Sanjay Ghodawat University, Kolhapur

2020-21

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EXM/P/09/00

Year and Program: Final Year B. Tech Mechanical Engineering	**School of Technology**	**Department: Mechanical Engineering**
Course Code: MET 409.2	**Course Title: Industrial Engineering & Management**	**Semester : VII**
Day : Tuesday **Date : 29.12.2020**	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Instructions: 1) All Questions are compulsory.
2) Assume suitable data wherever necessary and state it clearly in answer sheet.

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)**			
a)	The superstars of industry all have a particular leadership style that is recognized by others. These leaders reach the top of their profession because of different traits, behaviour, and situational factors. The following is a brief list of a few of the recognized superstars and some explanation about why they are considered the best. John S. Reed (Chairperson and CEO, Citicorp) John Reed (see the Managerial Application in the chapter) is called one of the true geniuses in the business world. He thinks ahead in 10 to 15-year blocks of time and seems to have an amazing ability to forecast what the future holds. His unique characteristics are patience, stamina, and courage to make tough decisions. He increased Citicorp's bad debt reserves by S3 billion, acknowledging the riskiness of Third World. This took decisive leadership according to experts in the field Kenneth H. Olsen (President and Director, Digital Equipment Corporation (DEC)) Mr. Olsen formed the firm in 1957. He has never appointed a CEO since he runs the company He believed in what he was doing and conveyed this feeling to his employees He works hard and long and stays with an idea from start to finish. Being persistent and exercising control are behaviours that have made Ken Olsen a tough market competitor for IBM D. Wayne Calloway (Chairperson and CEO, PepsiCo., Inc.) Wayne Calloway is considered to be an aggressive and competitive leader. These are behaviours he believes are needed in the soft drink war zone. On the other hand, he is an exceptional manager of people. Although he is a hard driver, people like to be around him because he likes people. He values being able to help people develop by giving them challenging assignments.	8	2	409.2.1

Charles F. Knight (Chairperson and CEO, Emerson Electric Co.)
Mr. Knight is viewed as a strategic thinker and an incredibly disciplined manager One of his important characteristics is the ability to ask tough questions. He asks these questions to stimulate thinking, planning, and teamwork. In a staid industry, Mr. Knight has been able to encourage innovative thinking by subordinates. He has also helped develop managers who, when and if they leave Emerson, are considered disciplined and competent individuals who are well respected.

Donald E Petersen (Chairperson and CEO, Ford Motor Co.)
Donald Petersen in 1988 was riding a wave that has placed him in a position to be considered a hero in the U.S. auto industry. Ford Motor was in terrible shape untill Mr. Petersen came along, His style, his work ethic, and his energy helped make the difference. He is a technical expert who loves cars. He has pressed hard to have For produce only high-quality cars and tracks. If they are not the very tops in quality customers should not buy them. His enthusiasm for quality is so contagious the workers on the Boor of Fond assembly plants are talking up quality. The role model for quality at Ford is Donald E Petersen.

Questions
1. Develop a list of traits and behaviours that these leaders appear to possess and use in their organizations.
2 Which leader appears to be the most task oriented? Which is the most people oriented?
3. Do these leaders display any charismatic leadership qualities? Explain.

b) Construct a two-handed process chart for an operator washing glass bottles with brush whose normal cycle is as follows — 8 — 3 — 409. 2.1

- Pickup two glass bottles with left hand.
- Put them on fixture.
- Press the fixture with right hand towards the brush.
- Extend the left hand and pickup two more bottles.
- Wait few seconds.
- When the washing is complete withdraw fixture with right hand.
- Lift two washed bottles on the side of the table with right hand and simultaneously load.
- Fixtures with two bottles ready for washing.

c) How does work sampling differ from stop watch time study? Describe in brief the factors affecting the accuracy in work sampling as well as stop watch time study method. — 8 — 2 — 409. 2.2

Q.2 Answer the following (any two)

a) For which situations do you recommend to reduce duration of project? State effect on cost of the project for each situation. Also explain the concept of time-cost tradeoff. 8 3 409.2.4

b) Following are the different strategies of maintenance. Suggest at least one example for each strategy. Justify your answer. 8 2 409.2.5
- Time Based Maintenance (TBM)
- Failure Finding Maintenance (FFM)
- Risk Based Maintenance (RBM)
- Condition Based Maintenance (CBM)
- Predictive Maintenance (PDM)
- Corrective Maintenance (CM)
- Deferred Corrective Maintenance
- Emergency Maintenance (EM)

c) Describe a situation where a decision maker faces a decision under uncertainty and where a decision based on maximising the expected monetary value cannot be made. How do you think the decision maker should make the required decision? Explain the steps involved in the process. 8 3 409.2.5

Q.3 Answer the following (any two) –

a) The elemental data on a power hacksaw is as under 9 2 409.2.2

Sr No.	Element	Observed time	Rating	Frequency	Relaxation Allowance
1	Loosen vice	0.15	80	1	12
2	Set part length against bar stop	0.06	100	1	15
3	Tighten vice	0.12	100	1	11
4	Switch on the machine	0.05	80	1	11
5	Unlock arm and set saw to work	0.08	100	1	11
6	Saw off	8.00	100	1	5
7	Raise saw into clear	0.10	90	1	15
8	Switch off the machine	0.05	80	1	11
9	Keep the part aside	0.08	75	1	13
10	Bar changing time	10.00	80	1/50	13
11	Change dull saw to sharp saw	6.00	100	1/500	13

Calculate work content of each element and the standard time for the job if contingency allowance is 2%

b) A small project composed of nine activities whose time estimates are given below — 9 — 2 — 409. 2.4

Activity	A	B	C	D	E	F	G	H	I
Optimistic time	3	3	5	3	3	4	3	6	4
Most likely time	3	6	5	3	6	7	6	9	7
Pessimistic time	9	9	11	3	15	16	9	12	16

Activities A, B & C can start simultaneously. Activity D follows activity A while E follows activity B. Activity D & E are followed by activity G while F is dependent on C, H depends on D and E, I depends on F & G.

i. Construct the network
ii. Identify the critical path
iii. Estimate the project duration

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c) Following failure rates have been observed for a particular type of transistor in computer. — 9 — 2 — 409. 2.5

End of week	1	2	3	4	5	6	7
Probability of Failure	**0.07**	**0.18**	**0.30**	**0.48**	**0.69**	**0.89**	**1.00**

The cost of replacing a failed transistor individually is Rs 20. If all the transistors are replaced simultaneously it would cost Rs 5 per transistor. Any one of the following two options can be followed to replace the transistors.

i. Replace the transistors individually when they fail.
ii. Replace all the transistors simultaneously at fixed intervals and replace the individual transistor as they fail in service during the fixed interval (group replacement policy)

Find out the replacement policy, i.e. individual or group replacement policy. If group replacement policy is optimal then what equal interval should all the transistors be replaced.

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