



MACHAKOS UNIVERSITY

University Examinations 2017/2018

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION DIPLOMA IN
ELECTRICAL ENGINEERING

EED 301: ELEMENTS OF ELECTRICAL POWER SYSTEM 1

DATE: 14/12/2017

TIME: 8:30 – 10:30 AM

INSTRUCTIONS:

*This paper consists of **FIVE** Questions. Answer Question ONE and ANY OTHER TWO question*

1. (a) State any FOUR sources of electrical power (4 marks)
- (b) With the aid of a well labelled diagram, explain the construction of hydroelectric power station (18 marks)
- (c) State any FIVE advantages and THREE disadvantages of hydroelectric power station (8 marks)

SECTION B: ANSWER ANY TWO QUESTION FROM THIS SECTION

2. (a) Define the following terms
 - i. Load factor
 - ii. Plant capacity
 - iii. Diversity factor
 - iv. Maximum demand (8 marks)
- (b) A generating station supplies the following loads 20000KW, 9500KW, 6000KW, and 450KW. The station has a max demand of 25000KW. The annual load factor of the station is 48% calculate
 - i. The number of units supplied annually
 - ii. The diversity factor
 - iii. The demand factor (12marks)

- 3 (a) State three types of overhead transmission insulators (3 marks)
- (b) State any TWO advantages and TWO disadvantages of wooden poles (4 marks)
- (c) With the aid of a well labelled diagram explain the operation of nuclear reactor. (13 marks)
4. (a) A hydro electric power station has a reservoir of area 2.5 square kilometres and capacity of $5 \times 10^6 \text{ M}^3$. The effective head of water is 100meters. The penstock turbine and generation efficiencies are respectively 95%, 90% and 85%.
- Calculate**
- i. The total electrical energy that can be generated from the power station.
- ii. If a load of 15000KW has been supplied for 3hours, find the fall in reservoir level (16 marks)
- b) State and explain any FOUR factors to be considered when selecting a steam power plant site (4 marks)
5. a) With the aid of a diagram explain the operation of steam power plant size (12 marks)
- b) With an aid of a diagram explain the operation of wind power generating station. (8 marks)