The Open University of Sri Lanka
Faculty of Engineering Technology

Study Programme	:	Bachelor of Technology Honours in Engineering
Name of the Examination	:	Final Examination
Course Code and Title	:	**MEX4135 Production Management** / 4235
Academic Year	:	2014/15
Date	:	11.09.2015
Time	:	0930-1230 hrs
Duration	:	3 hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of 08 questions. All questions carry equal marks.
3. Answer any 05 questions only..

Q1   a.   What is meant by opportunity cost?

b.   Discuss the advantages and disadvantages of free economy.

c.   What are the causes of change in demand of any commodity?

d.   Explain the term "Price Elasticity of Demand".

e.   Draw the supply and demand curve for indirect taxes imposed on perfectly

inelastic commodity. In this case who will bear the tax?

Q2   a.   What is meant by productivity? How it differs from production?

b.   What are the benefits of work study for an organization?

c.   What are the factors to be considered when selecting a job for method study?

d.   What is time study?

e. Write down the time study procedure in logical order.

f. The following observed times are taken by stop watch method during 20 observations of a single elements of a manual task.

Observations	Time taken (in 1/100 min)
1	41
2	40
3	45
4	42
5	43
6	47
7	41
8	47
9	48
10	42
11	39
12	40
13	42
14	41
15	43
16	40
17	45
18	44
19	41
20	40

Determine whether sufficient observations of this element have been made to provide an accuracy of 5% with a confidence interval of 95%?

Q3

a. What is critical path and how important is it in project planning?

b. A medium scale manufacturing firm has undertaken a project of installing a computerized information system. The project basically consists of twelve activities. The time in days required to complete activities are given below.

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	Activity	Duration (Days)	Activity Predecessor
A	Physical preparation	04	None
B	Organizational planning	05	None
C	Personal Selection	03	A
D	Hardware/Software installation	05	A
E	Personal training	04	B
F	Detail system design	04	B
G	File conversion	05	C,E
H	Establishment of standards.	02	D
I	Program preparation	03	F
J	Program Testing	09	F
K	Parallel Operation	08	G,H,I
L	Finalised system documentations	04	J,K

(i)   Draw the network diagram for the project.

(ii)   Find the earliest start (ES), Latest start (LS), Earliest finish (EF), Latest finish (LF) and slack for the each activity.

(iii)   Find the critical path and the total time duration of the Project.

Q4   a.   What is aggregate planning?

b.   What are the assumptions made in " Transportation algorithm" method?

c.   A garment manufacturer has three factories at Kurunegala, Kaluthara and Hambanthota. There are four (04) distribution centres at Colombo, Galle, Matara and Kandy. The cost of production in each factory is identical and only variable cost is the transportation cost. The production at each factories are 5000, 6000 and 2500 units respectively. The demand at four distribution centres are 6000, 4000, 2000 and 1500 respectively.

Transportation cost per unit from different factories to different centres are given below;

Factory	Distribution centres			
	Colombo	Galle	Matara	Kandy
Kurunegala	3	2	7	6
Kaluthara	7	5	2	3
Hambanthota	2	5	4	5

Suggest the optimum transportation schedule and find the minimum cost of transportation.

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Q5   a.   What are the requirements for effective quality control in a production system?

        b.   State clearly the purpose of adopting statistical quality control procedure using control charts.

        c.   Differentiate between assignable causes and random causes.

        d.   On a bar cropping press, steel bars are to be cut continuously to a length of 12cm. Random sample of five pieces cut from bars are taken each hours of Monday production, and each of their mean and range are tabulated as shown in table below.

Sample taken at (hr)	Sample mean	Sample range
0900	12.005	0.007
1000	12.001	0.008
1100	11.993	0.010
1200	11.991	0.003
1300	12.001	0.006
1400	12.003	0.015
1500	11.995	0.011
1600	12.004	0.008
1700	12.003	0.009
1800	12.000	0.010
1900	11.999	0.006
2000	11.997	0.013
2100	11.999	0.011
2200	12.000	0.010

        i.   Setup the control charts in order to check the stability of the process.

        ii.   Comment on the stability of the process taking machine and human factors into consideration.

Q6   a.   Explain why an inventory system is important in production planning?

        b.   What are the two basic types of inventory management systems? Explain them in brief.

        c.   The demand for a product manufactured in factory is 5000 units per year. The fixed administrative cost of placing an order is Rs.1000. If each unit cost is Rs.100 and the stock holding cost is Rs.5 per unit per year calculate;

        i.   economic lot size

        ii.   how often orders are placed

        iii.   the average yearly cost.

Q7.   Write short notes on the following.

        a.   Price Mechanism
        b.   Group Technology
        c.   Budget line
        d.   Cost centres
        e.   Preventive maintenance

Q8.   a.   Differentiate indirect cost from direct cost.

        b.   What do you mean by "sunk cost"?

        c.   A company decided to install a new machine to increase its profit by Rs.50,000.00. There is an alternative solution to invest the money in a bank with 10% annual interest. What is the "opportunity cost" of deciding to install the machine if the machine price is Rs.300,000.00 .

        d.   A factory wanted to dispose an old machine from a production line which has purchased 10 years ago for Rs.500,000.00. After considering the depreciation, present value of the machine is estimated as Rs.200,000.00.

             i.   What is the "Sunk cost" of the machine?

             ii.   The machine can be given for lease for Rs.250,000.00 which includes property taxes and other service charges of Rs.30,000.00 or it can be immediately sold through a broker for Rs.240,000.00 , but broker charges a commission of 5%. What cause of action would you take to get the maximum profit for the company?

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