INTERMEDIATE EXAMINATION GROUP II (SYLLABUS 2016)

SUGGESTED ANSWERS TO QUESTIONS JUNE 2019

Paper- 9: OPERATIONS MANAGEMENT AND STRATEGIC MANAGEMENT

Time Allowed: 3 Hours

Full Marks: 100

The figures in the margin on the right side indicate the full marks. This paper contains two Sections. Both Sections are compulsory, subject to instructions provided against each. All working must form part of your answer. Assumptions, if any, must be clearly indicated.

Section A

Operations Management

1. (a) Choose the correct answer:

(i) Inventory cost per product in intermittent production is

- (A) Higher
- (B) Lowest
- (C) Medium
- (D) Abnormal
- (ii) The act of assessing the future and make provisions for it is known as
 - (A) Planning
 - (B) Forecasting
 - (C) Assessment
 - (D) Scheduling

1x10=10

- (iii) One of the important charts used in Programme control is
 - (A) Material chart
 - (B) Gantt chart
 - (C) Route chart
 - (D) Inspection chart
- (iv) Cost reduction can be achieved through
 - (A) Work sampling
 - (B) Value analysis
 - (C) Quality assurance
 - (D) Supply chain management
- (v) Linear Programming is a technique used for determining
 - (A) Production Programme
 - (B) Plant Layout
 - (C) Product Mix
 - (D) Manufacturing Sequence
- (vi) (Total station time/cycle time x Number of work stations) x 100 is known as
 - (A) Line efficiency
 - (B) Line smoothness
 - (C) Balance delay of line
 - (D) Station efficiency
- (vii) Arrangement of machines depending on sequence of operations happens in
 - (A) Process Layout
 - (B) Product Layout
 - (C) Hybrid Layout
 - (D) Group Technology Layout
- (viii) Line of Best fit is another name given to
 - (A) Method of Least Squares
 - (B) Moving Average Method
 - (C) Semi Average Method
 - (D) Trend Line Method
- (ix) In route sheet or operation layout, one has to show
 - (A) A list of materials to be used.
 - (B) A list of machine tools to be used.

- (C) Every work center and the operation to be done at that work center.
- (D) The cost of product.
- (x) Computers are used in Production control in this area
 - (A) follow-up activity.
 - (B) to control labour.
 - (C) to disseminate information.
 - (D) Loading, Scheduling and Assignment works.

(b) Match Column A with Column B:

1x6=6

	Column A	Column B
(A)	Cost Benefit Analysis	(i) Crashing
(B)	Network Analysis	(ii) Product Design
(C)	Television Set	(iii) Plant Layout
(D)	Use of Templates	(iv) Method Study
(E)	Computer Aided Design	(v) Project Viability Checking
(F)	Motion Economy	(vi) Assembly Line

- (c) State whether the following statements are 'True' or 'False': 1x6=6
 - (i) A work stoppage generally reduces the cost of production.
 - (ii) Depending on the need, the maintenance activity may be centralized or decentralized.
 - (iii) Piece wage system is a substitute for proper supervision.
 - (iv) Most suitable layout for continuous production is Matrix Layout.
 - (v) Addition of value to raw materials through application of technology is production.
 - (vi) Breakdown maintenance doesn't require use of standby machines.

Answer:

1. (a)

- (i) (A) Higher
- (ii) (B) Forecasting
- (iii) (B) Gantt Chart
- (iv) (B) Value analysis
- (v) (C) Product Mix

- (vi) (A) Line efficiency
- (vii) (B) Product Layout
- (viii) (A) Method of Least Squares
- (ix) (C) Every work center and the operation to be done at that work center
- (x) (D) Loading, Scheduling and Assignment works.

1. (b)

- A (v) Project viability checking
- B (i) Crashing
- C (vi) Assembly Line
- D (iii) Plan Layout
- E (ii) Product design
- F (iv) Method Study

1. (c)

- (i) False
- (ii) True
- (iii) False
- (iv) False
- (v) True
- (vi) False

Answer any three questions from the following:

16x3=48

- 2. (a) List down various activities lying under Production and Operations Management function.
 - (b) The present layout is shown in the figure. The manager of the department is intending to interchange the departments C and F in the present layout. The handling frequencies between the departments is given. All the departments are of the same size and configuration. The material handling cost per unit length travel between departments is same. What will be the effect of interchange of departments C and F in the layout?

6+10=16

Α	С	E
В	D	F

From / To	Α	В	с	D	E	F
Α	—	0	80	150	60	10
В	—	-	90	0	90	110
С	-	-	-	40	0	5
D		-	-	-	160	20
E	_	-	—	_	—	60
F	-	-	-	-	-	-

Answer:

2. (a) Various activities lying under Production and Operations Management functions:

- (i) Location of facilities.
- (ii) Plant layouts and Material Handling.
- (iii) Product Design.
- (iv) Process Design.
- (v) Production Planning and Control.
- (vi) Quality Control.
- (vii) Materials Management.
- (viii) Maintenance Management.

(b) (i) The distance matrix of the present layout:

From / To	Α	В	с	D	Ε	F
А		1	1	2	2	3
В			2	1	3	2
С				1	1	2
D					2	1
E						1
F						-

(ii) Computation of total cost matrix (combining the inter-departmental material handling frequencies and distance matrix).

From / To	Α	В	с	D	E	F	Total
А		0	80	300	120	30	530
В			180	0	270	220	670
С				40	0	10	50
D					320	20	340
E						60	60
F							_
Total							1,650

If the departments are interchanged, the layout will be represented as shown below.

А	F	E
В	D	С

(iii) The distance matrix and the cost matrix of the new layout are shown:

From / To	Α	В	с	D	E	F
A		1	3	2	2	1
В			2	1	3	2
С				1	1	2
D					2	1
E						1
F						-

(iv) Total cost matrix for the modified layout.

From / To	Α	В	с	D	E	F	Total
А		0	240	300	120	10	670
В			180	0	270	220	670
С				40	0	10	50
D					320	20	340
E						60	60
F							-
Total							1,790

(v) Interpretation and conclusion: The interchange of departments C and F increases the total material handling cost. Thus, it is not a desirable modification.

- 3. (a) Examine the following types of Process decisions:
 - (i) Job Shop Process
 - (ii) Project Process
 - (b) Describe the different types of Production Control.

(3x2)+10=16

Answer:

- 3. (a) Examination of the following types of Process decisions:
 - (i) Job shop process: It is used in job shops when a low volume of high-variety goods are needed. Processing is intermittent, each job requires somewhat different processing requirements. A job shop is characterised by high customisation (made to order), high flexibility of equipment and skilled labour and low volume. A tool and die shop is an example of job shop, where job process is carried out to produce one-of-a kind of tools. Firms having job shops often carry out job works for other firms. A job shop uses a flexible flow strategy, with resources organised around the process.
 - (ii) **Project process:** It is characterised by high degree of job customisation, the large scope for each project and need for substantial resources to complete the project. Examples of projects are building a shopping centre, a dam, a bridge, construction of a factory, hospital, developing a new product, publishing a new book etc. Projects tend to be complex, take a long time and consist of a large number of complex activities. Equipment flexibility and labour skills can range from low to high depending on the type of projects.
 - (b) Production control can be of six types:

(i) Block control

This type of control is most prominent in textiles and book and magazine printing. In these industries it is necessary to keep things separated and this is the fundamental reason why industries resort to block control.

(ii) Flow control

This type of control is commonly applied in industries like chemicals, petroleum, glass, and some areas of food manufacturing and processing. Once the production system is thoroughly designed, the production planning and control department controls the rate of flow of work into the system and checks it as it comes out of the system. But, under this method, routing and scheduling are done when the plant is laid out. That is to say, the production line which is established is well balanced and sequenced before production operations begin; this type of control is more prevalent in continuous production systems.

(iii) Load control

Load control is typically found wherever a particular bottleneck machine exists in the process of manufacturing.

(iv) Order control

The most, common type of production control is called order control. This type of control is commonly employed in companies with intermittent production systems, the so-called job-lot shops. Under this method, orders come into the shop for different quantities for different products. Therefore, production planning and control must be based, on the individual orders.

(v) Special project control

Special production control is necessary in certain projects like the construction of bridges, office buildings, schools, colleges, universities, hospitals and any other construction industries. Under this type of control, instead of having sets of elaborate forms for tooling and scheduling, a man or a group of men keeps in close contact with the work.

(vi) Batch control

Batch control is another important, type of production control which is frequently found

in the food processing industries.

4. (a)	A Project consists of four major jobs, for which four contractors have submitted tenders.
	The tender amounts, in thousands of Rupees, are given below:

Contractor		ol		
	Α	В	С	D
1	110	98	75	95
2	85	95	115	65
3	105	135	125	98
4	95	95	75	95

Find the assignment, which minimizes the total cost of the Project. Each contractor has to be assigned one job.

(b) A Taxi operator is planning to open a computerised ticket counter in the center of the city, staffed by one ticket agent. It is estimated that requests for tickets and information will average 18 per hour, and requests will have a Poisson distribution.

Service time is assumed to be exponentially distributed. Previous experience with similar computerised operations suggests that mean service time should average about 2-5 minutes per request.

Determine each of the following:

- (i) System utilization
- (ii) Percentage of time the server (agent) will be idle.

(iii) The expected number of customers waiting to be served

(iv) The average time customers will spend in the system.

8+(2x4)=16

Answer:

4. (a)

The given problem is a standard minimization problem. Subtracting the minimum element of each row from all its elements in turn, the given problem reduces to:

Contractor	Jobs						
	Α	В	С	D			
1	35	23	0	20			
2	20	30	50	0			
3	7	37	27	0			
4	20	20	0	20			

Now subtract the minimum element of each column from all of its elements in turn. Draw the minimum number of lines, horizontal or vertical, so as to cover all zeros:

Contractor	Jobs						
	Α	В	С	D			
1		3	0	20-			
2	13	10	50	Φ			
3	0	17	27	Φ			
4	-13	0	0	20			

Since the minimum number of lines to cover all zeroes is equal to 4 (= order of the matrix), this matrix will give optimal solution. The optimal assignment is made in the matrix below:

Contractor	Jobs					
	Α	В	С	D		
1	28	3	0	20		
2	13	10	50	0		
3	0	17	27	×		
4	13	0	\times	20		

The optimal assignment is:

Contractors	Job	Cost (in thousands of Rupees)
1	С	75
2	D	65
3	A	105
4	В	95

Hence, total minimum cost of Project will be ₹ 3,40,000.

Answer:

4. (b)

Arrival Rate = λ = 18 customers per hour

Service Rate = μ = 1 / service time = (1 customer / 2.5 minutes) × 60 minutes per hour = 24 customers per hour

- (i) System Utilisation = $p = \lambda M\mu = 18 / (1 \times 24) = 0.75$
- (ii) Percentage idle time = 1 p = 1 0.75 = 0.25, or 25 percent
- (iii) Expected no. of customers waiting to be served = Lq = $\lambda^2/\mu(\mu \lambda)$

 $= (18)^2 / [24 \times (24 - 18)] = 2.25$ customers

(iv) Average time customers will spend in the system =

 $W_s = (L_q / \lambda) + (1/\mu) = (2.25/18) + (1/24) = 0.1667$ hrs = 10 minutes.

5. (a) Table shows the time remaining (number of days until due date) and the work remaining (number of days still required to finish the work) for 5 jobs which were assigned the letters A to E as they arrived to the shop. Sequence these jobs by priority rules viz., (i) FCFS, (ii) EDD, (iii) LS, (iv) SPT and (v) LPT.

doſ	Number of days until due date	Number of days of work remaining
Α	10	8
В	4	5
С	8	7
D	11	4
E	5	9

(b) An electronic device components manufacturing company carries out the 'A' components testing for 2500 hours. A sample of 100 'A' components was put through this quality test during which two components failed. If the average usage of the electronic device by the customer is 5 hours/day and if 12,000 such devices were sold, then in one year how many 'A' components were expected to fail and what is the mean time between failures for these components? (2x5)+6=16

Answer:

5. (a)

Job	Number days until due date	Number of days of work remaining
А	10	8
В	4	5
С	8	7
D	11	4
E	5	9

- (i) FCFS (First come first served) : Since the jobs are assigned letters A to E as they arrived /to the shop, the sequence according to FCFS priority rule is A B C D E
- (ii) EDD (Early due date job first) rule : Taking into account the number of days until due date, the sequence of jobs as per EDD rules is

Job	В	E	С	Α	D
No. of days until due date	4	5	8	10	11

(iii) L.S. (Least slack) rule also called as Minimum slack rule.

Calculation of slack:

Slack = (Number of days until due dale) - (Number of cays of work remaining)

Job	No. of days until/due date	No. of days of work remaining	Slack (Days)
А	10	8	10 - 8 = 2
В	4	5	4 – 5 = -1
С	8	7	8 – 7 = 1
D	11	4	11 – 4 = 7
E	5	9	5 – 9 = -4

Sequence:

Job	Е	В	С	А	D
Slack	-4	-1	1	2	7

Here the jobs are sequenced in ascending order of magnitude of their respective slacks.

(iv) SPT (Shortest Processing Time job first) also referred as SOT (Shortest Operation time job First) rule or MINPRT (Minimum Processing time job first) rule. As per this rule, jobs are sequenced in ascending order of magnitude of their respective processing time.

Sequence:

Job	D	В	С	А	E
Processing Time (Days)	4	5	7	8	9

(v) LPT (Longest Processing time job first) also referred to as LOT (Longest operation time job first) rule.

As per this rule jobs are sequenced in descending order of magnitude of their respective processing times.

Sequence:

Jop	E	А	С	В	D
Processing Time (Days)	9	8	7	5	4

(b) The total test time = (100 components) × 2500 hours = 250,000 component-hours.

There are two components which have failed and hence the total time is to be adjusted for the number of hours lost due to the failures during the testing.

The lost hours are computed as = $(2 \times 2500) / 2 = 2500$ hours.

The assumption is made here is that each of the failed tubes have lasted an average of half of the test period.

Therefore, the test shows that there are two failures during (2,50,000 - 2500) = 2,47,500 component hours of testing.

During 365 days a year (four hours a day) for 12,000 components the number of expected failures = $(2 \times 12,000 \times 365 \times 5)/2,47,500 = 176.97 = 177$ components approximately.

Mean time between failures = 2,47,500 components hrs. of testing / 2 failures = 1,23,750 components hours per failure = 1,23,750 / (5/365) = 67.8 components year per failure.

Section **B**

Strategic Management

- 6. Choose the correct answer:
 - (i) Offensive strategy is a strategy
 - (A) for small companies that consider offensive attacks in the market.
 - (B) for those companies that search for new inventory opportunities to create competitive advantage.
 - (C) for the market leader who should attack the competitor by introducing new products that make existing ones obsolete.
 - (D) for those companies who are strong in the market but not leaders and might capture a market share from the leader.
 - (ii) The BCG growth matrix is based on the two dimensions:
 - (A) Market Size and Market Share
 - (B) Market Size and Profit Margins
 - (C) Market Size and Competitive Intensity
 - (D) None of the above
 - (iii) For an entrepreneur
 - (A) Vision is before the mission.
 - (B) Mission is before the vision.
 - (C) Both are developed simultaneously.
 - (D) Vision or mission are un-important issues.
 - (iv) Benchmarking is
 - (A) the analytical tool to identify high cost activities based on the 'Pareto Analysis'.
 - (A) the search for industries best practices that lead to superior performance.
 - (B) the simulation of cost reduction schemes that help to build commitment and improvement of actions.
 - (B) the process of marketing and redesigning the way a typical company works.
 - (v) Strategic analysis is concerned with stating the position of the organisation in terms of
 - (A) Mission, choice of market segments, product selection, financial targets and external appraisal.
 - (B) Mission, goals, corporate appraisal, position audit and gap analysis.

1x6=6

- (C) Mission, goals, identification of key competitors, SWOT and environmental appraisal.
- (D) Mission, targeted ROI, manpower planning and position audit.
- (vi) Intensity of competition is in low return industries.
 - (A) low
 - (B) non-existent
 - (C) high
 - (D) not important

Answer:

- **6.** Choose the correct answer:
 - (i) (D) For those companies who are strong in the market but not leaders and might capture a market share from the leader.
 - (ii) (D) None of the above
 - (iii) (A) Vision is before the mission
 - (iv) (B) The search for industries best practices that lead to superior performance.
 - (v) (B) Mission, goals, corporate appraisal, position audit and gap analysis.
 - (vi) (C) high.

Answer any two questions from the following:

7. (a) What is a Company Mission? List the guidelines for formulation of 'mission' statement.

(b) Briefly describe the limitations of the BCG model. 8+4=12

12x2=24

Answer:

7. (a) The mission is a broadly framed but enduring statement of company intent. It embodies the business philosophy of strategic decision makers; implies the image the company seeks to project; reflects the firm's self-concept; indicates the principal product or service areas and primary customer needs the company will attempt to satisfy. In short, the mission describes the product, market, and technological areas of emphasis for the business. And it does so in a way that reflects the values and priorities of strategic decision makers.

Guidelines for formulation of "mission" statement

- It should be based on existing business capabilities "Who we are and what we do?"
- It should follow the long term strategy principles

- Profit making should not be the only mission of organisation
- It should be logical extension of business existing capabilities
- It should clearly and precisely present the future orientation of business
- It should include achievable missions
- It should be stated in a form that it becomes the motivating force to every member of organisation
- Mission statement once formed shall be communicated to every member of organisations
- It should include interest of customers and society

(b) Limitations of the BCG Model:

(i) How do you define your market? Segmentation strategies can provide a niche. A niche is inevitably a low or restricted share of the market, yet it is the heart of a focus strategy.

Fimis can profit servicing small low-growth niches.

- (ii) Market growth and market share are assumed to be reliable pointers for cash flow. This is often not true. High market share does not necessarily mean high profits, especially if a firm has high costs, or has bought market share by low pricing.
- (iii) Relative market share amongst competitors is not necessarily an indication of their competitive strengths at any particular time. After all, market leaders are vulnerable.
- (iv) The BCG model might become a self-fulfilling prophecy: Dogs which could be made profitable might simply be left to the rather than be resuscitated.
- (v) It does not suggest any response to declining markets other than withdrawal: many firms can make money in 'sunset industries'.
- (vi) It ignores the extent to which a firm which serves a number of markets can exploit production synergies.
- (vii) It ignores the threat of substitute products.

- 8. (a) State the basic distinctions between Strategic Management and Strategic Planning.
 - (b) State the various advantages and disadvantages of SBU structure.

6+6=12

4x3=12

Answer:

8. (a) The basic differences between Strategic management and Strategic planning are as follows:

Str	ategic Management	Strategic Planning				
1.	It is focused on producing strategic results; new markets; new products; new technologies etc.	: 1. It is focused on making optimal , strategic decisions.				
2.	It is management by results.	2. It is management by plans.				
3.	It is an organizational action process.	3. It is an analytical process.				
4.	It broadens focus to include psychological, sociological and political variables.	 4. It is focused on business, economic and technological variables. 				
5.	It is about choosing things to do and also about the people who will do them.	5. It is about choosing things to do.				

(b) Various advantages and disadvantages of SBU structure:

Advantages:

- (i) Promotes accountability since units' heads are responsible for individual SBU profitability
- (ii) Career development opportunities are further higher in this structure
- (iii) Allow better control of categories of products manufacturing, marketing and distributions
- (iv) Helps to expand in different related and unrelated businesses.

Disadvantages:

- (i) May provide inconsistent approach to tackle customers, etc., because each unit may work in it's own way to handle situations
- (ii) High cost approach.

9. Write short notes on any three of the following:

- (a) Features of Human Resources Strategy
- (b) McKinsey's 7-S Framework
- (c) Principle of BPR

(d) Stages involved in Strategic Planning

Answer:

9. (a) Features of Human Resources Strategy

The more important features which human resource strategy may bring to bear on the organisation are as follows:

- (i) Orientation of the members. HRM strategy has to ensure that individuals employed in the organisation have necessary orientation so that the mission and objectives of the organisation are internalised by the members and they have a sense of identification with the values and culture of the organisation.
- (ii) Facilitation of organisational changes as and when called for. The practices and procedures are required to be in conformity with the changing internal and external conditions. This is a vital role of HR strategy management.
- (iii) Coping with diversity of workforce. Modem organisations with highly complex nature of jobs and processes generally have a highly diversified workforce differentiated in terms of age, sex, religion, professional and technical skills and educational background. To maintain a balanced workforce with harmonious relations and providing equitable incentives and rewards are aspects of HRM functions which can sustain an effective workforce. This is a responsibility of HR strategy managers.
- (iv) Maintaining competent and committed workforce in a competitive environment. The intensity of market competition for enterprises has been growing fast with globalisation and liberaliation of economic policies. There are competitive strategies of low cost production and differentiation of products which may enable companies to secure a competitive edge. HRM has the responsibility of managing workforce so as to make it competent in ability as well as committed to organisational success.
- (v) Development of core competency. An enterprise succeeds in achieving its strategic objectives mainly on the basis of capabilities in the technical, marketing or human skills in areas of crucial importance. These are known as core competencies of the organisation which are unique internal strengths not possessed by competitors. HRM is required to undertake building up of core competency by the organisation as to secure dynamic leadership in the product market.
- (vi) Empowered workforce as an active resource. HR strategy is best managed when the members of an organisation are individually in control of their work and are able to realise their potentials with empowerment to take relevant decisions on their own. This is likely to secure enduring performance based achievements.
- (vii) Appropriate work culture and ethical norms. No organisation can get the best contribution from its members unless individuals develop a liking for challenging jobs and follow the ethical norms of the organisation functionally. This may require redesigning of jobs and work processes as well as developing trust and confidence among individuals and work groups, as also emphasizing intrinsic

motivation for improving performance. HRM encompasses creation of an appropriate work culture on the above lines.

(b) McKinsey's 7-S Framework



Strategy is dependent on many variables - Internal as well as external. All factors are interrelated.

- Strategy: A set of decisions and actions aimed at gaining a sustainable competitive advantage.
- Structure: The organisation chart and associated information that shows who reports to whom and how tasks are both divided and integrated.
- Systems: The flow of activities involved in the daily operation of a business, including its core processes and its support systems.
- Style: How managers collectively spend their time and attention and how they use symbolic behaviour. How management acts is more important than what management says.
- Staff: How companies develop employees and shape basic values.
- Shared Values: Commonly held beliefs, mindsets and assumptions that shape how an organisation behaves— its corporate culture.
- Skills: An organisation's dominant capabilities and competencies.

(c) Principle of BPR

BPR is achieving dramatic performance improvements through radical change in organizational processes, re-architecting) of business and management processes. It involves the redrawing of organizational boundaries, the reconsideration of jobs, tasks, and skills. This occurs with the creation and the use of models. Whether those be physical models, mathematical, computer or structural models, engineers build and analyze models to predict the performance of designs or to understand the behavior of devices. More specifically, BPR is defined as the use of scientific methods, models and tools to bring about the radical restructuring of an enterprise that result in significant improvements in performance.

Re-design, re-tooling and re-orchestrating form the key components of BPR that are essential for an organization to focus on the outcome that it needs to achieve. The outcome pursued should be an ambitious outcome (as for instance, are a 24 hour delivery to any customer anywhere in the world, approval of mortgage loans within 60 minutes of application, or ability to have on-line access to a patient's medical records no matter where they are in any major city in the world). These types of visionary goals require rethinking the way most organizations do business, careful redesign. They will additionally need very sophisticated supporting information systems and a transformation from a traditional organizational structure to a network type organization.

(d) Stages involved in Strategic Planning:

Stage I: Strategic Option Generations

At this stage, a variety of alternatives are considered, relating to the firm's product and markets, its competitors and so forth. Examples of strategies might be:

- (i) increase market share
- (ii) penetration into international market
- (iii) concentration on core competencies
- (iv) acquisition or expansion etc.

Stage II - Strategic Options Evaluation

Each option is then examined on its merits.

- (i) does it increase existing strengths?
- (ii) does it alleviate existing weaknesses?
- (iii) is it suitable for the firm's existing position?
- (iv) is it acceptable to stakeholders?

Stage III - Strategic Selection

It involves choosing between the alternative strategies. This process is strongly influenced by the values of the managers in selecting the strategies.