Time allowed: 2 Hrs 30 Min
Max Marks: 50

Roll No: _____

Instruction: Students are required to write Roll No on every page of the Answer Sheet. All other instructions on the question paper / notifications should be followed meticulously.

Sections	No. of Questions to attempt	Marks	Total Marks
A	Minimum 3 question with internal choices and CILO (Course Intended Learning Outcome) covered	3*10	30
	Or	Or	
	Maximum 6 questions with internal choices and CILO covered (as an example)	6*5	
B	Compulsory Case Study with minimum of 2 questions	20	20
			50

Section A

Q1. CILO 02
(a) How should a manager decide on the appropriate service level for finished goods items? Should some items have a 100 percent service level? (5 marks)
    Or
(b) A manager was heard complaining, "I have some items that have two-week review interval, and it takes four weeks for resupply. Every two weeks, I place orders based on the on hand quantity in stock. Now I seem to have too much inventory" what went wrong?
(5 marks)

Q2. (CILO 03)

(a) Suppose that a travel company has performed a process analysis with respect to attending customer requests for airlines and hotel bookings. The analysis shows that it takes 30 mins. to finish this process and has identified the insufficient number of computers, people, and information as the possible reasons. Suppose the project requires redesigning to bring it to 15 mins., how will you go about the task? (5 marks)

 Or

(b) An organization is currently manufacturing basic cooking utensils for household use. Although it has been in operation for the last ten years, of late there has been a margin squeeze due to a fall in its sales volume. The organization is trying to decide if it should provide a wider range of products choices to its customer in order to improve its margins.
What are your suggestions to the organization for resolving this confusion? Would your answer have been different if they were manufacturers of high-end premium cookware?
(5 Marks)

Q3. (CILO 03)

(a) A manufacturer of spark plugs for the mask market would like to design the final assembly shop and requires certain data for the process. The factory works for two shifts and the total available time is 15 hours per day.

i. There are five tasks involved in the final assembly and the task times (in seconds) are 3.5, 4.5, 2.0, 3.0, 4.0. What are the minimum and maximum outputs possible from the factory?

ii. The daily production needs to be 4000 plugs, what should be the cycle time of the operations at the assembly?

iii. If the firm want to use three work stations, what will be the best output possible? By how much will the output increase if it adds one more workstation? (5 Marks)

Or

(b) A cereal manufacturer fills cereal boxes to an average weight of 20 ounces, and has an average range of 2 ounces when the filling process is in control. A sample size of 10 boxes is used in sampling the process.
i. What are CL, UCL, and LCL for the mean and range charts?
ii. A sample with the following 10 measurements was just taken 20, 21, 19, 18, 19, 21, 22, 20, 20, 19. Is the process still in control? (5 Marks)

Sample Size n	Factor for $\bar{x}$-Chart A_2	Factors for R-Chart D_3	D_4
2	1.88	0	3.27
3	1.02	0	2.57
4	0.73	0	2.28
5	0.58	0	2.11
6	0.48	0	2.00
7	0.42	0.08	1.92
8	0.37	0.14	1.86
9	0.34	0.18	1.82
10	0.31	0.22	1.78
11	0.29	0.26	1.74
12	0.27	0.28	1.72
13	0.25	0.31	1.69
14	0.24	0.33	1.67
15	0.22	0.35	1.65
16	0.21	0.36	1.64
17	0.20	0.38	1.62
18	0.19	0.39	1.61
19	0.19	0.40	1.60
20	0.18	0.41	1.59
21	0.17	0.43	1.58
22	0.17	0.43	1.57
23	0.16	0.44	1.56
24	0.16	0.45	1.55
25	0.15	0.46	1.54

Q4.
(a) A request is gone out to all sales people in a company to make forecast for their sales territories for next year. The forecasts will be aggregated by product lines, districts, regions, and finally at the national level. Describe the problems in using this forecast for planning aggregate level of operations for the next year and for specific inventory and scheduling decisions? (5 Marks) (CILO 02)

b. During handling of a project, the manager need to make tradeoffs between cost, performance, and schedule? Give examples? (CILO 01)

Q5.
(a) A manager checked production records and found that a worker produces 160 units working 40 hours. In the previous week, the same worker produces 138 units working 36 hours. Does the worker's productivity increases or decreases? The machining process done by this worker uses material of 120 kgs to produce 160 units of finished goods. It cost Rs.

130 per unit of consumption. If the worker produces 138 units working for 36 hours (as mentioned above) does it amounts to loss in efficiency or not? (marks 05) (CILO 01)

Or
(b) A military contractor is manufacturing an electronic component for a weapons system. It is estimated from the production of a prototype unit that 176 hours of direct labour will be required to produce the first units. The industrial standard learning curve for this type of component is 90%. The contractor wants to know the labour hours that will be required for the 144th unit produce. (Log 2= .30103; Log .9 = -0.04576) (5 marks) (CILO 02)

Q6.

(a) Share the role of "Voice of customer" and "House of quality" in surfacing customer demand and requirements while designing a new product? Share your views as to how effective this method is in doing so? (5 marks) CILO 01
Or
(b) Demystify the term "Operational Excellence" its underlying philosophy, objectives and implications? (5 Marks) CILO 01

Section B

Yokohama Electric Utility Organization has a very good computer system controlling the electrical power supply system to the city. While the current computer network has received routine and frequent updates, the core system is 15 years old and annual operation and maintenance costs are increasing. At the present time, it is costing the electric company $500,000 to operate and maintain the current system. The utility has asked the current system vendor how much it would cost to update the full system to the current version, both hardware and software. The vendor has estimated it would cost $1,500,000 to upgrade and it would take about 24 months. There would be a complete power outage about every four months during the upgrade process.

The utility company has asked two world-recognized leaders in the electric utility computer systems business to provide quotes to replace the current system. Vendor 1 has offered to replace the system for $1,200,000. To accomplish this work, they will require the utility firm's engineers to assist at an estimated cost of $250,000. The new operation and maintenance cost, at the end of the 18-month project, is estimated at $200,000 per year. Vendor 2 has offered to install a new system for $1,800,000 and they will need the same utility resource support at an estimated cost of $275,000. They will take about 16 months to complete the project, at which time operation and maintenance cost should drop to $350,000 per year.

Q1. Which alternative would you recommend they go with if the operation and maintenance costs are estimated for a 10-year period (ignore net present value calculations)?
Q2. What other things should the utility company take into consideration in making this decision?
(CILO 03) (20 Marks)