



MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

CERTIFICATE IN ELECTRICAL AND ELECTRONIC ENGINEERING

1601/105 - ELECTRICAL INSTALLATION TECHNOLOGY 1

DATE: 15/4/2019

TIME: 3 HOURS

INSTRUCTIONS:

Attempt all questions

QUESTION ONE (30 MARKS)

- a) Draw labelled circuit diagram for each of the following D.C machines:
 - i. Separately excited D.C. generator;
 - ii. Shunt motor;
 - iii. Series motor. (6 marks)
- b) Describe the constructional features of each of the following parts of a D.C. machine
 - i. armature;
 - ii. commutator;
 - iii. field winding (6 marks)
- c) Outline three checks carried out on a D.C. motor. (3 marks)
- d) (Draw a labelled diagram of a split phase A.C single phase induction motor. (3 marks)
- e) state the purpose of starting winding in (d) (i) above. (2 marks)

QUESTION TWO (20 MARKS)

- a) State any three advantages of a grid system. (3 marks)
- b) Outline the functions of the following electric power authorities in Kenya:

- i) Kenya generating company;
- ii) Kenya Power Company. (2 marks)
- c) Name:
 - i) Four sources of energy used to generate electric power in Kenya.
 - ii) Three constituents of a hydro-electric power plant. (7 marks)
- d) Draw a labelled diagram of a three phase four wire system supplying both single phase and three phase loads. (5 marks)
- e) State three advantages of A.C system over D.C system of power supply. (3 marks)

QUESTION THREE (20 MARKS)

- a) i State five factors that affect the rating of cables.
- ii Calculate the sizes of cables given the following: -
 - I. 1/1.3 mm
 - II. 127/2.52 mm (7 marks)
- b) A PVC insulated twin sheathed cable 20m long supplies a current from the consumer unit to a 6KW 240V cooker which incorporates a socket outlet. Determine the minimum size of cable required using the appropriate table provided refer to table 3M. (7 marks)
- c) Describe with the aid of a labelled diagram describe the pony method of starting a synchronous motor. (6 marks)

QUESTION FOUR (20 MARKS)

- a) Define the following terms with reference to cables
 - i) Conductor
 - ii) Insulator (4 marks)
- b) Explain the following types of cables:
 - i) Polychloroprene
 - ii) Mineral Insulation (4 marks)
- c) A supply is taken at 240V single phase. From the main switch to the main distribution board the distance is 55 metres, and the load is 40A. From the m.d.b. to the sub circuit fuse board the distance is 45 metres, and the load is 15A. A final sub circuit supplies and appliance of 1200W rating. The cross - sectional area of the sub circuit wires is 2.5 square mm, and the distance to the appliance is 25 metres.

Calculate the sizes of the main cable and the sub main cable to ensure that the voltage drop from the point of supply to the appliance comes within the limits imposed by the I.E.E regulations, and that no unnecessary copper to be used. Refer to table 1 and the diagram Fig 1 attached (12 marks)

QUESTION FIVE (20 MARKS)

- a) Define gas turbine power plant (2 marks)
- b) State two disadvantages and advantages of gas power plants (4 marks)
- c) With the aid of a labelled diagram describe the constituents of a gas power plants geothermal power station. (12 marks)