



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SECOND TERM EXAMINATION FOR

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

2601/204C, ELECTRICAL CIRCUIT ANALYSIS

DATE: 9/6/2021

TIME: 2.30-5.30 PM

INSTRUCTIONS

ANSWER ALL QUESTIONS

QUESTION ONE

- a) State any **four** advantage of squirrel cage induction motor (4 marks)
- b) Explain the operation of a three-phase induction motor (6 marks)
- c) Explain the operation of linear motor (4 marks)
- d) A 4pole ,3 phase induction motor operation from 60 Hz supply. Calculate
 - i. Synchronous speed
 - ii. Rotor speed at a slip of 5 %
 - iii. frequency of rotor current at stand still (6 marks)

QUESTION TWO

- a) Explain the following terms as applied to duty cycles
 - i. Continuous rating
 - ii. Intermittent
 - iii. Short time rating (6 marks)
- b) List any six factors to consider for the choice of a drive (6 marks)

- c) Explain the following drives
 - i. Group
 - ii. Individual (4 marks)
- d) List any FOUR types of enclosures for motors (4 marks)

QUESTION THREE

- a) State any **four** conditions to be observed before synchronous a machine to supply (4 marks)
- b) 11000V, three phase synchronous motor is 50A .The reactance and resistance per phase are 40Ω and 1Ω respectively
Calculate
 - i. power supplied at 0.8 p.f lagging
 - ii. Induced E.M.F for p.f 0.8 lagging
 - iii. induced E.M.F for a p.f 0.6 lagging (16 marks)

QUESTION FOUR

- a) Explain the THREE classification of DC Machines (6 marks)
- b) A 240v d.c motor has a shunt resistance of 50Ω . The armature resistance is 0.4Ω . The supply current is 20A. Calculate the back e.m.f (4 marks)
- c) With the aid of a diagram, explain difference between One port and Two port networks (4 marks)
- d) List the Four impedance Z parameters and boundary conditions (6 marks)

QUESTION FIVE

- a) List any **three** characteristics of linear motor (6 marks)
- b) With the aids of a diagram explain the operation of
 - i. Capacitor start –run motor
 - ii. Reluctance
 - iii. hysteresis motor (14 marks)