

Roll No: -----



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

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|--------------------------|---|-------------------|---------|
| Program | : BBA-AIS-GEN | Semester | : II |
| Subject (Course): | Operations & Materials Management (OMM) | Max. Marks | : 100 |
| Course Code | : LSCM 1002 | Duration | : 3 Hrs |
| No. of page/s | : 4 | | |

Section A [This section comprises of objective answer type questions.]

1. Answer all questions. [20 Marks]
 - i. Does the elements of operations management find applications in managing supply chains? [Yes / No] [1]
 - ii. Suggest two options to follow when a situation arises before a operations head of a business that the product demand is greater than the production capacity? [1]
 - iii. In a situation where, by maintaining proximity to your market, your company is away from suppliers; and vice versa. What should be the location choice, why? [1]
 - iv. The principles of analyzing the efficiency of a manufacturing location is equally applicable to a service location. [True / False] [1]
 - v. The principles of analyzing the efficiency of a manufacturing layout is equally applicable to a service layout. [True / False] [1]
 - vi. Write the mathematical expression for productivity. [1]
 - vii. Competition and competitiveness are same. [True / False] [1]
 - viii. Define EOQ [1]
 - ix. What are the three types of automations? [1]
 - x. ERP stands for _____ . [1]

- xi. JIT stands for _____. [1]
- xii. MPS stands for _____. [1]
- xiii. AGVS stands for _____. [1]
- xiv. ISO stands for _____. [1]
- xv. Services never include goods and goods never include services. [True or False][1]
- xvi. SRM stands for _____. [1]
- xvii. How OM interacts with HRM area? Show at least two activities. [1]
- xviii. What do you mean by 'development speed'? [1]
- xix. _____ type of production deals with highest variety of production. [1]
- xx. What are the dimensions of operations strategies to achieve competitiveness? [1]

Section B [This section comprises of short answer type questions.]

2. Answer four questions. [5 x 4 = 20 Marks]
- i. The following information is available on 2 vendors: X and Y. Using the data below, determine the best source of supply under weighed-point method and substantiate your solution.
Vendor X: Delivered 50 lots of which 2 were rejected; 3 were not in time.
Vendor Y: Supplied 40 lots of which 3 were rejected; 2 were late.
[Assign 40 weights for quality and 30 weights for service.]
 - ii. Find out the standard time at a workshop where the following data is observed:
Average time for machine elements = 16 min.
Average time for manual elements = 14 min.
Performance rating = 110%
Allowances = 10%
 - iii. Write a short note on 'Ergonomics'.
 - iv. How do the quality control tools work, explain any two QC tools.

- v. With the following data pertaining to two locations and their factors, decide which one is better?

| Sl. No. | Factors | Weightage | Rating of Location-A | Rating of Location-B |
|---------|----------------------------|-----------|----------------------|----------------------|
| 1 | Facility utilization | 25 | 3 | 5 |
| 2 | Total service turnover | 25 | 4 | 3 |
| 3 | Scope for rush orders | 25 | 3 | 3 |
| 4 | Land and construction cost | 15 | 1 | 2 |
| 5 | Employee availability | 10 | 5 | 3 |

- vi. Draw the network diagram. Show the critical path on it. Calculate the project duration.

| Task | Immediate Predecessors | Task Time |
|------|------------------------|-----------|
| A | None | 6 |
| B | None | 4 |
| C | A | 12 |
| D | A | 5 |
| E | C | 11 |
| F | D | 6 |
| G | B | 9 |
| H | E,F | 4 |
| I | G,H | 19 |

Section C [This section comprises of long answer type questions.]

3. Answer three questions. [10 x 3 = 30 Marks]
- Explain how a company can gain competitive advantage through the operations management. Explain how the automation strategy may be advantageous and/or disadvantageous to a manufacturing company.
 - What is the difference between quality inspection and quality assurance? Whether TQM is governed by the quality inspection or quality assurance approach.
 - Explain how a facility location is selected with reference to various scenarios and techniques.
 - Describe the functions of materials management highlighting the JIT approach wherever applicable.

- v. What are the ten basic functions of PPC? Explain them. What is the difference between breakdown maintenance and preventive maintenance? When those are conducted in which phases of PPC?
- vi. List and explain four types of production systems.

Section D [Analyze the case and answer the related questions.]

[30 Marks]

CASE STUDY

M/s ABC Manufacturing Enterprise located in northern part of India is into the business of manufacturing components for the automobile sector. For the first few years, the firm did not do well in its business and its sales in the market showed downward trend. The Chief Executive Officer, Mr Prakash, wants to determine the actual cause of the low sales over the period and to understand the cause of low growth rate. Mr Prakash hired a consultant to diagnose whether the low growth was due to low demand in the market or due to ineffective utilization of resources. The consultant calculated the productivity and other partial productivities of the firm.

Table 17.6 Input and Output Data

| Quantity | | Period 1 | | | Period 2 | | |
|----------|-----------------|----------|-------|----------|----------|-------|--------|
| | | Price | Value | Quantity | Price | Value | |
| Output | Product 1 | 1500 | 20 | 30,000 | 110 | 350 | 38,500 |
| | Product 2 | 190 | 100 | 19,000 | 160 | 100 | 16,000 |
| Input | Labour | | | | | | |
| | Labour 1 | 1000 | 15 | 15,000 | 2,500 | 7 | 17500 |
| | Labour 2 | 300 | 12 | 3,600 | 1000 | 4 | 4,000 |
| | Material | | | | | | |
| | Material 1 | 6,000 | 1 | 6,000 | 7,000 | 1.3 | 9,100 |
| | Material 2 | 400 | 3 | 1,200 | 150 | 7.5 | 1,125 |
| | Material 3 | 600 | 1 | 600 | 200 | 4.5 | 900 |
| | Energy | | | | | | |
| | Energy 1 | 1000 | 1.5 | 1,500 | 800 | 2.0 | 1,600 |
| | Energy 2 | 2000 | 0.1 | 200 | 100 | 2.75 | 275 |
| | Capital | | | | | | |
| | Depreciation | 100,000 | 0.10 | 10,000 | 100,000 | 0.10 | 10,000 |
| | Return | 150,000 | 0.073 | 10,900 | 180,000 | 0.073 | 13,140 |

Discussion Questions

1. Calculate all possible partial productivity.
2. Calculate the total factor productivity and productivity index.
3. Comment on the growth of the firm based on the above productivity calculations.

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Section A [This section comprises of objective answer type questions.]

1. Answer all questions. [20 Marks]
 - i. Give an example of input-output transformation in a manufacturing industry. [1]
 - ii. Give an example of input-output transformation in a service industry. [1]
 - iii. In a situation where, by maintaining proximity to your market, your company is away from suppliers; and vice versa. What should be the location choice, why? [1]
 - iv. What are the components of IPO model? [1]
 - v. Production and productivity are same. [True / False] [1]
 - vi. What are the cost components for determining the EOQ? [1]
 - vii. What are the three types of wastes? [1]
 - viii. MRP stands for _____. [1]
 - ix. PPC stands for _____. [1]
 - x. ASRS stands for _____. [1]
 - xi. TQM stands for _____. [1]
 - xii. Write the mathematical expression for capacity utilization. [1]

- xiii. What is the difference between the input and resource in the IPO model of operations management? [1]
- xiv. Film and Television industry does _____ type of transformation through their services.
- xv. CRM stands for _____. [1]
- xvi. How OM interacts with Finance area? Show at least two activities. [1]
- xvii. What do you understand by 'low cost operation' strategy? [1]
- xviii. Calculate the productivity of a service manager who handles 30 customers worth Rs.20,000 per each customer in average in a month, while drawing a salary of Rs.60,000 pm.
- xix. _____ type of production deals with highest volume of production. [1]
- xx. What are the dimensions of operations strategies to achieve competitiveness? [1]

Section B [This section comprises of short answer type questions.]

2. Answer four questions. [5 x 4 = 20 Marks]

- i. With the following tabulated cost data for three locations, decide which one is better for an order size of 2,20,000 units.

| | Location X | Location Y | Location Z |
|---------------------|------------|------------|------------|
| Fixed Cost (Rs.) | 1,20,000 | 3,20,000 | 9,00,000 |
| Variable Cost (Rs.) | 12 | 10 | 8 |

- ii. The following information is available on 2 vendors: X and Y. Using the data below, determine the best source of supply under weighed-point method and substantiate your solution.

Vendor X: Delivered 40 lots of which 3 were rejected; 2 were late.

Vendor Y: Supplied 50 lots of which 2 were rejected; 3 were not in time.

[Give 40 for quality and 30 weights for service.]

- iii. List and explain the four types of layouts.

- iv. How do the quality control tools work, explain any two QC tools.
- v. Draw the network diagram. Show the critical path on it. Calculate the project duration.

| Task | Immediate Predecessors | Task Time |
|------|------------------------|-----------|
| A | None | 6 |
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| G | B | 9 |
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| I | G,H | 19 |

- vi. What is the difference between predictive and productive maintenance?

Section C [This section comprises of long answer type questions.]

3. Answer three questions. [10 x 3 = 30 Marks]
- i. Explain how a company can gain competitive advantage other than the quality driven operations. Which technique of quality management will be a competitive advantage to a company – quality inspection and quality assurance?
 - ii. Write short notes on Quality Circle; TQM and MRP.
 - iii. Explain how a facility location is selected with reference to various scenarios and techniques.
 - iv. Describe the functions of materials management highlighting the JIT approach wherever applicable.
 - v. What are the ten basic functions of PPC? Explain them.

Short case **Ecologically smart**²

When Daimler-Chrysler started to examine the feasibility of the Smart town car, the challenge was not just to examine the economic feasibility of the product but also to build in environmental sensitivity to the design of the product and the process that was to make it. This is why environmental protection is now a fundamental part of all production activities in the company's 'Smartville' plant at Hambach near France's border with Germany.

The product itself is designed on environmentally compatible principles. Even before assembly starts, the product's disassembly must be considered. In fact, the modular construction of the Smart car helped to guarantee economical dismantling at the end of its life. This also helps with the recycling of materials. Over 85 per cent of the Smart's components are recyclable and recycled material is used in its initial construction. For example, the Smart's instrument panel comprises 12 per cent recycled plastic material. Similarly, production processes are designed to be ecologically sustainable. The plant's environmentally friendly painting technique allows less paint to be used while maintaining a high quality of protection. It also involves no solvent emission and no hazardous waste, as well as the recycling of surplus material. But it is not only the use of new technology that contributes to the plant's ecological credentials. Ensuring a smooth and efficient movement of materials within the plant also saves time, effort and, above all, energy. So, traffic flow outside and through the building has been optimized, buildings are made accessible to suppliers delivering to the plant and



Source: SmartCar, DaimlerChrysler UK Limited

conveyor systems are designed to be loaded equally in both directions so as to avoid empty runs. The company even claims that the buildings themselves are a model for ecological compatibility. No construction materials contain formaldehyde or CFCs and the outside of the buildings are lined with 'TRESPA', a raw material made from European timber that is quick to regenerate.

Questions

- 1 What are the various objectives that the Smart car's manufacturing processes must achieve?
- 2 Which do you think are the most important objectives?
- 3 By 2006 the Smart car was still not profitable for Daimler-Chrysler. Does this necessarily mean that some process objectives were neglected?