

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF INDUSTRIAL ENGINEERING

**PART III – INDUSTRIAL ENGINEERING DESIGN– TIE 3220**

SECOND SEMESTER EXAMINATION – APRIL/MAY 2000

Time Allowed: 3 Hours

Answer **FOUR** Questions

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- Qu. 1 a) Explain differences between design for manufacturability (DFM) and design for assembly (DFA). [12]
- b) Which one would be performed first in the design process if they can not be performed concurrently and why? [13]
- Qu. 2 a) Explain why the timing of Industrial Design (ID) effort depends upon the nature of the product being designed. [13]
- b) What do you understand by the following “design for X” (DFX) methodologies:
- i) design for logistics (DFL) [4]
- ii) design for compatibility (DFC) [8]
- Qu. 3 a) Say why Failure Mode and Effect Analysis (FMEA) is a useful tool for product quality assessment, then explain what FMEA is and draw a basic process diagram followed in FMEA. [18]
- b) Would you say the Risk Priority Numbers (RPN) in FMEA are absolute indicators that might be used for product performance comparison? Justify your assertion. [7]
- Qu. 4 a) When is designing with mixed factor levels necessary? [5]
- b) Describe the procedure you would follow to design an experiment to accommodate one factor at 4 levels and four other at two levels each (Ref linear graphs appended). [20]

Qu. 5 The task of designing a new product might involve the following activities:

Activity	Immediate Predecessor	Time (week)
A	-	6
B	A	3
C	A	7
D	C	2
E	B, D	4
F	D	3
G	E, F	7

- a) Draw the network. [8]
- b) Which activities are critical activities in project. [10]
- c) When a task on the critical path is delayed, the completion of the entire project is delayed even though the total amount of work required to complete the project may remain the same. How would you expect such a delay to impact the total cost of the project? [7]

**END OF EXAM**