

PAPER – 9 : OPERATIONS MANAGEMENT AND STRATEGIC MANAGEMENT

SUGGESTED ANSWERS

SECTION - A

1.

- (i) (D)
- (ii) (B)
- (iii) (C)
- (iv) (B)
- (v) (C)
- (vi) (C)
- (vii) (B)
- (viii) (C)
- (ix) (B)
- (x) (B)
- (xi) (D)
- (xii) (A)
- (xiii) (B)
- (xiv) (C)
- (xv) (D)

SECTION – B

2. (a)

Recent trends In production / operations management relate to global competition and the impact it has on manufacturing firms. Some of the recent trends are :

- (1) **Global Market Place** : Globalisation of business has compelled many manufacturing firms to have operations in many countries where they have certain economic advantage. This has resulted in a steep increase in the level of competition among manufacturing firms throughout the world.
- (2) **Production / Operations Strategy** : More and more firms are recognizing the importance of production / operations strategy for the overall success of their business and the necessity for relating it to their overall business strategy.
- (3) **Total Quality Management (TQM)** : TQM approach has been adopted by many firms to achieve customer satisfaction by a never-ending quest for improving the quality of goods and services.
- (4) **Flexibility** : The ability to adapt quickly to changes in volume of demand, in the product mix demanded, and in product design or in delivery schedules, has become a major competitive strategy and a competitive advantage to the firms. This is sometimes called as agile manufacturing.
- (5) **Time Reduction** : Reduction of manufacturing cycle time and speed to market **for** a new product provide competitive edge to a firm over other firms. When companies can provide products at the same price and quality, quicker delivery (short lead times) provide one firm competitive edge over the other.
- (6) **Technology** : Advances in technology have led to a vast array of new products, new processes and new materials and components. Automation, computerisation, information and communication technologies have revolutionised the way companies operate.
- (7) **Worker Involvement** : The recent trend is to assign responsibility for decision making and problem solving to the lower levels in the organisation. This is known as employee involvement and empowerment **Examples** of worker involvement are quality circles and use of work teams or quality improvement teams.

- (8) **Re-engineering:** This involves drastic measures or break-through improvements to improve the performance of a firm, It involves the concept of clean-slate approach or starting from scratch in redesigning the business processes.
- (9) **Environmental Issues :** Today's production managers are concerned more and more with pollution control and waste disposal which are key issues in protection of environment and social responsibility.
- (10) **Corporate Downsizing (or Right Sizing) :** Downsizing or right sizing has been forced on firms to shed their obesity. This has become necessary due to competition, lowering productivity, need for improved profit and for higher dividend payment to shareholders.
- (11) **Supply - Chain Management :** Management of supply-chain, from suppliers to final customers reduces the cost of transportation, warehousing and distribution throughout the supply chain.
- (12) **Lean Production:** Production systems have become lean production systems which use minimal amounts of resources to produce a high volume of high quality goods with some variety.

2. (b)

The basic Process type to be chosen by the Production Manager are enumerated below :

- (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 characterized 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.
- (ii) **Batch process :** Batch processing is used when a moderate volume of goods or services is required and also a moderate variety in products or services. A batch process differs from the job process with respect to volume and variety in batch processing, volumes are higher because same or similar products or services are repeatedly provided, examples of products produced in batches include paint, ice cream, soft drinks, books and magazines.
- (iii) **Repetitive process :** This is used when higher volumes of more standardised goods or services are needed. This type of process is characterised by slight flexibility of equipment (as products are standardised) and generally low labour skills. Products produced include automobiles, home appliances, television sets, computers, toys etc. This kind of process is suitable to "manufacture-to- stock" strategy with standard products held in finished goods inventory. However, "assemble-to-order" strategy and "mass customisation" are also possible in repetitive process.
- (iv) **Continuous process :** This is used when a very highly standardised product is desired in high volumes. These systems have almost no variety in output and hence there is no need for equipment flexibility. A continuous process is the extreme end of high volume, standardised production with rigid line flows. Examples of products made in continuous process systems include petroleum products, steel, sugar, flour, paper, cement, fertilisers etc.
- (v) **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.

3. (a)

Basic types of production control:

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.

(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. Thus, production control in batch-system of control operates with a set of

3. (b)

(a) Regression equation of y on x is

$$Y = 5 + 3.25 X$$

(b) (i) Maintenance Cost for Age of Cars of 10 years : Rs 37,500

(ii) Age of Car in Years for Maintenance Cost of Rs 50000 : 13.85 years

4. (a)

Step 1 :

Since the number of Jobs are not equal to the number of Machines, a dummy Machine – 5 is created. The time (in hours) Consumed by any Job for the dummy Machines – 5 is 0.

Machine Job	1	2	3	4	5
A	6	2	5	2	0
B	2	5	8	7	0
C	7	8	6	9	0
D	6	2	3	4	0
E	9	3	8	9	0

Step 2 :

Column Operation

Machine Job	1	2	3	4	5
A	4	0	2	0	0
B	0	3	5	5	0
C	5	6	3	7	0
D	4	0	0	2	0
E	7	1	5	7	0

Here minimum no. of Horizontal and Vertical Straight lines to cover all the Zeros = 4 * order of Matrix (5), So, Solution is non optimal.

STEP - 3 :

Subtract $\perp$ from every uncovered value and add $\perp$ to every value at the intersection of two lines. Draw the number of lines to cover all Zeros.

Improved Matrix

Machine Job	1	2	3	4	5
A	4	0	2	0	1
B	0	3	5	5	1
C	4	5	2	6	0
D	4	0	0	2	1
E	6	0	4	6	0

Here minimum no. of Horizontal and Vertical Straight lines to cover all the Zeros = 5 order of Matrix.

So, the solution is optimal.

Hence the optimal assignment is made in the matrix below.

Machine Job	1	2	3	4	5
A	4	0	2	0	1
B	0	3	5	5	1
C	4	5	2	6	0
D	4	0	0	2	1
E	6	0	4	6	0

The optimal assignment and corresponding Time are as follows :

Jobs	Machine	Time (in hours)
A	4	2
B	1	2
C	5 (Dummy)	0
D	3	3
E	2	3
		10

Minimum Time is 10 hours and Unassigned Job is C.

4. (b)

- The expected number of Machines in the repair Shop : = 1 Machine
- The expected number of Machines in the shop in which the Machinist has not started to work : = 0.50 Machine
- The average down time (Waiting for Repairs) per Machine : = 2 Hours after failing
- Average time a Machine waits for Service : = 1 Hour

5. (a)

- No. of light bulbs to be replaced every month = 299 bulbs.
- The average monthly cost of the individual replacement = Rs. 29900
- Group replacement : Initial Cost = Rs. 20000

The optimum replacement cycle under Group replacement is given under:

Month	No. of light bulbs to be replaced	Monthly cost of Individual replacement @ Rs. 100 / bulb (Rs.)	Cumulative cost of Individual replacement (Rs.)	Total cost of individual replacement as well as Group replacement (Rs.)	Average monthly cost (Rs.)
1.	100	10000	10000	30000	30000
2.	160	16000	26000	46000	23000
3.	281	28100	54100	74100	24700
4.	377	37700	91800	111800	27950
5.	350	35000	126800	146800	29360

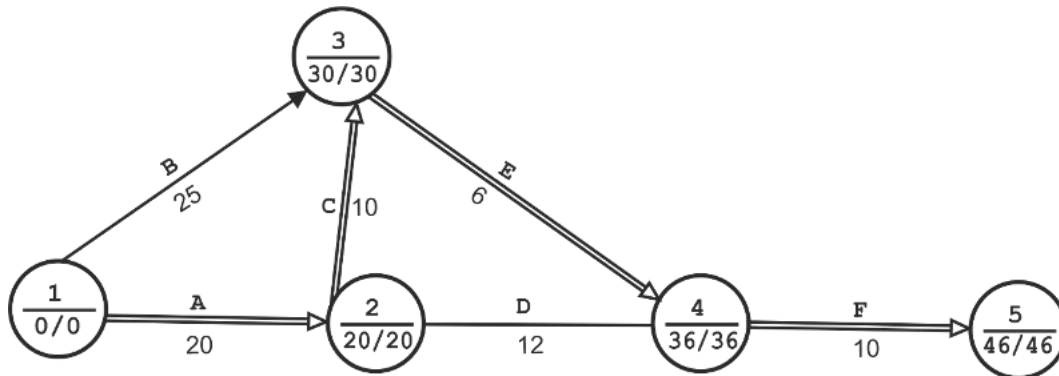
Since the Average Cost as stated Supra is lowest in 2nd Month the optimal interval i.e. replacement is in 2 months. So the Management of BB Hotel should replace all light bulbs in every two months. Further since the average Cost (Rs 23000) is less than Rs 29900 of individual replacement, the Group Replacement Policy is economical and better.

5. (b)

(i) Expected Time (in days).

Activity and Identification		(a)	(m)	(b)	$te = \frac{a + 4m + b}{6}$
A	1 – 2	15	20	25	20
B	1 – 3	20	25	30	25
C	2 – 3	6	10	14	10
D	2 – 4	8	12	16	12
E	3 – 4	2	6	10	6
F	4 – 5	6	10	14	10

(ii)



(iii) Critical Path with duration of the project :

(A – C – E – F) 1 – 2 – 3 – 4 – 5 and duration 46 days.

The floats for each Activity are assessed below :

Activity and Identification		Expected Time	EST	EFT	LST	LFT	Flats	
							Total	Free (TF – HS)
A	1 – 2	20	0	20	0	20	0	0
B	1 – 3	25	0	25	5	30	5	5
C	2 – 3	10	20	30	20	30	0	0
D	2 – 4	12	20	32	24	36	4	4
E	3 – 4	6	30	36	30	35	0	0
F	4 – 5	10	36	46	36	46	0	0

6. (a)

The important issues that need to be kept in mind while setting objectives are as follows :

- Specificity** : Specificity is related to the organisational level for which a set of objectives have been stated. Objectives may be stated at different levels of specificity. At one extreme they might be very broadly stated goals and on the other extreme it may be translated into performance targets.
- Multiplicity** : The issue of multiplicity arise from the fact that it is rare for an organisation to work on a single objective or a few objectives. Since objectives deal with a large number of functional areas, a large number of them have to be formulated to cover the diverse aspects of the organisation's functioning.

- (iii) **Periodicity** : Objectives may be set for different time frame. It is possible to set long term, medium term and short term objectives. Normally organisations determine objectives for the long term and the short term. These different time frame of objectives need to be integrated with each other in order to achieve the desired result.
- (iv) **Verifiability** : The issue of verifiability revolves around the question of deciding whether an objective has been met or not. Moreover, linked to verifiability is the concept of quantification. A definite way to measure an objective is to quantify it. In cases where objectives cannot be quantified, qualitative objectives may be set.
- (v) **Reality** : It is often found that organisations have two set of objectives namely, official and operative. While the official objectives are those which the organisation professes to attain, the operative objectives are those which they seek to attain in reality. For example developing human resource is the official objective of most of the organisations.
- (vi) **Quality** : The capability of an objective to provide a specific direction and a tangible basis for evaluating performance determines the quality of an objective. For example stating that "to increase revenue" is considered to be a bad objective as it lacks the element of measurability.

6. (b)

The demerits of Cloud computing are enumerated below :

- (i) **Cloud Security** : There is clear lack of transparency regarding how and where sensitive information entrusted to the cloud provider is handled. When relying on the cloud, organisations risk data breaches, hacking of APIs and interfaces, compromised credentials and authentication issues.
- (ii) **Costs unpredictability** : The concept pay-as-you-go subscription plans for cloud use, along with scaling resources to accommodate fluctuating workload demands, can make it tough to define and predict final costs.
- (iii) **Lack of capability and expertise** : With cloud-supporting technologies rapidly advancing, organisations are struggling to keep up with the growing demand for tools and employees with the proper skill sets and knowledge needed to architect, deploy and manage workloads and data in a cloud.
- (iv) **IT Governance** : The emphasis on do-it-yourself capability in cloud computing can make IT Governance difficult, as there is no control over provisioning, de provisioning and management of infrastructure operations.
- (v) **Compliance with Industry laws** : When transferring data from on-premises local storage into cloud storage, it can be difficult to manage compliance in the industry regulation through a third party.
- (vi) **Management of multiple clouds** : Every cloud is different, so multi-cloud deployments can dis-join efforts to address more general cloud computing challenges.
- (vii) **Cloud Performance** : Network and providers outages can interfere with productivity and disrupt business processes if organisations are not prepared with contingency plans.
- (viii) **Building a private Cloud** : Architecting, building and managing private clouds whether for its own purpose or for a hybrid cloud goal can be a daunting task for IT Department, and staff.
- (ix) **Cloud migration** : The process of moving applications and other data to a cloud Infrastructure often causes complications. Migration projects frequently take longer than anticipated and go-over budget.
- (x) **Vendor Lock-in** : Switching between cloud providers can cause significant Issues. This includes Technical incompatibilities, legal and regulatory limitations and substantial costs incurred from sizable data migrations.

7. (a)

The various Mechanisms that may be employed for identifying the strategic alternatives in the medium and large organisations are examined as follows :

- (i) **Brainstorming Sessions :** In most organizations, strategic alternatives are identified during brainstorming sessions of top management and key executives. In such meetings, participants generate a number of alternatives. At this stage, no importance is given to the relative merits and demerits of the options. In the next stage, each alternative is reviewed and subjected to close scrutiny. The alternatives which are considered fairly appealing are further examined and analyzed for final selection.
- (ii) **Special Meetings :** Some large organizations may hold special meetings of top executives away from their work, in a hotel or a holiday resort. This is to ensure that the process of thinking is not disturbed by interruptions during the course of deliberations. The participants present different alternative scenarios along with their recommended courses of action. Depending on the assumptions and future trends, each course of action is discussed and attempts are made to finalize the best options for further analysis.
- (iii) **Outside Consultants :** Some organizations may engage the services of an outside consultant to handle the process of generating alternative strategies. The premise is that an outsider can observe the phenomenon objectively and dispassionately, and bring in his own expertise into the process. The outside viewpoint is expected to be new and fresh, and thus can show up many new opportunities to the organization.
- (iv) **Joint Meetings :** Another useful way of generating alternatives is to hire the services of a consultant and also associate some internal members in the process. This method has the advantage of blending the new ideas contributed by the outside consultants with workable solutions from within the organization.

7. (b)

The activities involved in Value Chain can be broadly divided into two types namely, primary activities and secondary or support activities.

The following are the Primary activities :

- (i) Inbound logistics are activities concerned with receiving; storing and distributing inputs to the product or service including materials handling, stock control, transport, etc.
- (ii) Operations transform these inputs into the final product or service. Operations include machining, packaging, assembly, testing, etc.
- (iii) Outbound logistics collect, store and distribute the product to customers, for example warehousing, materials handling, distribution, etc.
- (iv) Marketing and sales provide the means whereby consumers / users are made aware of the product or service and are able to purchase it. This includes sales administration, advertising and selling.
- (v) Service includes those activities that enhance or maintain the value of product or service, such as installation, repair, training and spares.

Support activities help to improve the effectiveness or efficiency of primary activities. The following are the support or secondary activities:

- (i) **Procurement :** It refers to the processes that occur in many parts of the organisation for acquiring the various resource inputs to the primary activities.
- (ii) **Technology development :** All value activities have a 'technology', even if it is just know-how. Technologies may be concerned directly with a product or with processes or with a particular resource.

- (iii) **Human resource management** : This transcends all primary activities. It is concerned with those activities involved in recruiting, managing, training, developing and rewarding people within the organisation.
- (iv) **Infrastructure** : The formal systems of planning, finance, quality control, information management, and the structures and routines that are part of an organisation's culture.

8. (a)

The following guidelines are recommended for proper Control. (Any Seven)

- (i) Control should involve only the minimum amount of information needed to give a reliable picture of events: Too many controls create confusion. Focus on the strategic factors by following Pareto's 80/20 rule: Monitor those 20% of the factors determines 80% of the results.
- (ii) Control must be reasonable Frequent reporting and rapid reporting may frustrate control.
- (iii) Controls do not work unless they are acceptable to those who apply them.
- (iv) Controls should monitor only meaningful activities and results, regardless of measurement difficulty: If cooperation between divisions is important to corporate performance, some form of qualitative or quantitative measure should be established to monitor cooperation.
- (v) Controls must be flexible to take care of changing circumstances.
- (vi) Controls should be timely so that corrective action can be taken before it is too late: Steering controls, controls that monitor or measure the factors influencing performance, should be stressed so that advance notice of problems is given.
- (vii) Long-term and short-term controls should be used: If only short-term measures are emphasized, a short-term managerial orientation is likely.
- (viii) Controls should aim at pinpointing exceptions: Only activities or results that fall outside a predetermined tolerance range should call for action.
- (ix) Emphasize the reward of meeting or exceeding standards rather than punishment for failing to meet standards : Heavy punishment of failure typically results in goal displacement. Managers will fudge reports and lobby for lower standards.

8. (b)

Some of the areas that have the ability to create Goal Congruence are stated below :

(i) **Communication and Understanding –**

Channels of communication and how goals are perceived are important to achieve goal congruence. Operational managers have a responsibility of being aware as to what actions are desirable and what goals are to be achieved. It should be understood that the communication of different goals can occur through informal channels, which involves meetings and face to face interactions, or through formal channels including budgets or other financial documents.

(ii) **Create direction –**

One of the reasons for lack of goal congruence is the absence of direction related to employees' behaviour. Performance management and goals facilitate efficient communication about what managers want their subordinates to focus on. It needs no mention that providing clear information and direction, employees can better understand what is expected from them, how to perform adequately, and how to contribute effectively to the achievement of the organisational goal.

(iii) **Motivation –**

The problem of motivation can exist even though employees have knowledge about how to perform adequately because employees can act in their own self interest instead of in the

organisation's best interest. The employees can make their own performance report better by allocating resources without befitting the organisation as a whole. One of the strongest reasons for demotivation among employees and managers is dislike for the work allocated. The reason for motivation varies among employees. While some employees feel motivated for some recognition and appraisals others may feel motivated because of commitment and responsibility without any required pay off. The more motivated the employees of the organisation the better will be the goal congruence.

(iv) Incentives –

In order to increase the likelihood of employees working to achieve their individual goals, organisation's aim to influence motivation by providing incentives. Research suggests that individuals tend to perform better when they are rewarded. Rewards and compensations should create goal congruence between individual goals and organisational goals by stimulating individuals to perform by providing incentives, as rewards are related to increased effort.

(v) Connection

It is very important to create a connection between goals, performance measures and incentives. In order to align the employees' self-interest and overall organisational objectives it is necessary to relate incentives with performance.
