

**UNIVERSITY OF PETROLEUM
AND ENERGY STUDIES**



End Semester Examination, May 2017

Program/course:	MBA (Business Analytics)	Max. Marks	: 100
Semester –	II	Duration	: 3 Hrs.
Subject:	OMM		
Code :	MBCQ 722		
No. of page/s:	6		

Section A

[20 Qs x 2 Marks = 20 Marks]

1. Answer all questions of this section.

- (i) What the companies should do in the modern global business operations? [suggest right answer(s)]
 - a) Committed to customers
 - b) Exceptional quality
 - c) Low price
 - d) Launching innovative products for the customers
- (ii) Lower production cost often enables the manufacturer to gain advantage over the competitors. [True / False]
- (iii) Which of the following would not be a competitive priority?
 - a) Flexibility
 - b) Low production costs
 - c) Fast and steady delivery
 - d) High advertising expenditures
- (iv) _____ is a technique used for a short-range forecasting that constructs a new forecast for the next period with the help of last period's actual and forecast values. [Fill in the blank]
- (v) In _____ type of production the products/services follow direct linear paths without backtracking or sidetracking. [Fill in the blank]
- (vi) A form of production known as _____ is based on a coding system for parts that allows families of parts to be assigned to manufacturing cells for production. [Fill in the blank]
- (vii) A measure that relates output measure to inputs available is _____. [Fill in the blank]
- (viii) _____ type of layouts are designed to accommodate processing one or a few variety of related products.
- (ix) A layout for the production of variety of non-standard products in relatively small batches is _____. [Fill in the blank]

- (x) The phasing-in of new products to replace the older and declining products is one way of expanding capacity. [True / False]
- (xi) All things being equal, facilities with higher best operating levels require greater investments. [True / False]
- (xii) The design and layout of buildings must be integrated with the design of the material-handling system. [True / False]
- (xiii) A fixed position layout minimizes movement of materials-handling machines. [True / False]
- (xiv) If two parts require the same machines for production, it is an indication that they have similar production operations and therefore are good candidates for cellular manufacturing. [True / False]
- (xv) Which of the following is not a capacity expansion technique? [Select the right answer.]
 - a) Acquiring other companies' facilities or resources
 - b) Reactivating facilities on standby status
 - c) Expanding, updating, or modifying the existing facilities
 - d) Developing and phasing in new products as other products decline
- (xvi) A layout that typically recommends using specialized machines is a _____. [Select right answer]
 - a) Product layout
 - b) Process layout
 - c) Hybrid layout
 - d) Fixed position layout
- (xvii) Process layout is also known as: [select the right answer(s)]
 - a) Group layout
 - b) Combined layout
 - c) Functional layout
 - d) Line layout
- (xviii) Which type of layout to be opted by a firm engaged in manufacturing a very large or bulky product?
- (xix) Which type of layout should be opted by a service organization like a civil hospital?
- (xx) Who amongst the following has contributed the scientific management principles?
 - a) F W Taylor
 - b) Peter Drucker
 - c) Henry Gantt
 - d) Elton Mayo

Section B

[4 Qs x 5 Marks = 20 Marks]

2. Answer any four questions of this section.

- (i) Three production processes- P1, P2 and P3 have the following cost structure (see table). Which is the most economical process for a production volume of 8,000 units?

Process	Fixed Cost per year (in \$)	Variable cost per unit (in \$)
P1	120,000	3.00
P2	90,000	4.00
P3	80,000	4.50

- (ii) Delta Inc. has been experiencing imbalances in its inventory of components used in the production of computer printers. Both stock shortages and overstocks are occurring. The production analysis group studied the demand pattern of a component PS24 used in the products. The group wanted to do the material forecasting for all components including PS24. The group of analysts believes that the most recent data for 12 weeks as the true representative for future weekly demand study.

Weeks	1	2	3	4	5	6	7	8	9	10	11	12
Demand	159	217	186	161	173	157	203	195	188	168	198	159

- a) Use the 4-week moving average method to and forecast for the component PS24 for 13th week.
 b) Use the 4-week weighted moving average method and weights 0.4 (most recent), 0.3, 0.2 and 0.1 to forecast the demand of PS24 in the 13th week.

- (iii) What is value chain? Explain operations management with value chain perspectives.

- (iv) A project, under subcontract, is planned for execution as per the precedence table given below. Maximum duration for the project was 3 months. Keeping the project costs in mind, the project manager is interested to know the probability of exceeding the project period for more than 2 months. As a business analyst, calculate the probability to inform the project manager.

Project Tasks	Optimistic Time (days)	Most Likely Time (days)	Pessimistic Time (days)
A	3	6	15
B	2	4	14
C	6	12	30
D	2	5	8
E	5	11	17
F	3	6	15
G	3	9	27
H	1	4	7
I	4	19	28

- (v) What is 'flow process chart'? How it helps in doing process analysis and improvement?

- (vi) What are the commonly adopted operation strategies of aggregate planning? Explain in short.

Section C

[3 Qs x 10 Marks = 30 Marks]

3. Answer any three questions

- (i) John, the director of materials management for CPC Inc. is in the process of reviewing next year's plan for the supply of component currently purchased from Osiega (Japan).

John received the supply offer from another manufacturer, Spier (Atlanta). Then, he wanted to review the 'make-or-buy' decision for the component. CPC pays more than \$7 million per year towards this. John's purchasing-analysis staff has developed the following estimates:

Source	Description of Cost Elements	Annual Fixed Costs	Variable Cost per Unit
MAKE in-house at CPC	Annual tooling	\$70,000	
	Inspection and rework		\$00.55
	Shipping		\$00.25
	Production costs	\$5,000	\$11.50
BUY from Osiega (Japan)	Annual tooling	\$50,000	
	Inspection and rework		\$00.16
	Shipping		\$00.95
	Purchase price		\$11.88
BUY from Spier (Atlanta)	Annual tooling	\$95,000	
	Inspection and rework		\$01.05
	Shipping		\$00.15
	Purchase price		\$10.59

The purchasing-analysis group has learned that CPC will need about 550,000 components next year.

- a) If, Mr. John decides on total cost comparison, which source would be preferred for the next year – MAKE or BUY (Osiega or Spier) ?
- b) While taking the above decision, Mr. John used break-even-analysis to check the suitability of all sources. How many units are seen at different sources as least-cost bidding quantities?
- (ii) Answer both the questions.
- a) Draw a framework of design process from concept to delivery. Explain where in which stages of this process, the 'proof of concept' and 'prototypes' are released?
- b) Explain how design relates 'reliability', 'availability', 'maintainability', and 'serviceability' to make the business operations successful.
- (iii) Answer both parts of the question.
- a) Explain various types of production systems with respect to the volume and variety.
- b) Explain different types of process technologies and their role in building quality of the production processes
- (iv) The time to perform each task and the tasks that must precede are:

Task	A	B	C	D	E	F	G	H	I
Immediately preceding tasks	---	A	B	B	B	B	C,D,E	G,F	H
Task performance time (minutes)	0.15	0.06	0.05	0.12	0.09	0.16	0.08	0.06	0.05

If 300 products are needed per hour and 50 minutes per hour are productive –

- Draw a diagram showing the precedence relationships of the tasks.
 - Compute the cycle time per unit (in minutes).
 - Compute the minimum number of workstations required.
 - Balance the production line by using longest-task-time heuristic.
 - Evaluate your proposed solution.
- (v) Find the optimal sequence and makespan for 4 jobs to be processed on 4-machines by following CDS heuristic to a multistage Johnson's rule based problem, as per the data given below.

Jobs	Processing time			
	Machine-1	Machine-2	Machine-3	Machine-4
A	2	3	7	8
B	3	7	3	5
C	1	2	4	7
D	3	4	3	4

4. Answer the case-study with both analytical and logical thinking. Mention the assumptions, if any.

CASE: Use RFID tags to Improve Inventory Management process

Companies are constantly looking to innovate to manage their inventory to improve forecasts and make smart decisions about replenishments of their stock. Wal-Mart in January 2005 mandated that its top 100 suppliers use RFID labels on all their shipments. Radio Frequency Identification (RFID) is an electronic tag that is attached to an object. The tag when read will automatically identify the object and transfer the information about the object to a secure system. RFID thus has immense potential in terms of managing inventory. Stock keeping by recording items coming into a warehouse, pushing it onto the floor, and through checkout was a manual process that RFID can now automate. This results in significant savings in labor and time. In this post, I will highlight the benefits of using RFID for inventory management and its applications in the retail industry.

Tagging shipments with RFID is achievable; however, a Dutch bookstore took tagging one step further to the item-level. The retailer invested \$100,000 in RFID technology. This included setting up labels, scanners, readers, and antennas. The retailer saw improvements in lost inventory since it was able to track every book, and was also able to provide in-stock status to customers at kiosks installed within stores. This investment thus enabled the retailer to provide a great customer experience, while using the data to make smart decisions about replenishments.

As another example, Levis Strauss & Co, Mexico ran a pilot program with RFID. It tagged each pair of jeans, top, and jacket with a label and a human-readable sales price. The challenge involved with every apparel store is to keep track of the back-store inventory, items on the floor, and items in the dressing rooms. With RFID labels in place, the store representatives were able to use a transponder and complete a inventory status check in an hour, a process that used to take them over two hours. When the product was sold, the label was read off, and thus company executives were even able to keep a track of what's selling at all times. The RFID pilot program is said to have improved sales and the project was expected to be rolled out to other retail stores for good inventory management.

Jewelry business is challenging due to the value of every rare stone that is being sold in the stores. A jeweler in Indiana who is also an importer of diamonds and colored stones implemented RFID technology to keep track of inventory. Before using RFID, the inventory taking process meant manually counting every item which meant that the process was highly prone to manual error. The errors were intolerable since the items being counted are expensive and highly valuable in nature. Inventory taking was extremely time consuming and resulted in high labor costs. Implementing RFID technology cost the retailer \$15,000, however, the retailer views this as a one-time investment and believes that this technology will drastically reduce time and result in a lot of labor savings.

RFID is a heavy investment that retailers need to make. However, the benefits of using this technology make the investment worth its money. Some of the benefits a retailer could gain from using RFID are as follows –

- Improvements in productivity at various touch points of the item from warehouse to distribution centers to point of sale as there is a clear visibility of the items at every point.
- Significant reductions in out-of-stock situations as the system can alert the operations teams and take the necessary replenishments decisions.

There is a reduction in shrinkage and errors encountered during the supply chain.

Questions:

- (i) Having given examples of books, apparel, jewelry, can you think of other areas in which RFID technology can really improve inventory management process for retailers?
- (ii) Do you think it is worth investing in RFID technology given the high costs associated with it?
- (iii) Can a strong business case be built around using RFID technology to collect data, observe trends, and improve forecasting techniques for retailers which might convince them to invest in this technology?

[Source (adapted from): Chandar, S. (2012), <http://cmuscm.blogspot.in/>]