KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

FOURTH YEAR FIRST SEMESTER
SPECIAL / SUPPLEMENTARY EXAMINATIONS

FOR THE BACHELOR OF RENEWABLE ENERGY AND BIOFUELS TECHNOLOGY

COURSE CODE: IET 481

COURSE TITLE: PROJECT MANAGEMENT FOR TECHNOLOGISTS

DURATION: 2 HOURS

DATE: 05/10/2018   TIME: 11:30-1:30PM

<u>INSTRUCTIONS TO CANDIDATES</u>
- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

This paper consists of **3** printed pages. Please Turn Over
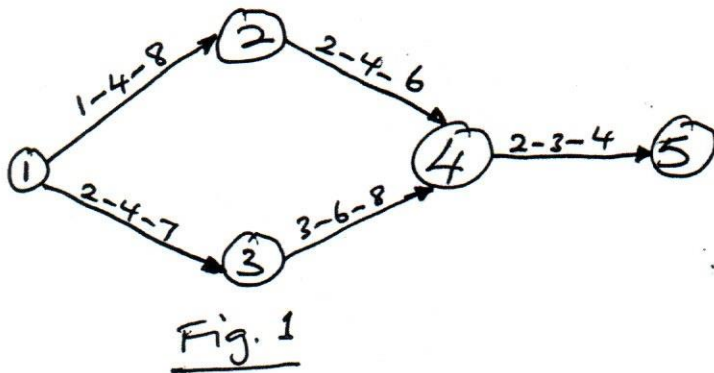
QUESTION 1 (30 marks)

a. Discuss the two quantitative project management techniques giving three (3) examples of each (15 marks).
b. State the advantages and disadvantages of computer simulations in project management (15 marks).

QUESTION 2 (20 marks)

A project consists of five activities as shown in the PERT network Fig. 1. The three estimates of activity duration along with the associated probability are given in the Table below. Using linear congruential method, generate 5 random numbers for each activity if $X_0 = 27$, $a = 17$, $c = 43$ and $m = 10$. Simulate the duration of the project five times and estimate the chances of various paths being critical. Also determine the average duration of the project.

Fig. 1

Activity	Days	Prob.
1-2	1	0.2
	4	0.5
	8	0.3
1-3	2	0.3
	4	0.5
	7	0.2
2-4	2	0.3
	4	0.3
	6	0.4
3-4	3	0.3
	6	0.4
	8	0.3
4-5	2	0.2
	3	0.2
	4	0.6

QUESTION 3 (20 marks)

Solve the following Linear Programming problem using simplex method.

Maximize $\qquad$ $z = 3x_1 + 2x_2 + 5x_3$

Subject to $\qquad$ $x_1 + 2x_2 + 3 \le 430$

$\qquad\qquad$ $3x_1 + 2x_3 \le 460$

$\qquad\qquad$ $x_1 + 4x_2 \le 420$

$\qquad\qquad$ $x_1, x_2, x_3 \ge 0$

QUESTION 4 (20 marks)

A project has twelve activities. The activity duration and the precedence relationship is given in Fig. 2. Find the total, free and independent floats for each activity. Identify the critical activities, the critical path and the project duration.
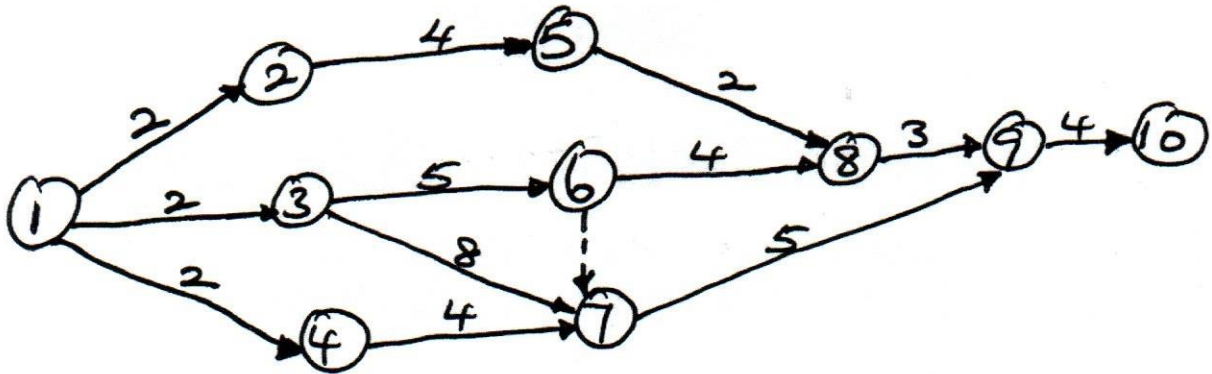

Fig. 2

QUESTION 5 (20 marks)

a. Describe the Monte Carlo Simulation and how it works (10 marks).
b. Compare and contrast CPM and PERT as used in project management (10 marks).