



United International University (UIU)

Term Final Examination

IPE 401/IPE3401: Industrial Management/ Industrial and Operational Management

Fall Trimester: 2023

Total time: 2:00 hours

Date: 24/12/2023

Total marks: 40

Section: A/C

There are 5 questions. You must answer question 1, 2&3 and any one of 4 & 5.

- 1 (a) A subassembly of a computer system consists of 3 different components C, N and B. Because of low reliability Component C has been replicated and 4 of C have been used. Reliabilities per 560 hours of C = 0.85 and N = 0.98 and B=0.92 [6] [CO3]
i) Find the MTBF and system failure rate per 300 hours
ii) System reliability per 2500 hours.
- (b) Suppose you are a quality manager of “BELL” laptop manufacturer. You Found out that the laptops overheats and battery life is not as good as the competitors. You also found out that the ram is not fitting well into the ram slot. All of these creating quality losses. Explain how you can measure the losses according to different types of Taguchi loss function, with necessary sketches. [4] [CO3]
- 2 Consider the following problem and solve it by using Simplex method. [10] [CO4]
Maximize, $Z = 10x + 5y + 6m$
Subject to,
 $3x + 2y + m \leq 80$
 $5x + 8y + 9m \leq 140$
 $x \geq 0, y \geq 0, m \geq 0$
- 3 (a) Explain the difference between 6σ and 2σ manufacturing system with necessary sketches. Which one will be appropriate for a brand-new mobile company to adapt logically? [5] [CO3]
- (b) Sequence the following jobs using Johnson’s rule and draw a “Gantt chart” and find the idle time for both machines. [5] [CO2]

Job	Processing Time of Work center 1	Processing time of Work center 2
M	7	3
N	5	7
S	4	1
P	2	3
Q	6	4
R	8	8

- 4 (a) Mr. Stokes is a Supply chain manager of organization “E”. Recently he is facing some problem about communicating with his workers. The workers stop working when there is no supply of materials, and they don’t even inform the suppliers about it. The people of the stores are in charge of supplying the materials to the workers. So, for removing the communication gap between the suppliers and workers Mr. Stokes wanted to make a system where the suppliers are visually notified by some [4] [CO3]

kind of sign automatically and can always replenish the materials timely. Should he follow Kanban or 5S or 6 sigma or Kaizen or TQM or TPM or SMED or Pareto analysis or BPR or Fishbone diagram? Explain your answer.

- (b) You have got a full-time job in sales in a manufacturing company. The manager gave you smoothing constant=0.35 and forecast value of 2015 which was 218. Find MSE of the following years. [6] [CO2]

Year	2015	2016	2017	2018	2019	2020	2021	
Actual	245	239	242	267	221	275	270	

- 5 (a) Mr. Gendry is a black smith of kings landing. Mr. Robert is his customer. He ordered a 20cm long sword. For making this sword, Gendry bought a brand-new hammer with \$5 because his old hammer was not suitable for making sword. He also bought a slide caliper with \$3 to measure the specified length. Gendry first made the sword. Then he measured the length of the sword to be sure. But it was 22cm long. Gendry had to cut the extra length with gas cutter which cost \$1. Then he delivered the sword to Mr. Robert. Find the type of quality costs involved here and explain your answer. [4] [CO3]

- (b) A department store is trying to forecast sales of potato chips using weighted moving average method. After trial and error, they found that the best forecast is derived by using 39% of one month ago, 37% of three months ago and 24% of four months ago.
- Find the forecast value of 9th 10th and 11th month using both moving average method and weighted moving average method.
 - What will be the weight in case of using moving average method?

Month	5	6	7	8	9	10	11
Actual sales	429	441	415	462	450	471	477

CO2	Analyze various industrial problems by using operation management, technique, operation research technique and cost accounting technique and solve it.
CO3	Explain the importance of quality control, and various industrial engineering techniques to improve the process in any engineering sector and how this affect the organization and customers
CO4	Analyze the optimization problems and solve it by using graphical method or simplex method