00117

The Open University of Sri Lanka
Faculty of Engineering Technology

Study Programme	:	Diploma in Technology / Bachelor of Technology (Engineering)
Name of the Examination	:	Final Examination
Course Code and Title	:	**MEX3174 Principles of Design**
Academic Year	:	2013/14
Date	:	September 04, 2014
Time	:	0930 hrs. – 1230 hrs.
Duration	:	3 hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of 8 questions. All questions carry equal marks.
3. Answer any 5 questions only.

Question 01

a. Design Council defines 'engineering design' as *an activity that translates an idea into a blueprint for something useful.*
Do you agree to this definition?
If you agree, justify your answer quoting appropriate examples. If you do not agree, define 'engineering design' in your own words and distinguish your definition with the Design Council's definition.

b. Select any appropriate modern artifact and elucidate how it evolves over the past years in order to make it more suitable to the requirements of the modern society.

c. List duties of an Engineering works in a modern manufacturing facility.

Question 02

a. *New designs/artifacts as a result of advancement of technology do not always uplift the social standards, but destroy the society.*
Justify the above statement using suitable examples of such designs/artifacts.

b. Authors such as McGinn and Winston list **Complexity**, **Dependency** and **Valence** are three of the general characteristics of technology. Explain **Complexity**, **Dependency** and **Valence** within the context of modern technology.

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Question 03

a. *It says that there is a tread to move design policy so that it includes the important aspects of the* ***holistic approach*** *to design.*
Explain what you understand by **holistic approach** to design, listing the important aspects of it.

b. What do you understand by **Aesthetic Factors** in design?
Select any appropriate modern artifact and clearly explain that the designer has given sufficient considerations to **Aesthetic Factors** at the design stage.

c. List three (03) ways to promote sustainable consumption and production.

Question 04

a. The objective tree method is popularly used to clarify objectives of a design exercise. Explain what objective tree method is?

b. You are required to re-design the main entrance of the Open University which situated at the Nugegoda-Nawala road.

   i. Prepare a list of design objectives (*Note: in practice these are finalized from questioning the users, administration, security personnel, etc*).

   ii. Order the list into sets of high-level and lower-level (sub) objectives according to their hierarchical level.

   iii. Draw a diagrammatic tree of objectives, showing hierarchical relationships and interconnections. The branches (or roots) in the tree should represent relationship which suggest means of achieving objectives.

Question 05

a. Explain why it is important to follow a Design Process in engineering.

b. Starting from the **definition of the problem** write your own Design Process.

c. Assume that you are supposed to find a solution to the problem, 'that there are no facilities for a disable person using a wheel chair to get into commuter buses in Sri Lanka'. List down the activities you conduct at each stage of the proposed design process under part (b).

Question 06

The black box representation of functional analysis method is shown in Fig.Q6, where black box represents the overall function of the design.

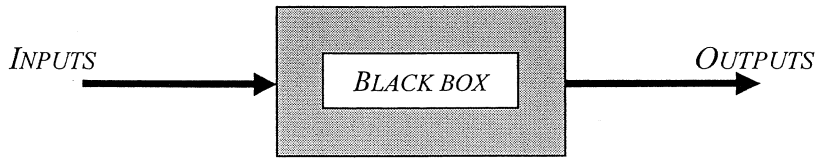


Fig.Q6

a. Explain what are the inputs and outputs.

b. Describe **Back box** and **Transparent box**.

c. What are the consequences if the system boundary is too narrow?

d. What are the actions that designer can implement in order to widen the design boundaries?

Question 07

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 it benefits to the designer.

b. You are assigned to design two types of dining chairs, one to be used by children under 10 years old when having food at hotels and other is to be used by adults in hotels near the sea.

   Distinguish the properties and requirements of the two products paying attention to aspects such as conformability, manuarability, working environments, appearance, mechanical properties, material properties and safety.

Question 08

Answer any **Four (04)** of the following.

a. Creative design methods attempt to promote the flow of ideas. **Brainstorming** is the most widely known method to promote creativity. Explain what Brainstorming is.

b. Explain the term 'division of labour' and list its advantages and disadvantages.

c. Briefly explain the four (4) steps in performance specification procedure which intends to help in defining the design problem.

d. The way and approach of the Scientists and Engineers solving a problem is different. Do you agree to this statement? Justify your answer.

e. Elaborate the role of an Engineering Designer in modern design environment.

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