The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Mechanical Engineering

Study Programme	: Bachelor of Technology Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	**:DMM5836 / MEM5336 Management for Engineers**
Academic Year	: 2019/20
Date	: 25th Saturday , July 2020
Time	: 1330-1630hrs

General Instructions

1. Read all instructions carefully before answering the questions.
2. Answer for each question should commence from a new page.
3. Relevant charts/ codes are provided.
4. This is a Closed Book Test (CBT).
5. Answers should be in clear hand writing.
6. Do not use Red colour pen.

THIS QUESTION PAPER HAS TWO SECTIONS, SECTION A AND B.

ANSWER ANY FIVE (5) PARTS FROM SECTION A AND FIVE (5) QUESTIONS FROM SECTION B.

SECTION A

(a) List and briefly explain the key elements of Management process **4 marks**

(b) What are the five levels identified by Maslow in his theory of motivation? **4 marks**

(c) State the importance of market segmentation and Name four different methods of market segmentation?. **4 marks**

(d) Henry Fayol in his theory of administrative management, laid down several principles for effective management, State five of such principles **4 marks**

(e) Discuss advantages of using critical path method in project scheduling **4 marks**

(f) List down four Ps of marketing . **4 marks**

(g) What are the three types of leadership styles commonly used ? briefly explain them **4 marks**

(h) List four methods to evaluate capital projects **4 marks**

SECTION B

Q1 (a) Explain functional organization structure quoting an example **4 marks**

(b) Discuss advantages and disadvantages of functional organization structure giving at least three facts for each. **4 marks**

(c) For a time bound project what sort of organizational structure do you suggest? Explain reasons (at least 3)?. **4 marks**

(d) Explain the importance of SWOT analysis in an emerging manufacturing organization giving examples. **4 marks**

Q2 (a) Briefly explain merits and demerits of maintaining an optimum inventory in a business organization . **2 marks**

(b) What are the cost associated with inventory management? list at least 4 of these costs . **4 marks**

(c) A company serving as a retailer carry following details.
Forecasted annual demand 4000 units
Holding cost Rs. 180 per unit per year
Ordering cost Rs 900 per order
Unit price Rs 400
No safety stocks and no penalty for stock outs considered.

Find the following

i. Economic order quantity **4 marks**
ii. Time between orders **2 marks**
iii. Average yearly inventory management cost **2 marks**
iv. If the product can be purchased according to the following scheduled price, what is the order quantity company should select? **2 marks**

Table Q2-1 Discounted price schedul

Lot size	Unit price
1-999	400
1000-1999	385
2000 or more	370

Q3 (a) Explain the importance of financial management for non-finance managers and engineers in an organization giving evidence **(4 marks)**

(b) The following balances were extracted from the ABC Company on 30th December 2019. Using the balances and the notes given below prepare the following **(6 marks)**

i. Profit and Loss account for the year ended 31 December 2019.

ii. Balance sheet as at that date **(6 marks)**

Table Q3-1 Trial balance as at 30th December 2019

	Debit (Rs)	Credit (Rs)
Capital		854,200
Purchases	413,900	
Opening stock	94,400	
Sales		573,800
Trade debtors	112,400	
Trade creditors		74,150
Balances at bank	70,000	
Cash	25,900	
Drawings	50,250	
Motor vehicle expenses	16,200	
Motor vehicle	600,000	
Furniture	15,000	
Rent and rates	14,800	
Salaries	61,200	
Electricity	16,650	
General expenses	2,800	
Insurance	8,650	
	1,502,150	1,502,150.00

Notes:

i. Stocks at the end of year Rs 124,950

ii. Prepayments : Insurance 1,200
Rent and rates 800

iii. Accrued expenses; Motor vehicle expenses Rs 1,600
General expenses Rs 900

iv. Depreciation to be charged on straight line basis;
Motor vehicle 5%
Furniture 10%.

Q4 (a) Explain meaning of following terms when scheduling projects using critical path method **3 marks**

i. Slack
ii. Critical path
iii. Late start date (**LS**)

(b) The following activities are a part of project to be scheduled using Critical path method

Table Q4-1 Activity details

Activity	Preceding activity	Time(weeks)
A	-	5
B	A	3
C	A	7
D	C	2
E	B,D	4
F	D	3
G	E,F	11

(i) Draw the network diagram . **5 marks**

(ii) Calculate slack of all the activities and find the activity that can be delayed highest number of days without affecting the project duration. **5 marks**

(iii) State the critical path and project duration **3 marks**

Q5 (a) Explain how you can use transportation algorithm in resource management . **3 marks**

(b) Cement is transported from three factories to four destinations. Capacity of factory A = **250 tons, B=350 tons and C=150 tons**. The destination warehouses (P, Q, R, S) can accept only **100 tons in P, 200 tons in Q, 200 tons in R and 250 tons in S.**

Table Q5-1 Cost table (Rs'000 per ton.)

	P	Q	R	S
A	7	3	8	6
B	4	2	5	10
C	2	6	5	1

(i) Calculate the basic feasible solution clearly stating the method you used **5 marks**

(ii) Check whether the solution obtained is the minimum cost? **4 marks**

(iii) Find the minimum transportation cost . **4 marks**

Q6 (a) A project requires the purchase of a new piece of machinery. You are the project manager and you must choose between two potential machines (Machine A and Machine B), either of which would be suitable. The cost of each machine is identical at $200,000. However, they differ in performance such that the projected future cash flows are different for each machine. Projected cash flows over a 5 year period are as shown in Table Q6-1

Table Q6-1 Five year cash flow figures for Machine A and Machine B

Year	Cash Flow: Machine A	Cash Flow: Machine B
0	-200,000	-200,000
1	140,000	60,000
2	70,000	75,000
3	50,000	90,000
4	25,000	150,000
5	20,000	220,000

(i) Show which machine would be the preferred choice based on a **Payback Period estimate .** **4 marks**

(ii) For each machine calculate **Return on Investment .** **4 marks**

(iii) For each machine, calculate the Net Present Value (NPV) after 5 years assuming a discount (inflation) rate of 2% for each year of the project. Table Q6-2 provides a list of discount factors for a range of discount (inflation) rates **4 marks**

Table Q6-2. Discount Factors for given discount (inflation) rates over a 5-year period

Discount Factors for given discount (inflation) rates over a 5-year period										
Years	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209

(b) Compare three financial project selection models mentioned above discussing the advantages and disadvantages of each .

4 marks

Q7	(a)	Human resources play a major role in any organization. Explain key elements of human resource management process..	**6 marks**
	(b)	Discuss briefly recruitment of human resources with different options available for management indicating merits and demerits of those options. ,	**5 marks**
	(c)	Distinguish a leader and a manager? Give examples where leadership should be highlighted and where management skills should be highlighted.	**5 marks**
Q8	(a)	What are the ergonomics factors you should consider as the manager in a garment factory? .	**4 marks**
	(b)	Explain the possible positive benefits of proper management of ergonomic factors in terms of organizational efficiency	**4 marks**
	(c)	Name possible maintenance techniques that can be practiced in a large-scale manufacturing plant. discuss advantages of one method you consider as appropriate for practicing in the plant.	**4 marks**
	(d)	Engineering ethics is the field of system of moral principles that apply to the practice of engineering. List down four such principles an engineer should possess and maintain throughout his career .	**4 marks**

END