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THE OPEN UNIVERSITY OF SRI LANKA

FACULTY OF ENGINEERING TECHNOLOGY

DIPLOMA IN TECHNOLOGY - LEVEL 03

FINAL EXAMINATION – 2010/11

MEX3174 – PRINCIPLES OF DESIGN
MEX2132 – DESIGN PHILOSOPHY

LIBRARY
01 NOV 2011

DATE : *MARCH 31, 2011*
TIME : *1400 HRS. – 1700 HRS.*
DURATION : *THREE HOURS*

ANSWER ANY FIVE (05) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS

Question 01

i. *In the history, there has not been any exclusive class of persons regarded as Designers. Many complex, functional and beautiful artifacts have been created without consciously designing them.*

Discuss the content of the above paragraph; quoting examples from the history.

Distinguish the manufacturing approach adopted in the past from that at present.

ii. Select an appropriate domestic appliance and explain its evolution over the time.

Question 02

a. "Interviewing the user" and "investigating user behavior" are two methods, which can be used to identify external conditions with which the design must be compatible. Explain these methods briefly and state how they benefit the designer.

b. You are assigned to design two kinds of stools, one to be used at hotels for outdoor eating areas and other to be used by the students at school laboratories.

If you are supposed to collect user information that support the designs; what are three (03) questions you would ask from user?

Distinguish the basic requirements and the properties of the two products (stools) paying attention to aspects such as conformability, manuarability, working environments, appearance, mechanical properties, material properties, etc.

Question 03

i. Different individuals have defined 'Engineering Design' in different manner. Clearly defined 'Engineering Design' from your point of view, with a brief explanation to support your definition.

ii. Clarifying objectives of a design activity is very important for a designer. Why is it so?

iii. State clearly, why economic considerations are important in an engineering design. Explain your answer with an example. Briefly discuss the impact of economic considerations on the design process and final product.

Question 04

A project to design a tea-making machine was started following the objective tree design method. The Black box representation of the overall function is represented as shown in Fig.Q4. The fundamental process to be achieved by this machine is to convert cold water and tea leaves into hot tea and there will also be a need to remove waste tea leaves after brewing process.

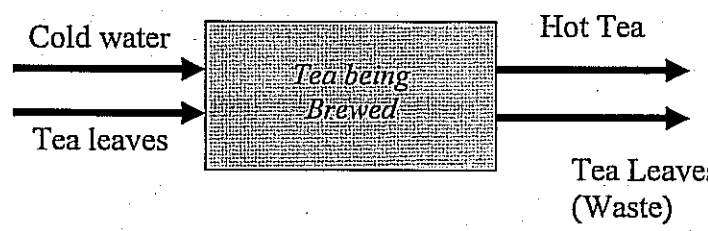


Fig.Q4: Black box model of the tea brewing process

i. Explain clearly what a black box representation is. Also explain the necessity of a black box representation at the beginning of a design exercise.

ii. Identify the appropriate sub functions which need to be used to achieve the design objective and illustrate them in a transparent box model.

Question 05

i. How do you identify /define a society?

ii. 'Technology can change the society'. Explain your opinion using appropriate examples.

iii. Consider a latest engineering product and explain the factors that the designer has considered related to environment, ergonomics, sustainability and economics.

Question 06

Imagine that you are an engineer, given the task of designing a camera tripod to use by professional cameramen.

i. State four (04) questions you would ask from the client to clarify the design objectives.

ii. Fig.Q6 shows a drawing of a proposed tripod.

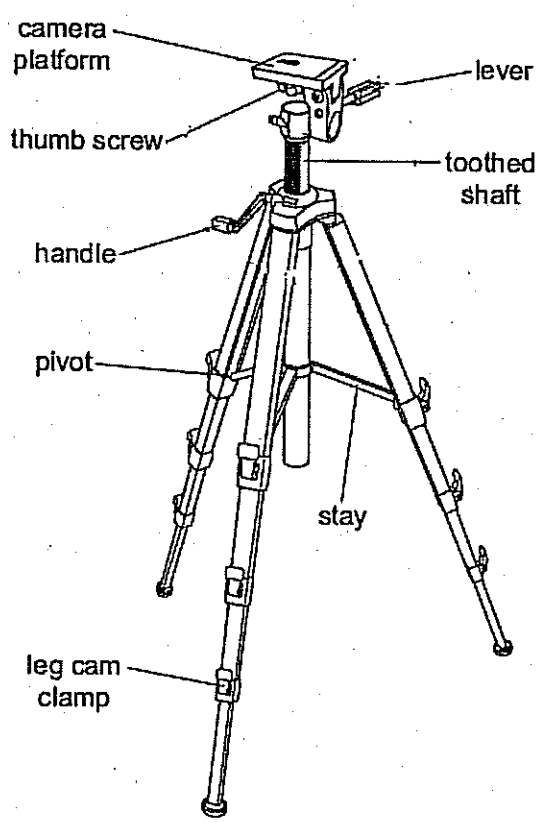


Fig.Q6: Sketch of a proposed tripod.

a. What would be the expected purpose of the stay, leg cam clamp, lever and thumb screw?

b. The purpose of the handle is to adjust the height of the tripod platform to a suitable level. Illustrate a possible mechanism which can be adapted where turning the handle should adjust the height.
Also explain the shape of the handle in terms of mechanical advantage.

Question 07

i. Creative design methods attempts promoting the flow of ideas, by removing mental blocks that inhibit creativity. State two creative design methods and briefly explain one.

ii. Following methods are used to overcome difficulties in design problems. Describe each of them clearly stating its applicability to result a better design.

Questionnaires
Analysis of interconnected decision areas (AIDA)
Interaction matrix.

Question 08

Answer any three (03) of the following.

i. Explain the term **Design for sustainability.**

ii. *'Whole building' design not only looks at how materials, systems and products of a building connect and overlap, but also looks at how the building and its systems can be integrated with supporting systems on its site and its community.*

List five such supporting systems which should be considered related to the site and to the local community.

iii. Importance of Ergonomic consideration in modern engineering designs.

iv. *People have always designed things and even animals make things to fulfill basic needs.*

Distinguish design by humans and design by other animal in the context of evolution and development of the design process.

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