GANPAT UNIVERSITY
M. TECH SEM- I (AMT) REGULAR EXAMINATION NOV-DEC 2015
3ME102 Production and Operation Management

MAX. TIME: 3 HRS   MAX. MARKS: 60

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION: I

Q.1

(A) What is the importance of sales forecasting? Explain the method of least squares. (04)

(B) Sale data for previous 4 years is a variable in some firm as shown below: (06)

Year	Quarter	Unit Sales ($\times 10^4$)	Year	Quarter	Unit Sales ($\times 10^4$)
1993	1	72	1995	1	110
	2	103		2	139
	3	121		3	147
	4	84		4	117
1994	1	93	1996	1	117
	2	120		2	135
	3	131		3	145
	4	105		4	130

Forecast sales for last two quarters (i.e., July to Dec.) of year 1997.

OR

Q.1

(A) Briefly explain the methodology to be followed for developing a Retrieval type of CAPP system. (04)

(B) Let the value of the money be assumed to be 10 per cent per year and suppose that machine A is replaced after every three years, whereas machine B is replaced every six years. The yearly costs (in Rs.) of both the machines are given below: (06)

Year	1	2	3	4	5	6
Machine A	1000	200	400	1000	200	400
Machine B	1700	100	200	300	400	500

Determine which machine should be purchased.

Q.2

(A) Discuss the advantages and disadvantages of various aggregate planning methods. (04)

(B) A readymade garments manufacturer has to process 7 items through three stages of production, viz, 1) Cutting, 2) Sewing and 3) Pressing and Packing. The time taken for each of these items at the different stages are given below in appropriate units: (06)

Item	1	2	3	4	5	6	7
Cutting	5	7	3	4	6	7	12
Sewing	2	6	7	5	9	5	8
Pressing & Packing	10	12	11	13	12	10	11

Find an order in which these seven items are to be processed so as to minimize the time taken to process all the items through all the three stages. Also find Total time T and idle time for all the three stages.

<div align="center">OR</div>

Q.2
(A) Explain the objective, functions and benefits of MRP. (04)
(B) The management of ABC company is considering the question of marketing a new product. (06) The fixed cost required in the project is Rs. 4,000. Three factors are uncertain, viz., the selling price, variable cost and annual sales volume. The product has a life of only one year. The management has the data on these three factors as under:

Selling Price (Rs)	Probability	Variable Cost (Rs)	Probability	Sales Volume (Units)	Probability
3	0.2	1	0.3	2,000	0.3
4	0.5	2	0.6	3,000	0.3
5	0.3	3	0.1	5,000	0.4

Considering the following sequence of thirty random numbers: 81, 32, 60, 04, 46, 31, 67, 25, 24, 10, 40, 02, 39, 68, 08, 59, 66, 90, 12, 64, 79, 31, 86, 68, 82, 89, 25, 11, 98, 16.
Using the sequence (First 3 random number for the first trial, etc.) simulate the average profit for the above project on the basis of 10 trails.

Q.3 Attempt Any TWO. (10)
(A) What is aggregate planning? What are Aggregate planning guidelines?
(B) Discuss the nature and scope of Management.
(C) What are the logics used in MRP? Explain its methodology.

SECTION: II

Q.4
(A) Explain the steps involved in Capacity Planning. (04)
(B) An airline company has to drawn up a new flight schedule involving five flights. To assist in (06) allocating five pilots to the flights, it has asked them to state their preference scores by giving each flight a number out of 10. The higher the number, the greater is the preference. Certain of these flights are unsuitable to some pilots owing to domestic reasons. These have been marked with a 'X'.

<div align="center">FLIGHT NUMBER</div>

		1	2	3	4	5
PILOT	A	8	2	X	5	4
	B	10	9	2	8	4
	C	5	4	9	6	X
	D	3	6	2	8	7
	E	5	6	10	4	3

What should be the allocation of the pilots to flights in order to meet as many preferences as possible?

<div align="center">OR</div>

Q.4
(A) Classify Management Information and explain in detail. (04)
(B) A marketing manager has five salesmen and sales districts. Considering the capabilities of the (06) salesmen and the nature of districts, the marketing manager estimates that sales per month (in hundred rupees) for each salesman in each district would be as follows:

	A	B	C	D	E
1	32	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

(Salesmen — rows 1-5)

Find the assignment the salesman to districts that will result in maximum sales.

Q.5

(A) What is SWOT analysis? Explain the various elements of SWOT analysis. (04)

(B) Draw a network of the following activities and tabulate earliest and latest starting and finishing times of each activity and the total and free floats of them : (06)

Event numbers	Activity symbol	Activity description	No. of days
1 - 2	A	Study of plan layout	2
2 - 3	B	Clearance of site	4
3 - 4	C	Earth work	10
2 - 4	D	Procurement of line, sand, cement and concrete	4
4 - 5	E	Laying of foundation	10
2 - 5	F	Procurement of bricks	5
5 - 8	G	Construction of building	36
5 - 6	H	Laying of conduit pipe lines for electric wires	12
6 - 8	I	Laying of electric wires	4
5 - 7	J	Laying of drainage and sewage system	12
7 - 8	K	Laying of water pipe lines and taps	8
8 - 9	L	Connecting building to water and electricity	6
9 - 10	M	Finishing work in building	12

OR

Q.5

(A) Define the following terms: (04)

(1) Merge Event, (2) Activity, (3) Dummy Activity, (4) Total Float.

(B) A small project is composed of 7 activities whose time estimates are listed in the table below. Activities are identified by their beginning (i) and ending (j) node numbers. (06)

Activity (i -j)	Estimated Duration (in weeks)		
	Optimistic	Most likely	Pessimistic
1 - 2	1	1	7
1 - 3	1	4	7
1 - 4	2	2	8
2 - 5	1	1	1
3 - 5	2	5	14
4 - 6	2	5	8
5 - 6	3	6	15

(a) Draw the project network diagram.

(b) Find the expected duration and variance for each activity. What is the expected project length?

(c) Calculate the variance and standard deviation of the project length. What is the probability that the project will be completed?

(i) at least 4 weeks earlier than expected time.

(ii) no more than 4 weeks later than expected time.

(d) If the project due date is 19 weeks, what is the probability of not meeting the due date.

Given :	Z	:	0.5	0.67	1	1.33	2
	Prob. :		0.3085	0.2514	0.1587	0.0918	0.0228

Q.6   Attempt Any TWO.   (10)
(A)   Write a short note on Group Technology.
(B)   What is Just in Time Production? Explain the basic element of JIT.
(C)   A firm has a single machinist in a repair shop. He works eight hours a day, and on an average four machines break each day. It takes on the average one hour to repair a machine. Using Poisson – exponential model, determine :

   (i) The expected number of machines in the repair shop.
   (ii) The expected number of machines in the shop on which the machinist has not started to work.
   (iii) The average down time (waiting for repairs or undergoing repairs) per machine.
   (iv) The average time a machine waits for service.

--------------------------------END OF PAPER--------------------------------