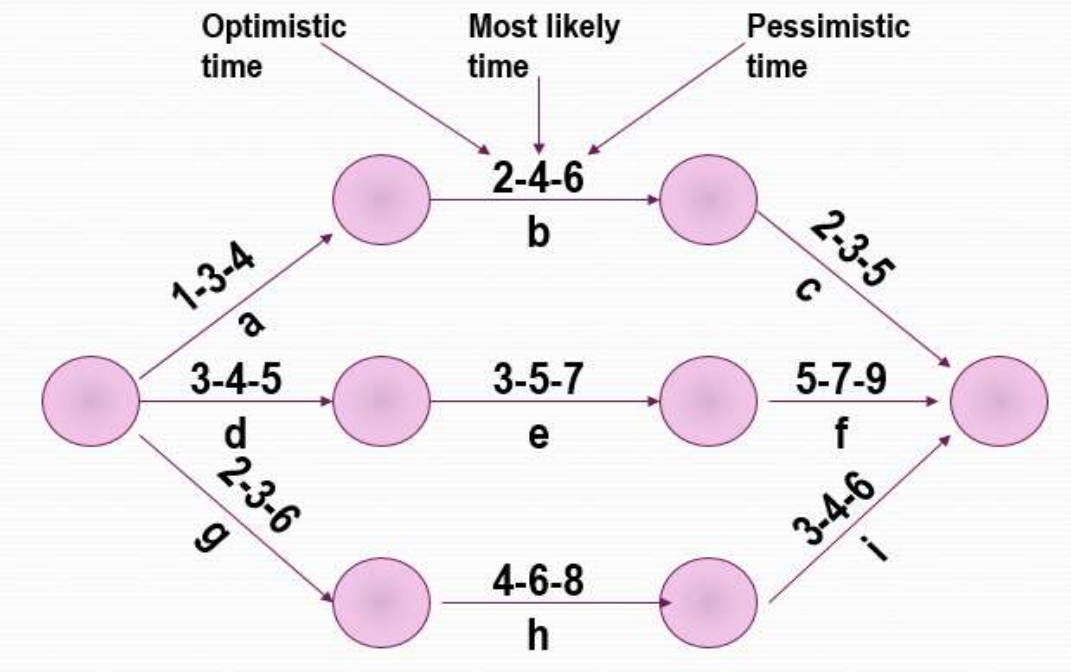

Fig. 1

i. Calculate the activity expected times, path durations and critical path for the project. [15]

ii. Identify the late start, early finish and late finish times. [3]

b. Fig. 2 shows activity time for the fabrication of a reactor. Numbers on top section denote activity number while the bottom one denotes the number of weeks:

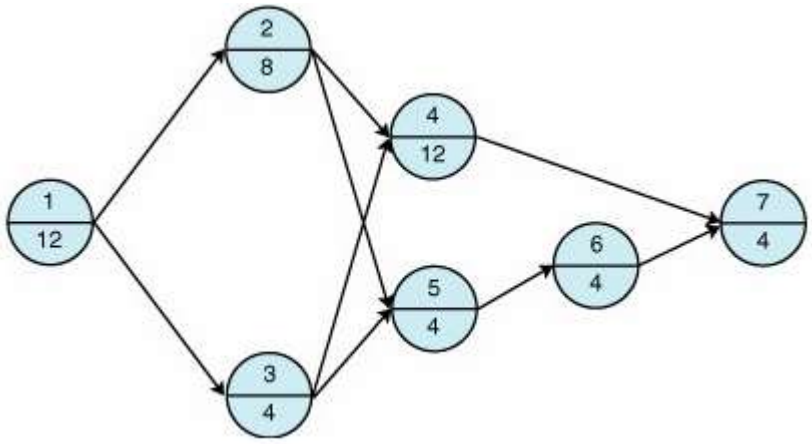

Fig. 2

i. Identify the critical path. [1]

ii. The project manager wants to reduce the time of completing the project to 31 weeks. Given Table 2 of normal and crashing costs, calculate the cost of such a time reduction showing your steps clearly. [6]

Table 2

Activity	*Normal time (weeks)*	*Crash time (weeks)*	*Normal cost ($)*	*Crash cost ($)*	*Total allowable Crash time (weeks)*
1	12	7	3,000	5,000	5
2	8	5	2,000	3,500	3
3	4	3	4,000	7,000	1
4	12	9	50,000	71,000	3
5	4	1	500	1,100	3
6	4	1	500	1,100	3
7	4	3	15,000	22,000	1
			75,000	110,700	

END OF EXAM