



**MBA Hospital, Health, Pharmaceutical and Development Management
(2022-2024)**

Second Year, Term 6 End Term Examination, March 2024

EC-215 Lean Six Sigma in Healthcare

Time - 3 Hour

Maximum Marks: 50 (Minimum Marks: 20)

Instructions to students:

- This question paper contains 3 printed pages.
- Don't write anything on the Question Paper except writing your Enrolment No.

Part A

(Maximum Marks: 5)

Q1. Choose the correct option for the following (1 mark each):

- Henry Ford is noted for his contribution to:
 - Statistical quality control
 - Time and motion studies
 - Moving assembly line
 - Scientific Management
- Who is the father of Toyota Production System (TPS)?
 - Ohno
 - Deming
 - Crosby
 - Taguchi
- Virginia Mason Medical Center, first application of lean in hospitals, their concept of quality is summarised in the equation:
 - $\text{Quality} = \text{appropriateness} \times (\text{outcomes} + \text{service}) / \text{cost}$
 - $\text{Quality} = \text{outcomes} / \text{expectations}$
 - $\text{Quality} = \text{appropriateness} \times (\text{outcomes} + \text{service}) / \text{waste}$
 - None of the above
- DPMO Stands for:
 - Delay per million opportunities
 - Defects per million opportunities
 - Defects per million offers
 - None of the above
- DMAIC stands for:
 - Define, Measure, Analyze, Improve & Control
 - Design, Measure, Analyze, Improve & Control
 - Define, Measure, Analyze, Install & Control
 - None of the above

Part B**(Maximum Marks: 15)****Answer any three of the following questions of Part B.**

- Q2. What do understand by quality in healthcare? Explain the origin of lean & six sigma in quality management. (5)
- Q3. Explain Value Stream Mapping in Lean Six Sigma. (5)
- Q4. Explain Mistake Proofing for Lean Healthcare. (5)
- Q5. Write short notes on **any two** of the following: (5)
- (i) Cause and Effect Diagram
 - (ii) Pareto Chart
 - (iii) FMEA

Part C**(Maximum Marks: 30)****Answer any three of the following questions of Part C in detail.**

- Q6. Explain the DMAIC methodology for process improvement used in Lean Six Sigma. (10)
- Q7. The healthcare manager at a hospital wants to evaluate activities in the patient care unit. The manager hired an analyst who timed all the patient care activities, which include seventeen elements. The observed times (OT) and performance ratings for six observations are shown in the table below. (10)

		Perf.	Observations (minutes)					
Pt. Care Activity		Rating	1	2	3	4	5	6
1	Patient assessment	1.1	9	11	11	9	13	11
2	Care planning	0.96	10	9	7	8	7	10
3	Treatments	1.14	8	9	8	9	10	10
4	Medication	1.07	4	3	4	4	5	3
5	Collecting blood/lab specimens	1.15	8	7	6	9	10	7
6	Passing/Collecting trays, giving out snacks, feeding patients	1.12	18	21	20	21	21	20
7	Shift report	0.97	7	6	5	7	9	7
8	Charting/Documentation	0.95	8	7	8	8	9	11
9	Responding to patients' call lights	1.1	4	5	4	7	6	8
10	Phone calls to/from other departments	0.95	6	7	5	4	9	8
11	Transporting patients, specimens etc.	1.06	11	11	12	12	9	10
12	Patient acuity classification	1.1	7	6	7	6	7	6
13	Order transcription and processing	0.95	5	7	4	6	7	6
14	Ordering/stocking supplies and lines	0.97	6	7	5	6	7	6
15	Equipment maintenance and cleaning	0.96	12	11	8	10	11	9
16	General cleaning/room work (garbage, making beds)	1.14	12	10	12	10	10	12
17	Assisting with the admission process	1.05	11	9	10	9	9	10

Determine the average observed time for each element. Find the normal time for each element. Use allowance percentage for a job element that requires a medium-low allowance (16%). Determine the standard time for the whole job (for all seventeen elements).

- Q8.** The number of infections from the Intensive Care Unit (ICU) at the ABC Medical Center over a period of twelve months is obtained. These numbers are the counts of stool assay positive for toxin, segregated by month. The patient population and other external factors such as change in provider have been stable. (10)

Months	Infections in ICU
January	4
February	3
March	6
April	3
May	4
June	3
July	5
August	6
September	3
October	3
November	6
December	3
Total	49

The quality manager who serves on the quality team wants to discover whether the infections are in control within 95.5 percent confidence limits. Construct a c-chart for these data within 95.5 percent (2σ) confidence intervals. Is the process under control?

- Q9.** What are the Five S's (5S) of Lean Six Sigma in healthcare. Explain in detail. (10)

- Q10.** Explain Just-in-Time & Standard Work in lean six-sigma. (10)