



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

SET 310: INNOVATION AND DESIGN

DATE: Tuesday 6th December 2011

TIME: 8.00a.m – 10.00a.m

INSTRUCTIONS

Answer any THREE (3) questions

All questions carry equal marks

Start each question on a fresh page.

- Q 1. a) Briefly describe the following terms
- (i) Engineering design
 - (ii) Product design
 - (iii) System design
 - (iv) Graphics design
 - (v) Mechanical design in contrast with Mechanical Engineering Design (10 marks)
- b) Almost everyone is involved with design in one way or another even in daily living, because problems are posed and situations arise which must be solved. Consider the case of a family of Mr. Njuguna and his wife Nancy who have three children. Mr. Njuguna is employed but Nancy is a house wife, their three children Rose 12, Stephen 10 and Ruth 8, and discuss how you could plan a family vacation for them. When is the optimal solution reached. (10 marks)
- Q 2. a) i) Discuss the meaning of DESIGN (2 marks)
- ii) Distinguish between 'the statement of a need' and 'identification of the problem' as used in design. Briefly explain the difference between a well-defined and an ill-defined need, Give examples. (8 marks)
- b) The total design process is made up of phases. Explain, briefly, the phases to answer the questions. How does it begin? What happens next? What factors influence or control the decisions which are made? Finally how does this design process end? (10 marks)

- Q. 3. a) Discuss the terms:- (i) Innovation (ii) Design
(iii) Product Engineering (iv) Design mock-up **(8 marks)**
- b) Briefly explain, What is involved in a 'Systematic Design Technique'
Using a simple process show how to achieve a design solution using this technique.
(use a sketch)
- Describe and distinguish the various stages **(12 marks)**
- Q. 4. a) Distinguish between (i) Primary needs and Secondary needs
(ii) System design and product design **(8 marks)**
- b) When we use the expression Design Considerations we are referring to some characteristics which influence the design of the elements or perhaps, the entire system. Explain it.
- Name at least ten important design considerations and discuss them briefly in as far as they impact the design of a system or element e.t.c. **(12 marks)**
- Q. 5. a) The consideration of cost plays an important role in the design decision process. Explain this briefly. **(5 marks)**
- b) Briefly describe as a principle of cost reduction the following:-
(i) The use of standard sizes
(ii) Large tolerances
(iii) Breakeven Points
(iv) Cost estimates **(15 marks)**