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THE OPEN UNIVERSITY OF SRI LANKA

FACULTY OF ENGINEERING TECHNOLOGY

BACHELOR OF TECHNOLOGY – LEVEL 06

FINAL EXAMINATION – 2009

MEX6334 – ADVANCED MANUFACTURING TECHNOLOGY

DATE : ***MARCH 16, 2010***

TIME : ***0930 HRS. – 1230 HRS***

DURATION : ***THREE HOURS***

PLEASE READ THE FOLLOWING INSTRUCTIONS BEFORE ANSWERING THE PAPER

INSTRUCTIONS:

1. *This paper is of closed book type.*
2. *This paper consists of eight questions.*
3. *You are required to answer any **five questions only.***
4. *Answers should be written on the answer books provided by the Examinations Division.*

Question 01

(1.1) List the types of manufacturing industries and discuss the applicability of computer integration for such industries.

(1.2) Discuss the evolution stages of automation. Give examples for each stage

(1.3) "CAPP is a typical example of an indirect application of computers in automation". Explain what is understood by "CAPP" and discuss the approaches taken in developing CAPP systems in industry

Question 02

(2.1) State the general characteristics of products to be manufactured using Numerical Control (NC) machines and list out the potential application areas of NC technology.

(2.2) Illustrate, with simple block diagrams, the difference in application of open-loop and closed-loop control for NC and Computer Numerical Control (CNC) machine tools.

(2.3) Today, most of the high-production equipment normally associated with hard (fixed) automation is controlled by computer systems that are programmable. Discuss the advantages of using such systems?

Question 03

(3.1) Numerous problems and deficiencies related to conventional NC machines have influenced machine tool design engineers to employ computer control. Discuss at least four such problems encountered in conventional NC machines..

(3.2) "In hierarchical approach in combined CNC and Direct Numerical Control (DNC) system provides more flexibilities than stand alone DNC or CNC systems." Elaborate briefly on the statement

(3.3) Explain briefly the difference between Hybrid CNC and Straight CNC in the context of machine tool control.

Question 04

(4.1) Define the acronyms CAD and CAM and list out the basic elements/components in each of these systems.

(4.2) Discuss the benefits that can be achieved when CAD and CAM technologies are integrated in manufacturing industry.

(4.3) *FEA applications have become a vital component in CAD environment.* Elaborate on the above statement.

Question 05

(5.1) Describe briefly the major functions to be performed by graphic software in order to fulfill its roll as a main part of a CAD system

(5.2) List out the different communication levels of graphic standards and explain briefly one of such graphic standards.

(5.3) Describe the importance of iterative computer graphics, which has the ability to manipulate images in three-dimensional space

Question 06

(6.1) Distinguish between 2D CAD system and 3D CAD system. Propose a suitable flow chart to represent the sequences and relationships of each step in conventional design process and CAD process..

(6.2) Differentiate between surface modelling and solid modelling. Describe how the primitives and Boolean operations are involved in sold modelling of a simple component, which you are familiar with.

(6.3) An entrepreneur, who is involved in designing car-bodies with distinct shapes, has intention in buying one or more application software to improve the quality of his

products. He seeks your advice on the type of software and their capabilities. How do you advice?

Question 07

(7.1) Discuss with the aid of sketches the operation of a Flexible Manufacturing Cell (FMC) for both cylindrical and prismatic components. Explain how a FMC differs from an Un-manned station

(7.2) Explain the importance of material and tool handling in a manufacturing system. Discuss how a Flexible Manufacturing System (FMS) manages cutting tools and workpieces within the system.

(7.3) Propose suitable members for a project team in FMS design and implementation for an organization familiar to you.

Question 08

Write short notes on any five (04) of the following

(a) Drum and flat bed plotters in a CAD system.

(b) Factors to be considered in purchasing FEA software.

(c) Robot applications in industries.

(d) Positive location as applied to work holding in CNC machines.

(e) Joint configurations in industrial robots.

(f) Specifications of robots.

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