

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MBA – SEMESTER 02– • EXAMINATION – SUMMER 2016

Subject Code: 2820006

Date: 27/05/2016

Subject Name: Production and Operations Management (POM)

Time: 10.30 am to 01.30 pm

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

Q 1 (a) Answer the following questions by selecting the right options (06)

1. Four common types of control charts include all the following except:
 - a. X bar chart
 - b. T chart
 - c. P chart
 - d. C chart
2. Which of the following is not an event or concept associated with the quality revolution?
 - a. TQM (total quality management)
 - b. PERT/CPM
 - c. Business process reengineering
 - d. JIT
3. A _____ layout encourages customer familiarity, has low costs, and is easy to clean.
 - a. free flow layout
 - b. grid layout
 - c. spine layout
 - d. loop layout
4. _____ demand items are used in the process of producing a final product.
 - a. Dependent
 - b. Independent
 - c. Seasonal
 - d. Cyclical
5. Which of the following is not used to calculate probabilistic time estimates?
 - a. optimistic
 - b. most likely
 - c. least likely
 - d. pessimistic
6. The process of breaking an aggregate plan into more detailed plans is referred to as
 - a. collaborative planning
 - b. hierarchical planning
 - c. disaggregation
 - d. rough-cut planning

Q 1 (b) Give the definition of the following terms (04)

1. Demonstrated Capacity
2. Total Quality Management (TQM)
3. Periodic Inventory System
4. Business Process Reengineering (BPR)

Q 1 (c) Explain the term PERT & CPM with context to Project Management. Give the example of projects where they would be applicable. (04)

Q 2 (a) Discuss the strategies to adjust capacity and manage demand along with examples. (07)

Q 2 (b) What is EOQ? Explain how order quantity is determined using the basic Economic Order Quantity Model. (07)

OR

Q 2 (b) As a project manager of a large petrochemical refinery, how will you select the appropriate location of a plant? Discuss various factors affecting your decision. (07)

Q 3 (a) What do you mean by Six Sigma? Explain the various analytical tools associated with Six Sigma. (07)

Q 3 (b) The Basic Block Company needs to produce 4000 boxes of blocks per 40 hour week to meet the upcoming holiday demand. The process of making blocks can be broken down into six work elements. The precedence and time requirements for each element are as follows. Draw and label a precedence diagram for the production process. Set up a balanced assembly line and calculate the efficiency of the line. (07)

Work Element	Precedence	Performance Time (Min)
A	-	0.10
B	A	0.40
C	A	0.50
D	-	0.20
E	C,D	0.60
F	B,E	0.40

OR

Q 3 (a) Explain the different types of layout. Additionally differentiate between product and process layout. (07)

Q 3 (b) I-75 Discount Carpet manufactures Cascade Carpet, which it sells in its adjoining showroom store near the interstate. Estimated annual demand is 20000 yards of carpet with an annual carrying cost of \$2.75 per yard. The manufacturing facility operates the same 360 days the store is open and produces 400 yards of carpet per day. The cost of setting up the manufacturing process for the production run is \$720. Determine the optimal order size, total inventory cost, length of the time to receive an order, and maximum inventory level. (07)

Q 4 (a) Discuss material handling principles and classify material handling equipments. (07)

Q 4 (b) The following table provides the information necessary to construct a project network and project crash data

Activity	Predecessor	Activity Time (Weeks)		Activity Cost (\$)	
		Normal	Crash	Normal	Crash
A	-	16	8	2000	4000
B	-	14	9	1000	1800
C	A	8	6	500	700
D	A	5	4	600	1300
E	B	4	2	1500	3000
F	B	6	4	800	1600
G	C	10	7	3000	4500
H	D,E	15	10	5000	8000

Construct the project network, and crash the network so G and H complete at the same time of 22 weeks. Also calculate the total crash cost. (07)

OR

Q 4 (a) What is Statistical Process Control (SPC) in Quality Management? Explain the difference between attribute control charts and variable control charts. Elaborate with examples how SPC is applied in case of services. (07)

Q 4 (b) Differentiate between production and operation. Additionally explain in detail the objectives and functions of production planning and control. (07)

Q 5 The Shanghai Textile Mill was inspected and found to be in violation of a number of safety regulations. The inspectors ordered the mill to alter some existing machinery to make it safe and relocate some machinery to make safer passages and unobstructed entrances and exits. The inspector gave the mill only 35 weeks to make the changes; if the changes were not made by then, the mill would be fined \$300000. The mill determined the activities in PERT network that would have to be completed and then estimated the indicated activity times, as shown in the table below:

Activity	Description	Predecessor	Time (Weeks)		
			a	m	b
A	Order new machine	-	1	2	4
B	Plan new layout	-	2	5	8
C	Deter safety changes	-	1	3	7
D	Receive equipments	A	5	10	23
E	Hire new employees	A	3	7	12
F	Make plant alterations	B	10	15	18
G	Make change in existing machine	C	7	9	11
H	Train new employees	D,E	2	4	7
I	Install new equipments	D,E,F	2	4	6
J	Relocate old machine	D,E,F,G	4	7	10
K	Conduct employee safety	H,I,J	2	3	4

Construct the PERT network and find the following

- Expected Activity Time
- Earliest / Latest Times / Slack
- Critical Path
- Expected project duration and variance
- The probability that mill would be fined \$300000 (14)

OR

Q 5 Read the following case and answer the question below

(14)

Steve Jobs and Apple

Late Steve Jobs completed the education only till high school when he dropped out from Reed College, Oregon. Another drop out from University of California at Berkley was Stephen Wozniak, who started working for Hewlett-Packard (HP) and came in contact with a summer intern there – Jobs. Wozniak was an engineering wizard, who was influenced by Jobs to quit his job at HP and start a new venture. Thus Apple Computer Corporation was founded by Jobs alongwith Wozniak in 1976 in his car garbage. At that time, nobody had imagined that large computers hitherto confined to scientific installations could be configured for personal use by individuals. The Apple computer designed and created by the duo received orders of 25 units from the local electronics retailer and from thereon, the story of first personal computer was started. Rest is now history.

Apple's approach to designing new products is rather unconventional, as if symbolizing the exotic leadership style of Jobs. If Steve's words, 'Simplicity is the ultimate sophistication.' A typical example is the iPod, which was designed to play the music through a miniature device and do nothing else. The platform strategy is clearly evident in use of OSX operating system in Macintosh, PCs, iPhone, and iPad. In fact, iPad is a natural extension of the iPhone in terms of touch screen and other common user interfaces/applications. This promotes reusability of parts, components, software etc., while ensuring less training on part of existing customers using Apple Products. Future applicability of current products through cross-pollination of internal ideas and technologies is an important aspect of Apple designs. Another facet of its approach is 'participatory design' whereby customers play an active role in design process. In the development stages, the experiences and problems faced by a sample set of customers using a software/product are meticulously observed. The focus then shifts to finding simple yet effective solutions to such problems for improvising the designs. The customer involvement is 'iterative' in nature, that is, there experiences are continually monitored to identify the scope of further improvement. This explains the progressive release of latest versions of products, taking for example iPhone 4 has innovative features such as video calling with Face time, retina display with 960 by 640 resolution, HD video recording, 5 megapixel camera with LED flash, dual-mic noise suppression, and much more. What sets Apple products apart from competition is their aesthetic appeal. The pristine white colour almost becomes synonymous with Apple products with 'snow white skin', when the company introduced vibrant colours in some of its products like iPods. This simply shows the flexibility and dynamism in Apple designs rather than getting trapped in statics of currently successful designs. The future outlook and boldness is clearly hallmark of Apple designs, which always leaves the competition to do lots of catching up.

Experts argue that Apple products are not radical innovations but improvisations of existing products in the market. According to them, neither was iPod the first MP3 player nor was iPhone the first smartphone with a touch screen. iPad was not the first tablet either. The bottom line is that Apple not only learns from its own mistakes, but also from the competitor's mistakes. Apple's mission is not to be the first but clearly to be the best.

Job's idea of innovation in design is aptly captured by his statement below:

‘The system is that there is no system. That doesn’t mean we don’t have process. Apple is a very disciplined company, and we have great processes. But that’s not what it’s about. Process makes you more efficient. But innovation comes from people meeting up in the hallways or calling each other at 10.30 am at night with a new idea, or because they realized something that shoots holes in how we have been thinking about a problem. Its adhoc meetings of six people called by someone who thinks he has figured out the coolest new thing ever and who wants to know what other people think of his idea. And it comes from saying no to thousand things to make sure we don’t get on the wrong track or try to do too much.’

- a. Do you agree with Apple’s strategy of creating their iPad only in two colours- black and white?
- b. Apple’s approach to product development has been to build upon existing technologies. Do you think it is high time that Apple started innovating new technologies on its own?
- c. When asked what consumer and market research Apple had done to guide the development of iPad, its former CEO Late Steve Jobs replied, ‘None. It isn’t the consumer’s job to know what they want.’ Do you agree with this statement from Jobs?