

MMS-T  
Operations Management  
**OM 01**

21.12.2013

Roll No.

Total No.of Printed Pages: 4

Total No.of Questions : 7

Maximum Marks : 60

Duration (hrs.) : 3 Hours

Note : 1.Question No. 1 is compulsory.

2. Attempt any four of the remaining questions. Each Question has three sub -questions. Attempt any two of them.

3.Marks for each question are shown on the right.

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Q1. Development of a new deluxe version of a particular software product is being considered by Hugo's software house. The activities necessary for the completion of this project are listed in the following table: 20 Marks

Activity	Normal Time (Weeks)	Crash Time (Weeks )	Normal Cost (\$)	Crash Cost (\$)	Imm.Pred.
A	4	3	2000	2600	-
B	2	1	2200	2800	-
C	3	3	500	500	-
D	8	4	2300	2600	A
E	6	3	900	1200	B
F	3	2	3000	4200	C
G	4	2	1400	2000	D, E

- What is the project completion duration?
- What is the total cost required for completing the project on normal time?
- If you wish to reduce the time required for completing this project by 1 week which activity should be crashed and how much will this increase the total cost?
- What is the maximum time that can be crashed? How much will that cost extra?

Q2. Audi Motors is considering three sites where it wants to locate a factory to build its new model automobile, the AUDI SUV XL 500. The goal is to locate at a minimum-cost site. The data is given below:

Site	Annualized Fixed Cost (\$)	Variable Cost Per Auto Produced (\$)
A	10,000,000	2500
B	20,000,000	2000
C	25,000,000	1000

The Company knows that it will produce between 0 and 60,000 SUV XL 500 at the new plant each year, but, thus far that is the extent of its knowledge about production plans.

- (a) At what volume will you recommend site A? 5 Marks
- (b) At what volume will you recommend site B? 5 Marks
- (c) At what volume will you recommend site C? 5 Marks

Q3. Management Science Associates promotes its Management Development Seminars by mailing thousands of individually composed and typed letters to various firms. A time study has been conducted on the task of preparing letters for mailing. On the basis of the following observations, Management Science Associates wants to develop a time standard for this task. The firm's personal, delay and fatigue allowance factor is 15%.

Job Element	Observations (minutes)					Performance Rating
	1	2	3	4	5	
(A) Compose and Type letter	8	10	9	21*	11	120%
(B) Type Envelope Address	2	3	2	1	3	105%
(C) Stuff, stamp, Seal and sort Envelopes	2	1	5*	2	1	110%

\* Unusual Observations

- (a) What is the average observed time? 5 Marks
- (b) What is the total normal time? 5 Marks
- (c) What is the standard time? 5 Marks

**Q4. The Accounts receivable department at Risk Wing Manufacturing has been having difficulty getting customers to pay the full amount of their bills. Many customers complain that the bills are not correct and don't reflect the materials that arrived at their receiving docks. Ten samples of 50 bills each were taken over a month's time and the items on the bills checked against the bill of lading sent by the company's shipping department to determine the number of bills that were not correct. The results were:**

Sample No.	No. of incorrect bills	Sample No.	No. of incorrect bills
1	6	6	5
2	5	7	3
3	11	8	4
4	4	9	7
5	0	10	2

- (a) How can we check this process? 5 Marks
- (b) What are the upper and lower control limits? 5 Marks
- (c) Is the process under control? 5 Marks

**Q5. Tax payers are lining up on June 29, in order to file their income-tax returns. The arrival of tax payers is at a mean rate of 5 per minute. The I.T. officer wishes that no tax payer should suffer for more than 10 minutes in the queuing system. Only one clerk is serving.**

- (a) What should be that rate at which the clerk dispose the tax return? 5 Marks
- (b) What is the mean number of tax payers in the waiting line? 5 Marks
- (c) What is the probability of 5 tax payers in the system? 5 Marks

Q6. A product is manufactured in a shop using a five stage process. The first step in the process is to cut the sheet metal to required shape and sizes using a shearing process. After the shearing process the components are subjected to pressing operation to alter the shape of flat sheet as per the design. In the third stage of the process, welding is done to join the components. The next step in the process is a painting operation. After painting the components are packed and kept ready for dispatch. The time taken for each of these operations is 20, 30, 15, 12 and 6 minutes respectively. Presently each stage has only one machine for each operation. Map the process and analyze the capacity with respect to the following scenarios:

- (a) If the shop works for an 8 hour shift with an effective available time of 450 minutes, what is the production capacity of shop? 5 Marks
- (b) Where is the bottleneck in the system? If we want to add one machine where should we make the investment? 5 Marks
- (c) Identify the additional capacity required for a daily production target of 25 units. 5 Marks

Q7. ABC is ISO 14001 certified company. A visitor comes to see an executive without an appointment. Executive's secretary asks him to wait in the reception. The visitor wants to smoke but is unable to locate an ash tray. He therefore tears a paper from a writing pad and makes a funnel out of it and uses it as an ash tray.

- (a) What are the different aspects in this situation pertaining to environmental management system? 5 Marks
- (b) What are the impacts of these aspects? 5 Marks
- (c) What CA/PA should company take? 5 Marks