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The Open University of Sri Lanka
Faculty of Engineering Technology

Study Programme	: Diploma in Technology (Engineering)
Name of the Examination	: Final Examination
Course Code and Title	: **MEX4235 – PRODUCTION MANAGEMENT**
Academic Year	: 2013/2014
Date	: 29th August 2014
Time	: 9.30am – 12.30pm
Duration	: 3hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of 8 questions. All questions carry equal marks.
3. Answer any 5 questions only.

(Q1)

a) What are the different forecasting techniques available for predicting the production quantities under the following conditions?

(i) Demand with a known trend

(ii) Uniform demand.

b) The actual demand for a certain product during a 12 month period is shown in table 01.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Demand (Units)	50	60	70	60	70	85	70	80	90	80	90	100

Table 01

(i) Propose the most suitable moving average period for the company to forecast the demand.

(ii) Calculate the forecasted demand based on the proposed moving average period.

(iii) Calculate the forecasted demand using exponential smoothing with a coefficient of 0.4

(Q2)

a) Define the term 'critical path' with respect to project planning.

b) The table below (Table 02) gives the activities and their time durations for a road construction project undertaken by a road construction company.

Activity	Duration (Months)	Predecessor Activity
A	04	None
B	05	None
C	03	A
D	05	A
E	04	B
F	04	B
G	05	C, E
H	02	D
I	03	F
J	09	F
K	08	G, H, I
L	04	J, K

Table 02

(I) Draw the project network diagram.

(II) Find the earliest start times (ES), Latest start times (LT), Earliest finish times (EF), Latest finish times (LF) and slack for each of the activities.

(III) Find the critical path and the normal duration of this project.

(Q3)

a) What are the strategies available for a production manager to manage capacity of a production system? Explain.

b) A company is to supply Asphalt to three different road construction projects situated at three different locations in the county. The company has three Asphalt plants and their capacities in metric ton are given in Table 03.

Asphalt plant location	**Capacity (metric-ton)**
Negambo	100
Kurunegala	60
Puttalam	80

Table 03

The company has to transport Asphalt to three different road construction projects underway and their daily requirements are depicted in Table 04.

Road construction location	Daily requirement (metric-ton)
Galle	40
Anuradhapura	90
Colombo	110

Table 04

The transportation costs (in Rs. '0000) for delivery from each plant to project locations are as follows.

Project location / Asphalt plant	Galle	Anuradhapura	Colombo
Negambo	4	6	2
Kurunegala	8	7	10
Puttalam	6	1	4

Table 05

(i) Find the basic feasible solution for the transportation cost. (You may use the method studied under your course, MEX4235 Production Management)

(ii) Ascertain whether the basic feasible solution is the optimal transportation cost.

(Q4)

a) What are the reasons for keeping inventories in production system?

b) Briefly explain the types of inventory management systems (models) used in inventory management.

c) Derive an expression for the economic lot size to be ordered for a simple lot size inventory control model with back orders allowed, in terms of demand rate "□" units per unit time, the fixed administrative cost of placing an order "A", the stock holding cost "I" per unit per unit time and penalty cost "P" per unit back ordered per unit time. State any assumptions made during the derivation.

(Q5)

a) Explain the concept of Group technology in relation to manufacturing systems.

b) What are the methods available for grouping components of similar families? Explain.

c) Shorter through-put times and greater job satisfaction are two benefits that can be achieved in implementing group technology in a manufacturing system. Discuss how these two benefits can be achieved.

(Q6)

a) Distinguish between externally oriented scheduling and internally oriented scheduling.

b) A garment washing plant has received an order for five jobs which needs to be processed on their washing facility. The washing could be performed on any of the three washing facilities A, B or C. Table 06 gives the operation (washing) times available on each machine.

Job No	Operation (washing) times - Minutes		
	A	B	C
01	25	30	40
02	40	35	30
03	50	40	30
04	25	20	30
05	35	30	40
Capacity (Minutes)	65	40	70

Table 06

(i) Assuming that the jobs are available for processing on each machine, find the allocation of jobs to each facility using the index method to minimize the through put time.

c) The above jobs are then subjected to two operations, first on a drying machine and then on a pressing machine. The unit operation time on respective machines for each job is given on Table 07.

Job No	Processing time - Minutes	
	Drying machine	Pressing machine
01	25	30
02	20	25
03	50	25
04	30	15
05	30	35

Table 07

(i) If the drying and pressing operations commences only after finishing all operations in the washing facility, find the order in which the jobs need to be loaded on to the drying and pressing machines in order to minimize the throughput time.

(ii) Find the total throughput time for the entire job using Gantt chart

(Q7)

a) Explain why Economists' consider, all goods as scarce.

b) Describe what economists mean by "Rationality of Human behavior".

c) Explain how an economist would solve an adverse balance payment scenario.

d) Explain the behaviour of money and real income when there is a inflation and decrease in price level of all commodities.

(Q8)

a) Explain the importance of time study in an organization.

b) State the different between time study and activity sampling in the context of work measurement and discuss the advantages and disadvantages of activity sampling over time study.

c) Why is it necessary to provide allowances in time study? List the types of allowances that are taken into consideration during a time study activity.

d) In order to determine the idle time of a machine operator a time study was conducted and the results are as shown below.

Observations of machine operator working - 300

Total number of observations - 550

How many observations should you take to determine the idle time of the machine operator, with a confidence level of 95% and an accuracy of 5%?

END