PGDM (IB), 2017-19

Operations Management

IB 201

Trimester –II, End-Term Examination: December 2017

Time allowed: 2 Hours 30 mins. **Max Marks:50**

Roll No: _____

Instruction: Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means.** In case of rough work please use answer sheet.

Sections	No. of Questions to attempt	Marks	Marks
A	3 out of 5 (Short Questions)	5 Marks each	3*5 = 15
B	2 out of 3 (Long Questions)	10 Marks each	3*10 = 20
C	Compulsory Case Study	15 Marks	15
		Total Marks	**50**

SECTION A

Q1. Karvan Industries maintain production facilities in several locations around the globe. Average monthly cost data and output level are as follows.

Units (000's)	Italy	US	Japan	Manila
Finished goods	10,000	12,000	5,000	8,000
Work-in- process	1,000	2,200	3,000	6,000

Cost (in 000's)($'s)	Italy	US	Japan	Manila
Labor cost	3,500	4,200	2,500	800
Material Cost	3,500	3,000	2,000	2,500
Energy Cost	1,000	1,500	1,200	800
Transportation Cost	250	2,500	2,000	5,000
Overhead Cost	1,200	3,000	2,500	500

a. Calculate the labor productivity of each facility
b. Calculate the multifactor productivity of each facility.
c. If Karvan needed to close one of the plant, which one would you choose.

Q2. Define two major categories of quality cost and how they relate to each other?

Q3. Distinguish between a process and product layout. Give an example of each?

Q4. A supplier supplies 40 furniture units to Evok, Home @, Furniture bazaar and few other retailers on each working day. Presently he is purchasing furniture in a lot of 200at a cost of Rs. 60000 per lot. Every order he incurs a handling charge of Rs.1500 and freight charge of Rs.2500 per order. Multiple and fractional lot can also be ordered. All orders are supplied the next day. The supplier finances investment in inventory by paying 2% monthly interest on borrowed funds. Incremental storage cost per furniture unit is Rs.8.

i. How many furniture unit should be ordered at a time to minimize the total annual inventory cost assuming that there 300 working days in a year?

ii. How frequently should ordered be placed?

Q5. How do scheduling activities differ for projects, mass production and process industries?

SECTION B

Q1.

1. US POLO Assn. an apparel company manufactures expansive, polo-style men's and women's short-sleeve knit shirts at its sourced plant at Surat. The production process requires that material be cut into large pattern squares by operators, which are then sewn together at another stage of the process. If the squares are not of a correct length, the final shirt will be either too large or too small. In order to monitor the cutting process, management takes a sample of four square cloth every other hour and measure the length.

   The company has taken 10 samples with following results.

Sample	Measurement (in.)			
1	37.3	36.5	38.2	36.1
2	33.4	37.9	35.8	36.2
3	32.1	32.1	33.4	35.3
4	36.1	34.5	33.6	33.7
5	35.1	35.2	32.1	39.8
6	33.1	36.1	34.5	31.1
7	38.1	39.4	32.9	38.5
8	35.4	32.4	32.1	33.5
9	37.8	33.8	33.0	34.7
10	34.5	36.0	34.7	32.1

   Construct mean and range charts for the sample and comment on process variability. (6)

2. WIPRO's long life 75 watt light bulbs are designed to have a life of 1125 hours with tolerance of ±210 hours. The process that makes light bulbs has a mean of 1050 hours, with standard deviation of 55 hours. Compute the process capability ratio and the process capability index and comment on the overall capability of the process. (4)

n	A_2	D_3	D_4	A_3	B_3	B_4
2	1.88	0	3.27	2.66	0	3.27
3	1.02	0	2.57	1.95	0	2.57
4	0.73	0	2.28	1.63	0	2.27
5	0.58	0	2.11	1.43	0	2.09
6	0.48	0	2.00	1.29	0.03	1.97
7	0.42	0.08	1.92	1.18	0.12	1.88
8	0.37	0.14	1.86	1.10	0.19	1.81
9	0.34	0.18	1.82	1.03	0.24	1.76
10	0.31	0.22	1.78	0.98	0.28	1.72
11	0.29	0.26	1.74	0.93	0.32	1.68
12	0.27	0.28	1.72	0.89	0.35	1.65
13	0.25	0.31	1.69	0.85	0.38	1.62
14	0.24	0.33	1.67	0.82	0.41	1.59
15	0.22	0.35	1.65	0.79	0.43	1.57
16	0.21	0.36	1.64	0.76	0.45	1.55
17	0.20	0.38	1.62	0.74	0.47	1.53
18	0.19	0.39	1.61	0.72	0.48	1.52
19	0.19	0.40	1.60	0.70	0.50	1.50
20	0.18	0.41	1.59	0.68	0.51	1.49

Q2. Harley-Davis Motorcycle dealer in the Noida area wants to be able to forecast accurately the demand for the Roadhog Super motorcycle during the next month. From the sales records, the dealer has accumulated the data in the adjacent table for the past year.

a. Compute a three month moving forecast of demand for April through January(for next year).
b. Compute five month moving average forecast for June through January.
c. Compare the two using MAD and decide as to which one should the dealer use for January of the next year.

Month	Motor Cycle Sales
January	9
February	7
March	10
April	8
May	7
June	12
July	10
August	11
September	12
October	10
November	16
December	14

Q3.

1. How does aggregate production planning impact each of the following functional areas in an organization?
   a. Marketing
   b. Finance
   c. Strategy
   d. Material and Procurement

2. Clean and shine car service has five cars waiting to be washed and waxed. The time required for each activity in given below. In what order should the cars be processed through the facility? When will the batch of cars be completed.

Car	Wash	Wax
1	5	0
2	7	2
3	10	5
4	8	6
5	3	5

SECTION C

Energex is one of Australia's electricity, natural gas, and LPG retailers. It is leveraging its experience and expertise to develop and deliver innovative energy solutions to a marketplace that is undergoing significant change. Energex's customer base consists of more than a million commercial and domestic consumers. The company is committed to offering a broad range of energy options and is positioning itself as an innovative multi-fuel retailer. This strategy has put significant focus on its product development capabilities. Energex products today include domestic and commercial electricity, natural gas, and LPG supply.

Energex responded to the challenge of deregulation by creating Energex Retail, a fast-moving market-focused corporation that concentrated on developing and marketing energy-based products to commercial and residential customers. It recruited some of the best people in the industry so that it could act swiftly to meet the changing needs of the evolving energy market. Typical of the innovative, high value-added new products is the company's energy monitoring programme (EMP). EMP packages hardware and software into one product, which monitors all energy inputs and costs, providing instant access to information on energy usage, power quality, billing verification, on-charging and greenhouse gas emissions. Managers usually have access to volumes of data but still lack quality information about one of their most critical operating costs-their energy consumption levels. EMP changes this situation.

The R&D team at Energex needed a product development process that would help them manage critical risk without slowing them down. Product managers and the product development manager were dissatisfied with the quality of "pre development homework" and wanted improvements in the quality of product definition and specification before committing to the development of new products. Energex chose business consultants to help them develop its new process and tackle the shortcomings identified. With the guidance of the CEO, the Energex team decided that a stage-gate based product development process was right for their business. With the help of a business consultant, they have tailored the stage-gate product development system to suit their managerial needs.

Energex has seen that process development by an empowered cross-functional team is crucial to long-term project success. Such teams must have the authority to make real decisions as well as the personal backing of the senior management team. Good senior management support speeds process acceptance and early success. Therefore the first step was to establish a process improvement team (PIT crew) comprising product managers, the product development manager, and representatives from finance, customer service and technical services. This team represented all the functional groups in the product development environment.

The initial plan was to involve the PIT crew in all aspects of process development, but after the initial training, it was obvious that this would be hard to achieve. Energex chose instead to use a more manageable development team consisting of a quality manager, two of the product managers and the CEO, with the original PIT crew's role being that of process reviewers, the review happening at least once every two weeks. It does however place more emphasis on training, and the core process development team should not just represent one functional group otherwise process buy-in will be adversely affected.

Design of this pre-development activity and the associated gates should always take most of the time in a stage-gate implementation project-70 per cent or more of project budget is not uncommon. Conversely, most companies are very competent at actual technical product development, so effort can be minimized in those areas. In the case of Energex, during the development of the process, as much as 60 per cent of the PIT team's time was spent in refining the tools for product definition and the first two critical gates.

The modified approach was much more productive than the initial plan, and the draft of the new process was developed in about ten weeks from project commencement. The new process follows the classic stage-gate model closely and has been christened RAPID by the Energex PIT crew. Many companies struggle with the design of their early gates: simple questions like "Is the product aligned to our strategy?" can engender hours of debate if a company doesn't have a clear, documented and communicated strategy. When it came to gate design, Energex was better prepared than most. Energex Retail had just completed a major strategic planning exercise, the outcome of which had been clearly documented and communicated to all staff. It was a relatively easy process to express this strategy as a series of "must meet" filtering questions and "should meet" project prioritization questions that would be well understood by all users of the RAPID process. Implementing a good stage-gate process is about changing attitudes and behaviour in an organization. It needs to be sold and sold well, to internal and external stakeholders. It is all about getting a "buy-in." Depending on the organization's size and complexity, the launch should consist of education and practical hands-on training for users and gatekeepers (senior management), accurate and concise process documentation, a process brochure for those who needed to be aware of but not use the new process, and some appropriate form of launch event to let everyone in the organization know that the process was now real and alive. New employees should also be trained in the process.

Energex handled the launch of the new process effectively. All process documents were published on the corporate network, a colour promotional brochure on RAPID was produced for internal circulation, and a launch function for the new idea process was held along with training for all users of the process.

During the implementation of RAPID, existing projects were mapped to the process and a number of pilot projects were conducted. The senior management gate-keeping team has already welcomed the consistency of business cases produced by the new process, and some tough and appropriate project "kill" decisions have been made-freeing up valuable resources for the best projects. Energex is experiencing a smooth lead-up to product launch with less re-work during the hectic pre-launch stages. This is a direct result of better pre-development homework, better cross-functional teamwork and tighter project specifications.

Within Energex Retail, the CEO's team has embarked on a formal product portfolio management programme, ably supported by the RAPID process. Portfolio management is a strategic management tool designed to balance and focus resources to support the long-term aims of the company.

QUESTIONS FOR DISCUSSION

Q1. What was the need for Energex to go for a stage-gate model? Was it worth the effort for them?

Q2. What are the major benefits an organization can derive from implementation of a stage-gate model for new-product development?

Q3. Comment on the statement, "The stage-gate process is difficult to manage."