



KATHMANDU UNIVERSITY
End Semester Examination
August, 2018

AUG 19 2018

Level : B.E.
Year : III
Time : 2 hrs. 30 mins.

Course : MEEG 308
Semester: II
F. M. : 55

SECTION "B"
[55 marks]

Instructions

Attempt all questions. Assume suitable data if necessary.

Q.N.1

- a. An operation is a transformation process, Explain. [2]
- b. Differentiate batch production and job production system and discuss its characteristics? [2]
- c. Explain in detail about the interrelationship in production planning and control. [3]

Q.N.2

- a. In detail perform a multi-product profit volume analysis and determine the better choice among the chosen products. [4]
- b. Choose a new product idea for a three wheeled transport vehicle for carrying goods and specify the unique concept of yours to carry weight and maintain balance with a three wheeler and explain in detail about the design and development of that unique product you chosen. [4]

Q.N.3

- a. List types of forecasting. Explain DELPHI method in detail. [3]
- b. Explain how to choose smoothing constant (α) and its impact in forecasting? [2]
- c. During the period between 1994 – 2000 the stocks of steel required are delivered to the India piston limited is listed below. Apply exponential smoothing to the given condition. Stock of Steel delivered in 1994 was forecasted as 78 tons. Assume the exponential smoothing constant (α) is taken as 0.15 and 0.4.
 - a. Determine MAD, recommend the best.
 - b. Compute MSE for $\alpha = 0.15$
 - c. Calculate MAPE when $\alpha = 0.15$ [6]

Year	1994	1995	1996	1997	1998	1999	2000
Stocks Delivered(tons)	80	85	90	86	92	75	100

Q.N.4

- a. Explain the procedure for capacity planning. [2]
- b. In assembly line whose activities are shown below has an eight minutes cycle time. Draw the precedence graph and final minimum possible number of work stations. Then arrange the work activities into work station so as to balance the line. What is the efficiency of the line balance? [3]

Task	Performance Time (Minutes)	Preceding Task
A	5	--
B	3	A
C	4	B
D	3	B
E	6	C
F	1	C
G	4	D,E,F
H	2	G

- c. Two product groups A and B, have product trees as shown in the diagram. In a company producing batteries,

Product A = watch battery (includes product C and D),

Product B = Camera battery (includes product C and E)

The process sheets give the sequence of operation for each item, along with the set up time and run time. Also the economic order quantities for these items are given in table as A, 15; B, 10; C,25 ; D, 20; and E, 30.

Item	Operation No.	Work Centre	Operation	Set up time (hr)	Run time (hr)
A	0010	1030	Assembly	0	2.0
B	0010	1030	Assembly	0	3.0
C	0010	1012	Milling	0.3	0.14
	0020	1020	Drilling	2.4	0.4
	0030	1012	Milling	2.7	0.23
	0040	1018	Grinding	1.0	0.21
D	0010	1012	Milling	0.4	0.15
	0020	1020	Drilling	2.8	0.35
	0030	1018	Grinding	2.2	0.24
E	0010	1012	Milling	0.3	0.18
	0020	1020	Drilling	2.1	0.39
	0030	1012	Milling	2.5	0.26
	0040	1018	Grinding	1.3	0.23

Determine the capacity requirement for drilling and milling for two products A and B. And assume an available capacity of 5000 units for five years 1995,1996,1997,1998 and 1999.

[5]

Q.N.5

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- a. A manufacturer requires 2000 units per year; the purchase price is quoted as 2 rupees per unit in quantities below 1000 units, 1.9 rupees per unit in quantities between 1000 - 1999 and 1.86 rupees per unit in quantities above 2000. Ordering costs are 20 rupees per order and inventory costs are 0.32 rupees per unit per year at 2 rupees unit price or 16 % inventory value per unit per year at the 2 rupees unit price. [4]
- b. Explain in detail and develop the gradual replacement model for controlling an inventory. And compare it with the basic economic order quantity model. [5]

Q.N.6

- a. There are six jobs, which are to be processed on four machines A, B, C and D in the order ABCD. The processing times in hours for the jobs are given below. Find the optimum sequence, total elapsed time, machine idle time and job idle time. [5]

Machine/Job	J1	J2	J3	J4	J5	J6
A	8	5	6	15	16	9
B	10	12	6	12	18	10
C	12	8	8	7	5	9
D	9	3	4	13	10	5

- b. Determine

- a. Draw the CPM network; analyze the paths through the network.
- b. Determine the float for each activity, find the critical path.
- c. Find the project completion time. [5]

Activity	A	B	C	D	E	F	G	H	I	J
Immediate predecessors	--	A	B	B	B	D	D	F,G	H	C,E,I
Durations	6	8	5	13	9	15	17	9	6	12

