KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2016/2017 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER
SPECIAL / SUPPLEMENTARY EXAMINATIONS

FOR THE BACHELOR OF RENEWABLE ENERGY AND BIOFUELS TECHNOLOGY

COURSE CODE: SUT 262

COURSE TITLE: ELECTRICAL TECHNOLOGY

DURATION: 2 HOURS

DATE: 11/10/2018   **TIME: 3 – 5PM**

Question 1

Using diagram explain the difference between a load curve and a load duration curve and why they are important to system operators.

5 Marks

a. Explain the working process of a thermal power plant

5 Marks

b. Briefly, explain why the efficiency of Thermal Power Plant is Low?

3 Marks

Question 2

a. Explain the three ways in which the efficiency of Thermal Plant can be improved based on an ideal reheat Rankine cycle.

10 Marks

b. What are the Advantages and Disadvantages of Thermal Power Plant?

6 Marks

c. Explain ash disposal section in steam power plant

4 Marks

Question 3

a. A coil of resistance R ohms and inductance L henrys is connected in series with a 50μF capacitor. If the supply voltage is 225 V at 50 Hz and the current flowing in the circuit is $1.5\angle-30°$A, determine the values of R and L. Determine also the voltage across the coil and the voltage across the capacitor.

10 Marks

b. Two impedances in an electrical network are given by $Z1=4.7\angle35°$ and $Z2 =7.3\angle - 48°$. Determine in polar form the total impedance ZT given that ZT = Z1Z2/(Z1 +Z2)

10 Marks

Question 4

a. List the five Disadvantages of Diesel Power Plants

4 Marks

b. What is meant by load factor and diversity factor?

4 Marks

c. The maximum (peak) load on a thermal power plant of 120 MW capacity is 80 MW at an annual load factor of 65%. The loads having maximum demands of 25MW, 20 MW, 8 MW and, 5MW are connected to the power station. Determine (i) Average load on power station (ii) Energy generated per year (iii) Demand factor (iv) Diversity factor.

12 Marks

Question 5

a. Use a diagram to describe the working principle of Internal Combustion and Spark Ignition engine.

10 Marks

b. A diesel engine develops 300 H.P. to overcome friction and delivers 1200 BHP. Air consumption is 120 kg per minute. The air-fuel ratio is 12 to 1. Find the following:

(i) IHP, (ii) Mechanical efficiency, (iii) Specific fuel consumption.

10 Marks

Question 6

a. What are the major components of a Hydroelectric Power Plant?

6 Marks

b. What is the purpose of surge tank in a hydroelectric power plant?

4 Marks

c. State and explain the factors to be considered for the selection of a site for the hydro power plant.

10 Marks