COURSE FILE

PRODUCTION AND OPERATION MANAGEMENT

SL.NO	UNIT	CONTENT	REFERENCES	CASE
1	**I**	**INTRODUCTION**		
2	1	Introduction to Production	**K.ASWATHAPPA**	**CASE – I**
3	1	Introduction to Production Management	**SN CHARY**	**ASSIGNMENT**
4	1	Nature and Scope of Production Management		
5	1	Functions of Production Management		
6	1	Decision Making in Production		
7	1	Historical Development of POM		
8	1	Global Scenario of POM		
9	1	Process of Product Design		
10	1	Basic factor affecting Process Design		
11	1	Phases of Product Design		
12	1	Manufacturing process		
13	1	Value Analysis		
14		Revision of Unit		
15		**CASE:Rover Honda**		
16	**II**	**FACILILITIES MANAGEMENT & AGGREGATE PLANNING**		
17	1	Needs and Steps of Location Decision		**CASE – II**
18	1	Factors affecting Location Decision	**K.ASWATHAPPA**	**ASSIGNMENT**
19	1	Methods of Evaluating Location Alternatives	**SN CHARY**	
20	1	Significance of Layout Choices		
21	1	Principles and Plant Layout		
22	2	Types of Plant Layout		
23	1	Aggregate Planning & Demand Forecasting		
24	1	Specification of Org policies for smoothing capacity utilization		
25	1	Determination of feasible production alternatives		
26		**CASE: Honda's Mixed Model Assemble Line**		
27	**III**	**SCHDULING**		
28	2	Scheduling Job Shop Type Production		**CASE – III**
29	1	Shop Loading	**K.ASWATHAPPA**	**ASSIGNMENT**
30	3	Sequencing, Scheduling in Mass Production	**SN CHARY**	
31	1	Line of Balance		
32	1	Methods of Production Control		
33	1	World Class Production		
34	1	Material Management meaning and definition		
35	1	Function and Scope of Material Management		
36	1	Material requirement planning Source and Supply		
37	1	Vendor Evaluation and Vendor Rating		
39		Revision		
40		**CASE: Baseline Scheduling & Rescheduling**		
41	**IV**	**WORK STUDY & QUALITY MANAGEMENT**		
42	1	Introduction to Work Study	**K.ASWATHAPPA**	**CASE – IV**
43	1	Definition and Objectives of Work Study	**SN CHARY**	**ASSIGNMENT**

44	1	Definition and objectives of Method Study		
45	1	Relationship Between method study and work study		
46	2	Basic work Study Procedure		
47	1	Work Measurement Objectives of Work Measurement		
48	1	Benefits & Techniques of Work Measurement		
49	1	Work Design, and Job Design		
50	1	Industrial Engineering Techniques		
51	1	Quality Management		
52	1	Economies of Quality Assurance		
53	1	Inspection and Quality Control		
54	2	Control Charts for Variable and Control Charts		
55	1	Acceptance Sampling		
56	1	TQM and ISO 9000 Standard		
57	1	Six Sigma		
58		Revision		
59		**CASE: Volkswagen**		
60	**V**	**PROJECT MANAGEMENT**	**K.ASWATHAPPA**	
61	2	Introduction to Project Management	**SN CHARY**	**CASE – V**
62	1	Project Planning and Controlling Techniques		**ASSIGNMENT**
63	2	PERT		
64	1	CPM		
65	2	Identifying Critical Path		
66	1	Probability of Completing within given Time		
67	2	Project Crashing		
68	1	Optimum Cost		
69	1	Optimum Duration		
70		**CASE Gadet Toy Company**		

QUESTION BANK

UNIT – I INTRODUCTION:

Short Type

1. Operation Management
2. Process Design
3. Value Analysis
4. Job Production
5. Batch Production

Essay questions

1. Define production and Operation Management? Explain function of POM?
2. Explain Different phases in Product Design development?
3. Write About Historical Development of POM?
4. Explain different manufacturing process technologies?
5. Explain different phases in Process Development?

UNIT – II FACILITIES MANAGEMENT AND AGGREGATE PLANNING :

Short Type

1. Plant Location
2. Plant Layout
3. Aggregate Planning
4. Demand forecasting
5. Product Layout

Essay Type

1. Explain need and steps of plant location decision?
2. Explain different type's layout of facilities?
3. Write about specification of organizational policies per smoothing capacity utilization?
4. What are the steps involving demand Forecast?
5. Explain how to determine the feasible production alternatives?

UNIT – III SCHEDULING

Short Type

1. Scheduling
2. Line of Balance
3. Sequencing
4. World Class Production
5. Materials Management

Essay Type

1. Explain the process marital requirement Planning?
2. Write about different method of Product Control?
3. What are Determinants of Vendor Rating?
4. Explain Different Techniques of Scheduling?
5. What are the different sources of supply of materials?

UNIT – IV WORK STUDY AND QUALITY MANAGEMENT:

Short Type

1. Work Study
2. Quality Control
3. Acceptance Sampling
4. Six Sigma
5. Job Design

Essay Type

1. Explain Steps involving Methods Study?
2. Explain Different Quality Control Charts?
3. What is TQM? And Write about ISO 9000 series Standards?
4. Explain Steps involving in Work Measurement?
5. Write about Industrial Engineering Techniques?

UNIT – V PROJECT MANAGMENT

Short Type

1. PERT/CPM
2. Floats
3. Optimum Cost
4. Critical Path
5. Slacks

Essay Type

1. Define Project Crashing? Explain the procedure project crashing?
2. Explain the difference between PERT and CPM?
3. Dine Project Management? Explain project planning and techniques?

CASES:-

UNIT-I

ROVER-HONDA

Rover, the British car maker belonging to the BLMC conglomerate (later renamed as BL)faced the problem of survival in the 1970s. No introduction of new models for a long time was a particularly acute problem for Rover. The existing range was tired and incompetent, and, because of financial weakness, investment had been severely curtailed for a number of years. Similarly, design resources had been cut and the specialist skills inherited from the the separate companies had not been protected. BL had excess production capacity, but products with a poor reputation for quality and reliability. The only solution seemed to be collaboration with a foreign company which could provide its design expertise to Rover.

Honda soon emerged as the likeliest choice. Honda had design strengths in the areas in which BL had lost expertise and curtailed investment-engines and gearboxes. BL/ for its part, possessed European design studios, something which particularly attracted the Japanese as a means of improving products by making them more attractive to customers both at home and abroad.in 1981,BL licensed an existing Honda model for assembly in the UK- the Triumph Acclaim. The project involved the purchase of a replica Honda production facility and an agreement for the supply of major parts. Acclaim became a success in terms of sales in the UK, but most of the revenues generated went to Honda as a part of the agreement. The image of BL saw an upturn, though this did not have much impact on its capabilities.

Acclaim was followed by Rover 200 in 1984. This product was more than a licensing deal, as BL was involved in the design of what was also to be a new Honda product. However, BL's design input was limited to making the 200 distinct from the Ballade; Honda's equivalent, with the key units-body and mechanics-designed by Honda. BL's job was only to adapt the design to take the existing O-series 1.6 litre engine and its matching gearbox. However, the biggest sellers, the 1.3 litre models, were powered by Honda units and thus, according to the contract agreement, Honda was again the main beneficiary. The agreement also contained the clause the Rover 200 will be manufactured at BL's Long bridge plant, Honda complained about the quality levels and terminated the agreement. In order to become self-reliant, BL design engineers were initially concentrating upon developing the Montege and Maestro models as a replacement to the existing models. Due to the diversion of BL"s resources to the Rover 200 project, these development projects became starved of resources.

After rover 200, the series of models launched by the BL- Honda team were Rover 800, R8, and Rover 600/Honda Accord in 1987,1990, and 1994, respectively. In all these projects, Honda had the upper hand in negotiations over design specifications and more importantly, in contracts to supply engines and other parts. Rover continued to expend a great deal of t its design resources in the continuous updating of its existing models, and tis further weakened the firm's ability to replace its products range. BL and Honda models into its Owen plans-Rover incorporating Honda models into its own plans- when these were offered and Honda sharing some of the cost with Rover in return for lucrative manufacturing rights. There is little doubt that the injection of Honda-derived models and facilities supported BL,and allowed it to survive. However, Honda received a stunning blow when Rover was sold to BMW in 1995 (Pilkington 1999).

QUESTIONS

1. What were the advantages derived by Honda from its relationship with BL?

2. Were there any commercial risks for Honda in sharing its design skills with BL?

What went wrong for Rover in regaining its design capabilities for replacing its existing fleet of models? Suggest a plan which Rover should have followed in this regard..

UNIT-II CASE

HONDA 'S MIXED MODEL ASEMBLY LINE

Honda has two major car manufacturing facilities in Japan-one at Sayama , north of Tokyo, and the other at Suzuka, west of Nagoya. The Sayama plant is the oldest one and its two assembly lines can make up to 600,000 vehicles a year. Suzuka'sthree assembly lines have a maximum capacity of around 800,000 vehicles a year. The production lines at both the plants are capable enough of making various models of cars simultaneously.For instance, at Sayama, seven types of cars can be assembled on the same assembly line-the basic Accord, Prelude, and Legend, the two –door Legend, the Accord-derived Accord Inspire, Vigor, and Ascot. The main advantage of the mixed model assembly line is that the declining demand for one model can be counterbalanced wit increased demand for others.

Mixed models on single lines is no longer a novelty in the automobile industry. Toyota has a better-known variant of such an assembly line. Toyota arranges different models one after the other on the conveyors across the line to balance the workload for workers and to balance the delivery of parts. On the other hand Honda has always produced in lots (Typically in factors of 60 cars) of one model at a time and the cars are exactly the same in all respects (e.g red Civics, left-hand drive, to be exported to Europe).

At Sayama, several batches of different derivative Accords may be manufactured before the line is switched to make Preludes for several batches. Models may be switched on the line three or four times in a day. This system allows easy panning of the supply of parts and at the same time offers flexibility in manufacturing according to fluctuatingdemandpatterns.

Unlike the Toyota system of mixing the cars to accommodate the workers who stay at fixed work stations or in fixed groups, the Honda production system reorganizes the workforce, when necessary, with groups of workers moving about the assembly line to balance the workload. While designing a new model, it is kept in mind that it will produced on the existing line with the same fixedequipment across the line. This is necessary to avoid staggering investments for making changes in the existing assembly line to suit the design requirement of a new model.

There arehowever, a few limitations of such a system. For example, the dimensions of the Honda Accord station wagon, introduced at Gilda's Marysville plant (USA), were designed to fit the existing production equipment. Hence, the third compartment was not very large and the rear window sloped forward.

Honda is also known for the complete metamorphosis of itsSuzuka plant. This plant was opened in 1960 for manufacturing motorcycles. By the mid-1980, Suzuka became the highest output motorcycle factory in the world. The same plant ahead started producing automobiles in 1967. Today this plant manufactures only automobiles after the motorcycle production was transferredcompletely to the exclusive motorcycle plant at Kumamoto in 1991 (Mair 1994).

Questions

1. Critically compare the mixed model assembly lines of Honda and Toyota. Which approach is better according to you?

2. What are the disadvantages of mixed model assembly?

UNIT –III

Scheduling, Rescheduling & Design

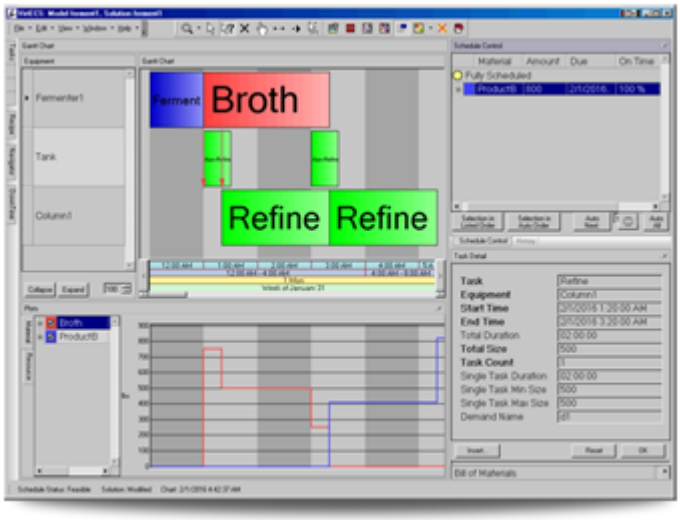
This case study will take a virtual tour of the highlights of the unique scheduling capabilities provided by the VirtECS Scheduler. as an example we'll look at scheduling a fermentation operation, starting with a very simple model, then adding more realistic and complex conditions. Next we'll consider some important rescheduling considerations, and finish by addressing some challenging scenarios for process modifications or redesign.

Baseline Scenarios

1. Basic Fermentation Process

This is a typical piece of a pharmaceutical process. While this system is relatively small, it illustrates a level of complexity that is non-trivial to schedule.

Process Description



View

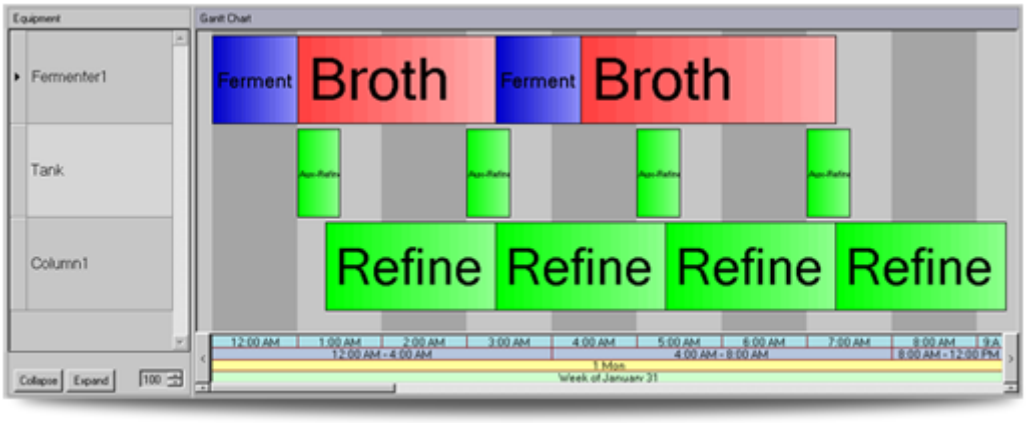
- 1000 lb of material is processed in a fermenter with a batch time of 1 hr

- When fermentation is complete, 500 lb of broth may be transferred to a feed tank, requiring 20 mins
- When the transfer is completed, the Fermenter is empty and available to start another batch
- Broth in the Tank is fed into the Column (10 mins) and the broth is refined, requiring 83 mins to produce 410 lb of product
- One fermenter batch requires two batches of Refining on one Column

Even this small process contains constraints which most other schedulers on the market cannot handle properly. The addition of a larger demand requiring more batches illustrates this point. Note the storage activities are shown as pink boxes.

2. Process Vessel Storage

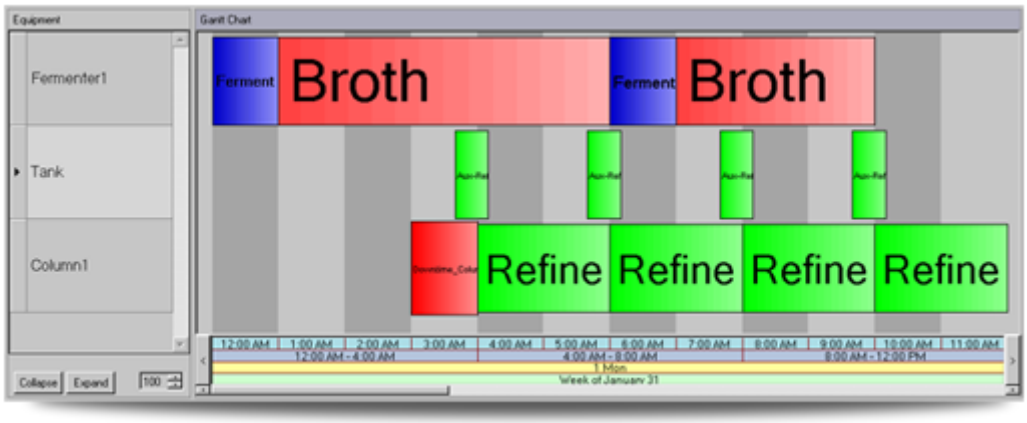
Note that the second batch of Fermentation cannot begin until the entire first batch has been fed to the Tank. This requires accounting for the time to feed the Broth into the Tank, start the Refine task, complete the Refine task, and feed the second half the Broth into the Tank just in time to begin the second Refine task. Only after the second transfer into the Tank is completed can we begin the second Fermentation task.



View

3. Unexpected Equipment Shutdown

Of course, if something happens which requires shutting down the Column (C1) for an hour, the schedule must be recomputed. For this reason, the timing of the tasks on one piece of equipment interacts strongly with those other pieces of equipment.

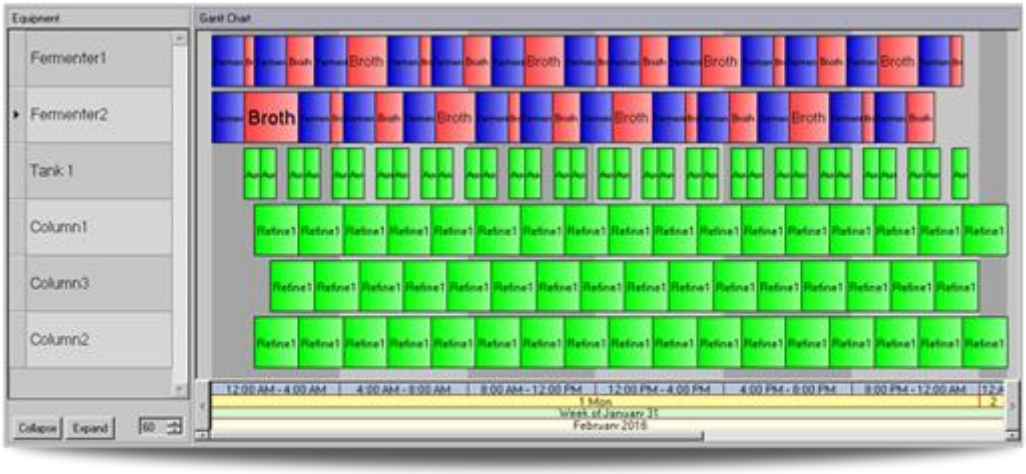


View

It is easy to implement a drag and drop interface allowing boxes on the chart to be moved about willy-nilly. But such moves will, in the absence of very strong model-based underpinning, produce infeasible schedules which are useless. Suffice it to say that any scheduling system which cannot automatically produce a feasible schedule for this simple process (without user intervention) will also lack the necessary modeling support to ensure feasibility under drag and drop manipulation.

4. New Equipment Considered

Now we begin to see the full power of VirtECS - the ability to automatically produce fully detailed feasible schedules for a realistic process. We have added a second fermenter and two additional columns with all three columns sharing a single feed tank. We can see here that the columns running the refining task are the rate limiting piece of equipment.

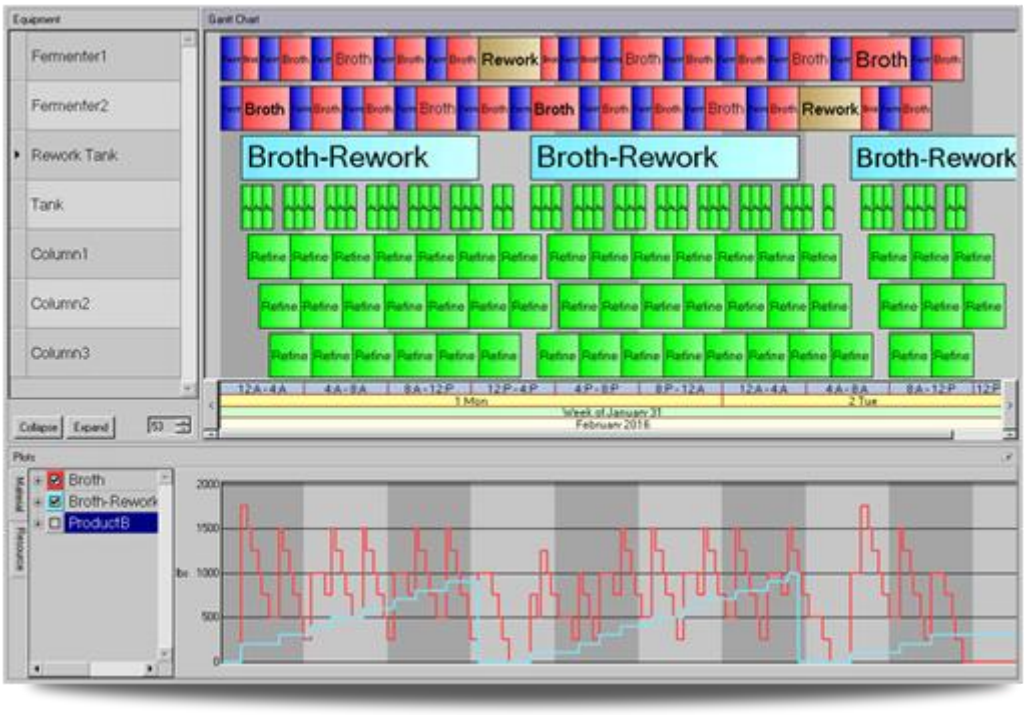


View

5. Rework Within Process

Now we add one further complicating factor which is common in pharmaceutical processes. The Fermentation task not only produces good product, but a small amount of material that must be fed to a rework tank. This material accumulates until at some point there is enough available to feed a special rework task on one of the fermenters.

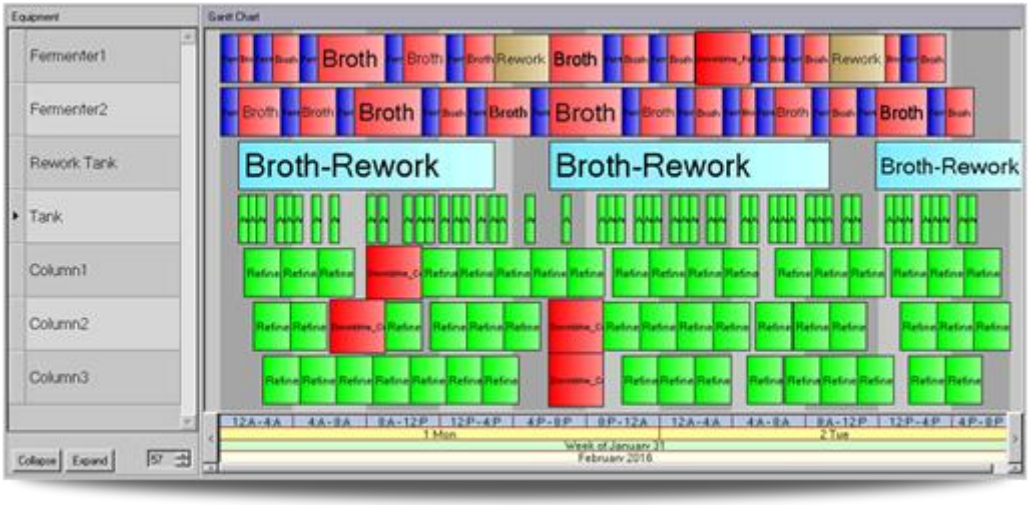
The Rework task requires three hours to complete, but converts all the off-spec material into broth suitable for refining. The Rework task must be run with some regularity because of the limited storage in Rework Tank. Note that VirtECS handles these complications automatically, requiring less than two seconds of CPU time to produce the schedule shown. Because VirtECS does not have to be "taught" or "configured" to generate these schedules, it can also easily and automatically respond to contingencies which arise in daily operation, as shown next.



View

6. Equipment Maintenance

Here we see how effortlessly VirtECS is able to automatically generate schedules that walk around four different equipment outages.



UNIT IV

VOLKWAGEN CASE ON WORK STUDY-

Volkswagen India Case Study Innovative campaign inspires 2,700 car recommendations in 4 weeks

Marketing Solutions Challenge

• Create brand awareness among working professionals

• Build loyalty and aspiration

• Influence decision-making

Solution

• Establish VW-branded Company Page on LinkedIn

• Enable LinkedIn members to recommend their favorite VW models

• Use LinkedIn Recommendation Ads to extend reach

Why LinkedIn?

• #1 resource for career-minded professionals

• Precise targeting by seniority and geography ensures match with affordability criteria, dealership locations

Results

• 2,700 product recommendations in 30 days

• 2,300 new followers on VW India Company Page

• 960,000 viral updates about VW car models

CASE-

Volkswagen (VW) is one of the world's leading automobile manufacturers and the largest carmaker in Europe. As Volkswagen pursues its goal of becoming the number one automaker in the world by 2018, India has become a key component of its strategy. India is currently the world's second fastest growing car market, with shipments expected to more than double by 2018. As a relatively recent entry into the Indian automotive market, VW needed to raise brand awareness. To address this challenge, Volkswagen's marketing team focused one of its key brand pillars, innovation, to make a strong impact throughout the roll-out in India. Innovation was showcased not only in Volkswagen's product introductions, but also in its communications and advertising.

Innovative marketing strategies raise awareness

VW India created groundbreaking campaigns such as the world's -rst 'talking newspaper', which used light-sensitive chips to speak to readers about Volkswagen as they turned the pages of their morning newspaper. The talking newspaper ad created a sensation in India, and garnered worldwide attention for taking print advertising to a new level. In one year, brand awareness more than quadrupled, increasing from 8 percent to a high of 37 percent. Volkswagen next turned to digital media to extend its success and create new opportunities for customers to connect with the brand. Lutz Kothe, Head of Marketing for VW India, says, "At Volkswagen, innovation is woven into everything we do. In formulating our digital strategy, we looked beyond the obvious for innovative ways to engage our audience. We knew that for many people, their car affects their professional life and their

professional identity affects their car choices. This made LinkedIn a natural choice to connect with current and potential car buyers among the growing Indian professional population."

Recommendation Ads get people talking

Next, Volkswagen launched a series of Recommendation Ads encouraging more customers to join the conversation. Each ad showcased endorsements of actual LinkedIn members, and invited the community to recommend their favorite Volkswagen model. Volkswagen used LinkedIn's broad reach (100 million members worldwide, 9 million in India) and precise targeting capabilities to connect with professionals who matched the buyer proles for their different models. Lutz Kothe said, "Volkswagen was the rst company in India to use LinkedIn Recommendation Ads, and the campaign was a success. We went in with a goal of inspiring 500 recommendations among current and prospective car buyers. In less than 30 days, over 2,700 Volkswagen fans had stepped forward to recommend their favorite cars and share these recommendations with their professional networks. In the same time period, we gained over 2,300 followers who asked to stay abreast of the latest news and developments from Volkswagen. Kothe concludes, "In a world where people spend an increasing amount of time at work, thinking about work, and interacting with their work colleagues, we believe it's important to foster discussion about Volkswagen products in a professional context. Our innovative partnership with LinkedIn lets our customers learn about Volkswagen products and provides insights"

Engaging working professionals on LinkedIn

LinkedIn approached Volkswagen India with an opportunity to be the rst auto major to establish a presence on LinkedIn Company Pages. 'Company Pages' provide a branded home base within the LinkedIn community where businesses can showcase their company, products, and services in a trusted, professional environment. Volkswagen India participated in the worldwide launch of Company Pages in November 2010, and soon thereafter opened up their pages to allow LinkedIn members to post reviews and recommendations of their car line in India including the New Beetle, Vento, and Polo. Mr. Lutz Kothe, Head of Marketing & PR, Volkswagen Passenger Cars says "We were pleasantly surprised to see how easy it was to create our Company Page on LinkedIn and start engaging with customers among the LinkedIn community. Furthermore, the quality of interaction was very high

Case-5

Gadget Toy Company

Joe Huffman, project manager at Gadget Toy Company (Gadget), had just submitted a proposal for funding to the new product review committee. He recommended that Gadget introduce, through its retail distribution network, a new children's Gadget could take advantage of what he felt would be strong market demand . However, due to the volatility of the market for these types of games, Joe could not be certain that the product would have

the same level of market acceptance the following year. It was now May6, 1996, and Joe knew he would have to manage the timing of the project carefully to meet the delivery date of September 15th, just 19 weeks away.

Gadget's head office was in Kitchener, Ontario, where it also operated a manufacturing plant and distribution center. Whenever possible, Gadgets preferred to manufacture its products in-house.

Joe expected feedback from the committee by the end of the week, at which time he would begin coordinating the launch of the project. Since Joe was an experienced project manager, he established a preliminary list of activities, as Based on his schedule; Joe felt he could start work on some activities immediately, such as finalizing the product design and placing an order for the equipment. However, many of the activities had to be performed sequentially. For example, he could not train the workers until the equipment was installed and the tools for the machine were completed. Similarly, he could not order the raw material until the engineering work was complete and the advertising plan was completed, since the advertising plan would influence colour selection.

Concerned about the delivery schedule, Joe investigated opportunities to cut the project time. After talking with the marketing manager, Peggy Pilon, Joe learned the t he could reduce product advertising Peggy anticipated a five percent reduction in sales for each week of lost advertising. Furthermore, she indicated that Joe could not get away with less than six weeks of advertising for a new product of this nature.

Joe also spoke with Steve Jeffrey, the production manager at the tool shop. Steve offered to speed up the tool build by working weekends, for a cost of $5,000. Steve thought he could improve their delivery time by two weeks if Joe authorized the extra cost.

Activity	**Description**	**Immediate predeseccor**	**Estimated time(weeks)**
A	Obtain funding approvals	-------	1
B	Finalise engineering	A	1
C	Deliver new equipment	A	8
D	Build dies/tools	B	12
E	Install equipment	C	1
F	Train workers	D,E	1
G	De-bug process	F	1
H	Establish advertising plan	A	1
I	Finalise package and art work	H	2
J	Advertise	H	12
K	Raw material delivery	D,I	2
L	Initial production run	G,K	3
M	Ship product	J,L	1

MODEL PAPER

Section – A (Short Answer type questions) (10x2m= 20marks)

Answer all questions

Write a short note on the following:

1. Process planning and process design

2. Scheduling Vs Sequencing

3. Plant capacity

4. Process Layout

5. Line of Balancing

6. Materials Requirement Planning (MRP)

7. Acceptance sampling

8. Concept of Six Sigma

9. Line of Balance

10. Critical Path

Section – B (Essay type questions) (5 x 8= 40marks)

Answer all questions, each question carry equal marks

11. A) what is POM? Explain the Nature and scope of POM.

(OR)

B) Explain the different steps in the value analysis.

12. A) Explain the factors influencing the plant layout.

(OR)

B) Write down the steps and approaches in aggregate planning.

13. A) What is production planning and control? Explain the various functions.

(OR)

B) 5 Jobs have to be processed on 3 machines X, Y, Z in the order of X, Y and Z, processing times are given below

JOBS	PROCESSING TIME (IN MINUTES)		
	X	Y	Z
1	10	15	12

2	12	18	12
3	15	16	14
4	11	10	15
5	16	15	14

Determine the sequence that will minimize the elapsed time or cycle time. Find the idle time in each of the machines X,Y.and Z.

14. A) Explain the control charts for variables in detail with examples.

(OR)

B) What are the main components and factors facilitating method study?

15. A) Explain the difference between PERT and CPM?

(OR)

B) Draw the event oriented network of the following data.

Event No. Immediate Predecessors

Event	. Immediate Predecessors Duration
1	-
2	1
3	1
4	2,3
5	10
6	3
7	8
	4,5
	7
	5,5
	12
	5
	3

Subject Code: R14E12MB07

ANURAG GROUP OF INSTITUTIONS

(Autonomous)

School of Business Management

I-M.B.A-II-Semester End Examinations, August - 2015

Subject: Production and Operation Management

Time: 3 Hours **Max.Marks:60**

Section – A (Short Answer type questions) **(10X2=20 Marks)**

Answer all questions, each question carry equal marks.

Write a short note on the following:

1. Functions of POM.
2. Product Design.
3. Plant Lay Out.
4. Demand Forecasting.
5. World Class Production.
6. Vender Rating.
7. T.Q.M.
8. Acceptance Sampling.
9. Project Management.

10. Project Crashing.

Section – B (Essay Type Questions)

Answer all the questions. **5x8=40 marks**

11. A) Discuss the present scenario of Production and Operations Management in India.

OR

B) Differentiate between Value Analysis and Value Engineering and explain the basic objectives of Value Analysis and the process involved.

12. A) What are the different types of Manufacturing Process Technologies and discuss in brief of any **two** of them.

OR

B) List out and discuss with merits and demerits of various types of plant layouts and suggest the suitable layout for a medium type of manufacturing Industry.

13. A) What is scheduling, distinguish between Single Machine Scheduling and Flow Shop Scheduling and also list out the priority rules for scheduling?

OR

B) Define Material Management and explain its importance in any industry on Product Cost and also explain the role of a good vendor in the Inventory Management.

14. A) What are the various components of a work study and also explain them in detail.

P.T.O

OR

B) The following Data is the record of four measurements per sample of six samples.

Sample No.	**Observations**			
	1	**2**	**3**	**4**
1	31	21	32	7
2	43	35	53	49
3	24	16	52	62
4	20	35	34	23
5	28	31	28	30
6	29	35	23	19

Determine the Control Limits for **X** and R-Charts, draw the charts and comment on the process.

15. A) Explain the Project Techniques Pert & CPM, distinguish between them and listout the rules to be followed for drawing a Project Network Diagram.

OR

B) The various time estimates of activities involved in a project are given in the table.

Activity	Time Estimates		
	T_O	T_M	T_P
1-2	2	6	10
1-3	4	8	12
2-4	2	3	4
2-3	2	4	6
3-4	0	0	0
3-5	3	6	9
4-6	6	10	14
5-6	1	3	15

Draw the network diagram, determine the critical path and expected time of completion of the project.

Subject Code: R14E12MB06

ANURAG GROUP OF INSTITUTIONS

(Autonomous)

School of Business Management

I-M.B.A-II-Semester Supplementary Examinations, Feb 2016

Subject: Production Operation Management

Time: 3 Hours **Max.Marks:60**

Section – A (Short Answer type questions) (10X2=20 Marks)

☐Answer all questions, each question carry equal marks.

Write short notes on the Following:

1. Define POM.
2. Line Layout
3. Job Shop Production method
4. Line of Balance
5. Method Study
6. Six Sigma
7. MRP-I
8. P-Chart
9. Critical Path
10. Cost Slope

Section – B (Essay Type Questions)

Answer all the questions. **5x8=40 marks**

11. A) What are the functions of Production and Operations Management?

OR

B) Explain various stages of a New Product Design in a manufacturing industry.

12. A) What are the major factors influencing Facilities location Decision for the IT Industry?

OR

B) What is Plant Layout? Explain types of layouts with their advantages and disadvantages.

13. A) What is Materials Management? Explain its functions and Objectives.

OR

P.T.O

B) 5 Jobs are performed first on Machine M1 and then on Machine M2. Time in hours taken by each job on each machine is given below.

	A	B	C	D	E
M1	5	1	9	3	10
M2	2	6	7	8	4

Determine the optional job sequence and the minimum time elapsed.

14. A) What is Work measurement? Explain the steps involved in work measurement.

OR

B) What is control chart? Explain various control charts for Variables and Attributes.

15. A) Explain about rules of Network diagram for PERT and CPM techniques.

OR

B) Explain various steps involved in the calculation of Probability of completing the project in the given scheduled time with the help of PERT technique.