



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

EED 214: ELECTRICAL MACHINES 11

DATE: 24/3/2021

TIME: 11.00-1.00 PM

INSTRUCTIONS

Answer Question One and any Other Two 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) List any **four** characteristics of synchronous motor (4 marks)
- d) Explain any **three** effects of changing field excitation of any synchronous motor (3 marks)
- e) Explain the operation of linear motor (7 marks)
- f) 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) List any major faults and remedy for
 - i. DC motor
 - ii. DC generator (6 marks)
- d) List the applications of Dc shunt Motors (4 marks)

QUESTION FIVE

- a) List any **three** characteristics of linear motor (6 marks)
- b) With the aids of a diagram explain the operation of a A.C series motor (14 marks)