



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

DIPLOMA IN ELECTRICAL ENGINEERING

POWER SYSTEMS 1

DATE: 24/3/2021

TIME: 8.30-10.30 AM

INSTRUCTIONS

Answer Question One and any Other Two Questions

QUESTION ONE

- a) List any **Four** sources of electrical energy (4 marks)
- b) Explain any **Four** advantages of electrical supply. (4 marks)
- c) With the aid of a schematic diagram explain the operation of a hydro power plant. (4 marks)
- d) List any **Three** elements of a transmission system. (3 marks)
- e) Outline **Three** characteristics of a good;
 - i. conductors
 - ii. insulator (4 marks)
- f) Highlight the **Five** advantages of suspension insulators. (5 marks)
- g) List any **Four** advantages of hydro power plant. (4 marks)
- h) List any **Two** methods of improving string efficiency. (2 marks)

QUESTION TWO

- a) Explain the various costs in economics of scale in overhead lines (6 marks)
- b)
 - i) Define a tariff (2 marks)
 - ii List any six characteristics of a desirable tariff (6 marks)
 - iii Explain any six reasons importances of load curves in a power station (6 marks)

QUESTION THREE

- a) State any Four factors to consider for the location of a Hydro power plant. (4 marks)
- b) State Three major advantages of AC distribution system as compared to DC distribution. (3 marks)
- c) compare and contrast overhead and underground supply (9 marks)
- d) Explain any Two types of tariffs commonly applied in economics of supply (4 marks)

QUESTION FOUR

- a) Define the following terms
 - i. demand
 - ii. connected load
 - iii. Demand factor (6 marks)
- b) With the aid of a diagram explain the operation of a rewirable fuse (8 marks)
- c) List any Six advantages of oil circuit breakers (6 marks)

QUESTION FIVE

- a) With the aid of a diagram list the major parts of an underground cable. (10 marks)
- b) Derive an expression for resistance of an underground cable. (4 marks)
- c) List any Three methods of laying underground cables. (3 marks)
- d) List any Three methods of reducing stresses in underground cables (3 marks)