United International University (UIU)

Term Final Examination

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

Spring Trimester: 2022

Total time: 2:00 hours | Date: 29/05/2022 | Total marks: 40

Section: A/B/C

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

1 (a) A subassembly of a computer system consists of 3 different components A, B and C. Because of low reliability Component A has been replicated and 6 of A have been used. Reliabilities per 300 hour of A = 0.55 and B = 0.92 and C=0.98 [6] [CO3]
i)Find the system failure rate per 100 hours
ii) System reliability per 300 hours.

(b) Mr. Saiki is an Engineer in a famous mobile company in Japan. Recently their mobile is getting heating issue and the SIM card is not fitting into slot properly. According to Traditional goal post view of quality loss there is no loss but these are creating quality losses according to quality loss function of Taguchi. Now determine which Taguchi loss function can find the losses here. Explain your answer with necessary sketches. [4] [CO3]

2 Consider the following problem and solve it by using Simplex method. [10] [CO4]

Maximize , $Z = 5p + 2q$

Subject to,

$4p + 2q \leq 56$

$3p + q \leq 40$

$p \geq 0, q \geq 0$

3 (a) Discuss the differences between 6σ and 3σ manufacturing system according to quality and cost with necessary diagram. [4] [CO3]

(b) Sequence the following jobs of a tailor who needs a cutting machine and a sewing machine to make dresses. He needs to cut the cloths first and then it can be sewed. Apply Johnson's rule to sequence the jobs, draw a "Gantt chart" and find the idle time for both machines. [6] [CO2]

	Processing Time	
Job	WC 1(cutting)	WC2(sewing)
D	11	7
B	8	9
C	3	2
A	3	1
E	8	6
F	4	5

4 (a) Suppose you are the owner of a burger shop in a reputed University canteen. You started making burgers beforehand anticipating how many students are present in a day and how much they normally consume. As your burgers are premade, it is easy to serve and the students don't have to wait for that. But because of that your burger lacks freshness and you have to produce a lot more than necessary to meet up the demands which occupies a lot of space in your daily storage. So Which type of inventory control system are you applying currently and which inventory control system can save you from the wastes you are generating? Explain. [4] [CO3]

(b) You have got a part time job in sales in a mobile company. The manager gave you.(α=0.23) and forecast value of 2019 which was 133. Now the manager wanted to see your analytical skill and asked you to forecast the sales of 2014.Show with necessary calculations. [6] [CO2]

Year	2013	2014	2015	2016	2017	2018	2019	2020
Actual	118	122	131	117	141	146	129	137

5 (a) Kakashi is a worker of a metal workshop in Japan. The canteen is outside their workshop. He can reach there within 5 minutes by using the emergency door. Suddenly the emergency door was kept locked as there were some construction works ongoing. For this reason Kakashi had to use the front door. By using this door he needs 15 minutes to reach there. After 1 month the authority observed that their production is less than previous month. Because every worker were using the front door for going to the canteen .As a student of IPE 401 find out the waste(non-value added task) involved here and explain your answer. [4] [CO3]

(b) The demand for electrical power at EGCB over the year 2012-2022 is given. Find the **overall trend**. Also find the demand of power at year 2417. [6] [CO2]

Year	Demand
2012	1879
2013	1897
2014	1881
2015	1889
2016	1898
2017	1911
2018	1929
2019	1978
2020	1981
2021	1980
2022	1999

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