United International University (UIU)

Term Final Examination

IPE 3401: Industrial and Operational Management

Fall Trimester: 2021

Total time: 2:00 hours Date: 29/01/2022 Total marks: 40

Section: A/B/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 component A, B and C in series. Because of low reliability, component A and B are replicated. The system contains 5 of A and 2 of B. Reliabilities per 220 hour of A = 0.61 and B = 0.76 and C=0.93 Find the system reliability, system failure rate per 10000 hour and system MTBF **[7] [CO3]**

(b) Between 4σ sigma and 2σ sigma manufacturing system, which one is better cost wise and quality wise? Explain with necessary sketches. **[5] [CO3]**

2 Consider the following problem and solve it by using Simplex method. **[11] [CO4]**

Maximize , $Z = 2a + 4b + 3c$

Subject to,

$5a+8b+c \leq 20$

$3a- 3b+6c \leq 30$

$a \geq 0, b \geq 0, c \geq 0$

3 Show the differences between Traditional goal post view of quality loss and Taguchi quality loss function with necessary sketches and Explanation. **[5] [CO3]**

4 (a) Mr. Gendry is a black smith of kings landing. Mr. Robert is his customer. Mr. Robert ordered a 1.3meter long sword. Gendry made the sword and delivered it to MR. Robert. Robert found out that the sword was 1.8meter long. So, he brought the sword back to Gendry. To repair the defect, Gendry had to spend $7 and his total quality loss was $20. Find out the tolerance limit in millimeter and what type of quality cost Gendry had to bear? Explain **[5] [CO3]**

(b) During the past 8 years the port of Baltimore has unloaded large quantities of grain.(α=0.26) The forecast of 2018 was 210.25 unit . Find the forecast for the 2021 and 2014. **[7] [CO2]**

Year	2013	2014	2015	2016	2017	2018	2019	2020
Actual	189	198	199	174	205	188	207	179

5 **(a)** CMW" is a famous luxury vehicle and motorcycle company. They are trying to establish Lean manufacturing system. They wanted to establish JIT System in their factories. They have a very stable production process and the workers are very expert at dealing with breakdowns and expert at assembling parts. Even though they have these things after 2 years of trying they are nowhere near establishing JIT. Determine the steps that can help them establish JIT in the given situation and determine the Type of inventory control system used for JIT with explanation **[5]** **[CO3]**

(b) Sequence the following jobs using Critical ratio method and determine average completion time, Utilization, average number of jobs in the system and average job lateness. **[7]** **[CO2]**

Job	Processing time	Due date
D	71	109
F	31	125
B	98	152
E	140	168
A	109	194
C	95	210

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 affects the organization and customers
CO4	Analyze the optimization problems and solve it by using graphical method or simplex method

"Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules"