



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

EMG 2306 : INTRODUCTION TO ENGINEERING DESIGN

END OF SEMESTER EXAMINATION

SERIES: DEC 2016

TIME: 2 HOURS

DATE: Pick Date Dec 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

a) Elaborate on conceptual design as a phase in the engineering design process.

(14 marks)

b) For the CPM network in figure 1(b) determine the earliest start time (ES) and the latest start time (LS) for the network
The time is in hours

(12 marks)

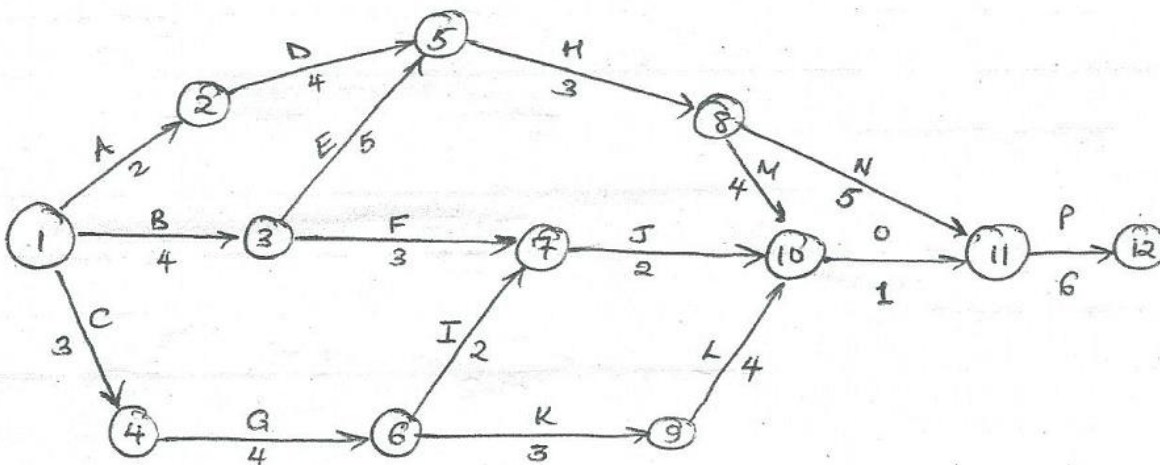


Fig 1(b)

c) Discuss in detail the challenges presented by the design environment. **(4 marks)**

Question TWO

a) Elaborate clearly with the diagrams the two types of tolerances used in parametric design in parts designed for assembly **(20 marks)**

Question THREE

a) Sketch a graph of product cost commitment during phases of the design process. **(7 marks)**

b) Explain how the study of ergonomics and anthropometrics has affected engineering designs **(13 marks)**

c) Discuss the design for manufacture guidelines. **(10 marks)**

Question FOUR

a) Explain reliability and safety in engineering design. **(4 marks)**

b) Discuss methods of developing cost estimates for a design by industries **(9 marks)**

c) Discuss and illustrate by use of diagrams normal distribution frequency as used in reliability theory with an example of its area of application. **(7 marks)**

Question FIVE

a) Explain the Gantt chart and Work Breakdown Structure as tools used in project planning **(10 Marks)**

b) Discuss system reliability and its application in design of mechanical and electronic systems. **(10 marks)**