

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING

Bachelor of Engineering (Honours) Degree in Industrial and Manufacturing Engineering

Concurrent Engineering – TIE 3119

SUPPLEMENTARY EXAMINATION JUNE 2013

Time allowed: 3 hours

Instructions: Answer FOUR (4) questions.

Question 1

- a) Explain the benefits of research and development (R&D) in a company. [6]
- b) Using a product life cycle diagram, explain how companies can cushion themselves against short product life and stiff competition. [5]
- c) Two sets of forces influence the forward move of a product. For each of the two types of products stated underneath, identify five modern factors which influence the forward move.
 - i) Technology push [5]
 - ii) Market pull [5]
 - iii) Explain how the market pull factors you specified above affect the forward move of any product of your choice. [4]

Question 2

- a) Explain the stages in a product life cycle using a product of your own choice. [10]
- b) What do you understand by the following terms as used in concept development for new products?
 - i) Mission statement [3]
 - ii) Innovation [3]
 - iii) Affinity diagram [3]
- c) What are the major pitfalls of the Quality Function Deployment (QFD) method? [6]

Question 3

- a) Explain in detail, the role of a CAD system such as AutoCAD in product design. You should pay attention to advantages and applications brought about by the latest releases of the software. [10]
- b) Briefly explain product architecture. [5]
- c) How does the modularity of a product affect its manufacturability? [5]

- d) What do you understand by prototyping and how does it help to reduce “*Time-to-Market*” in concurrent engineering. [5]

Question 4

- a) Define concurrent engineering. [2]
- b) Explain using a clearly labeled diagram how the Integrated Product Development (IPD) model of Andreasen and Hein facilitates concurrent engineering. [10]
- c) Use a well detailed diagram to explain the five step concept generation methodology. [10]
- d) What are the benefits of using a classification tree in concept generation? [3]

Question 5

- a) Discuss the concept selection process used during product development. [12]
- b) Fig Q5 below shows the structure of a product data management system (PDM). From your own understanding of concurrent engineering, explain how the system supports concurrent product development. [13]

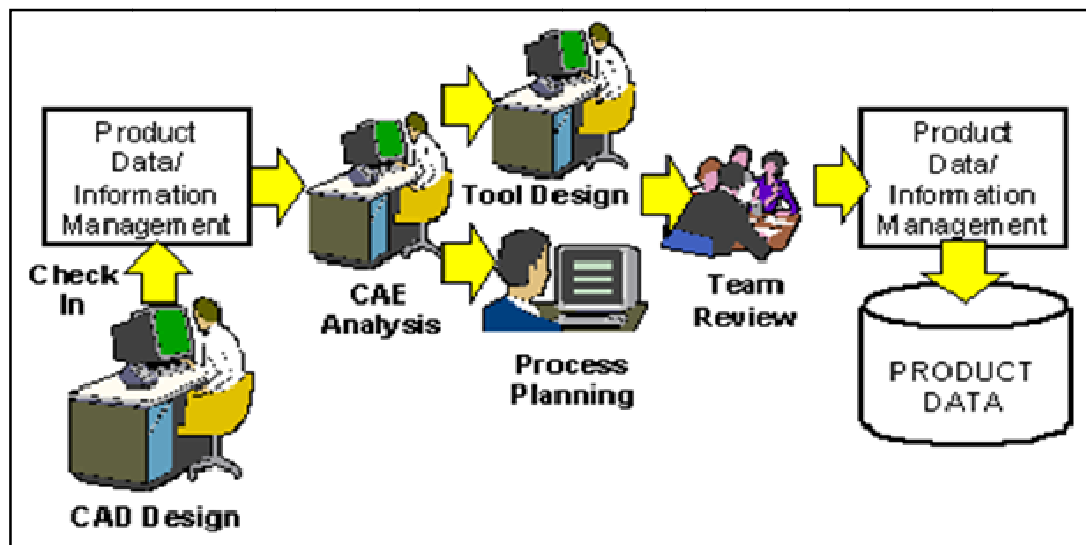


Fig Q5: Product Data Management System (PDM)

END OF EXAM