# MACHAKOS UNIVERSITY COLLEGE

**(A Constituent College of Kenyatta University)**
**University Examinations for 2014/2015 Academic Year**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY**

**SECOND SEMESTER EXAMINATION BACHELOR OF COMPUTER SCIENCE**

**SCO 302: SOFTWARE PROJECT MANAGEMENT**

Date:   31/3/2015                                            Time: 8:30 – 10:30 AM

**INSTRUCTIONS:**

**ANSWER QUESTION ONE AND ANY OTHER TWO**

## Question 1 (30 Marks)

a)  Define black box and white box testing. What are the advantages of each approach? Why are both necessary?                                                    **(6 marks)**

b)  Using a valid example, differentiate between a **work breakdown structure** (WBS) and a **product breakdown structure** (PBS)                              **(4 marks)**

c)  Table 1 below shows the state of a project at week 6:

| Task | Description | Duration (Working Days) | Predecessors | % complete |
|------|-------------|-------------------------|--------------|------------|
| A | Requirements Analysis | 5 | | 100 |
| B | Systems Design | 15 | A | 100 |
| C | Programming | 25 | B | 75 |
| D | Telecoms | 15 | B | 50 |
| E | Hardware installation | 30 | B | 30 |
| F | Integration | 30 | C, D | 10 |
| G | System testing | 30 | E, F | 0 |
| H | Training/support | 5 | G | 0 |
| I | Handover/Go-live | 5 | H | 0 |

**Assumptions:**

- The project team will work a standard working week (5 working days in 1 week)

- All tasks will start as soon as possible:

   i. Produce a well labeled Gantt chart for the project. **(5 marks)**

   ii. Determine the critical path of the project **(3 marks)**

   iii. Calculate the planned duration of the project in weeks **(3 marks)**

   iv. Identify any non-critical tasks and the float (free slack) on each. **(4 marks)**

d) Why is software maintenance difficult? Why is it necessary **(5 marks)**


## Question 2 (20 Marks)

a) Software maintenance activities can be classified as corrective (fixing errors), adaptive (responding to change) and perfective (improving the original software). Why is this distinction useful? How would you expect the proportion of time spent on each activity to change as the software ages **(5 marks)**

b) **Constructive Cost Model**

   i. Give your understanding of the term COCOMO as used in Software Project Management **(4 marks)**

   ii. Assume that the size of an organic type software product has been estimated to be 32,000 lines of source code. Assume that the average salary of software engineers be K.Shs. 70,000/- per month.

     Determine the effort required to develop the software product and the nominal development time. **(5 marks)**

   iii. Discuss any advantages and disadvantages of the COCOMO. **(6 marks)**


## Question 3 (20 Marks)

a) Your company has just acquired a smaller company that sells office automation software. The smaller company's spreadsheet software has a large market share, with many satisfied users (A major reason for the acquisition was that these existing users are potential customers for your company's other products). Unfortunately, no documentation for the spreadsheet software can be found, and the source code is not

commented. How would you go about maintaining this software to keep the
customers happy **(8 marks)**

b) A project manager can modify three basic elements of a software project: the
**resources** available, the **time** available, and the **amount** of product to be built.
Describe how each of these three can be varied during a development process in
order to ensure the resulting software is of high quality. **(6 marks)**

c) Risk management is an essential part of project management. Describe **THREE**
typical risks that can occur in a software project, and for each suggest two possible
countermeasures. **(6 marks)**


## Question 4 (20 Marks)

a) Brooks argues that adding people to a project that is running late will make it even
later. Why would this be the case? **(4 marks)**

b) The company you work for develops internet applications. To reduce time to
market, the company is considering dispensing altogether with integration testing.
Instead, the company plans to rely on Beta testing, in which free trial versions of
new software will be sent to existing, trusted customers to try out, with the
agreement that they will report any problems they encounter. Explain TWO
advantages and TWO disadvantages of this approach **(8 marks)**

c) Define the terms Verification and Validation. Why is each insufficient on its own?
What makes validation particularly hard? **(4 marks)**

d) **Infiniti Systems** has traditionally kept its software maintenance teams separate
from development teams. It now wants to move to a mission orientation where a
single team will be responsible for the development and maintenance of each
software product. What advantages should your company expect from the re-
organization, and what problems might it encounter? **(4 marks)**


## QUESTION 5 (20 Marks)

a) DeMarco states that "you cannot control what you cannot measure". What does this
mean for software project managers **(4 marks)**

b) What does it mean to take a systems view of a project? How does taking a systems view of a project apply to project management? **(4 marks)**

c) Explain the main processes included in project quality management?

**(6 marks)**

d) List and explain the management skills required in a software project. **(6 marks)**