

60



KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2015/2016 ACADEMIC YEAR**

**SECOND YEAR SECOND SEMESTER
MAIN EXAMINATIONS**

FOR THE DEGREE OF BSc. (RENEWABLE ENERGY)

COURSE CODE: IET 282

COURSE TITLE: ENERGY MANAGEMENT

DURATION: 2 HOURS

DATE: TUESDAY 10TH MAY 2016 TIME: 8 – 10AM

INSTRUCTIONS TO CANDIDATES

- 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



KIBU observes ZERO tolerance to examination cheating

Question One

- (a) State the commonly recommended immediate term energy savings strategies (3 Marks)
- (b) State the base line data that an audit team should collect while conducting detailed energy audit (6 Marks)
- (c) Give a typical energy audit reporting format. (14 Marks)
- (d) Describe typical components of tariff structure (7 Marks)

Question Two

The contracted demand of a chemical plant is 1000 KVA. The average monthly MD recorded is 800 KVA only. The average monthly energy consumption is 160,000 units. The utility bill analysis provides the following billing components. Minimum monthly billing demand is 80% of contracted MD or the actual recorded MD whichever is higher. Minimum power factor may be maintained is .9

0.5% of unit charge for every .01 point below the .90 PF will be charged additionally as penalty.

0.5% of unit charge for every .01 point above the .95 PF will be given as incentive for maintaining higher power factor.

MD charge is Rs.300 per KVA

Energy charges is Shs. 4 per kWh

Energy Manager of the plant has proposed to improve the power factor from 0.86 to 0.96 by adding capacitors in the distribution system.

Determine the following:

- (i) MD reduction in KVA
- (ii) Monthly Cost saving

(20 Marks)

Question Three

- (a) State the basic principles of energy management (5 Marks)
- (b) Define 'Energy Monitoring and targeting' (5 Marks)
- (c) Briefly list Benefits that arise from an effective M&T system (5 Marks)
- (d) Explain what is meant by CUSUM (5 Marks)

Question Four

- (a) Explain the importance of TOD (time of the day) tariff (5 Marks)
- (b) Explain how benchmarking of energy consumption internally and externally may be useful. (5 Marks)

(c) "One Unit saved in Industry is equal to Two Units generated in the Power Station"-
Justify this Statement. (5 Marks)

(d) Explain briefly the need for managerial skills in energy management. (5 Marks)

Question Five

(a) Explain how do an Industry, nation and globe would benefit from energy efficiency programs (5 Marks)

(b) List the strategies for better energy security of the nation (10 Marks)

(c) The Avg. PF of an engineering industry is 0.8 with electrical load of 400 KW. Determine the KVAR required if PF is improved to 0.9 to avoid PF penalty and MD reduction

(5 Marks)