MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FIRST SEMESTER EXAMINATION FOR DIPLOMA IN MECHANICAL ENGINEERING

SUPPLEMENTARY EXAMINATION

MED-PR-214: ELECTRICAL MACHINES I

DATE: 3/8/2016 **TIME: 2.00-4.00 PM**

INSTRUCTIONS TO CANDIDATES

Attempt Q 1 and Any Other Two

QUESTION ONE

a) Explain the working principle of a D.C

i) Motor

ii) Generator (6 marks)

b) Explain the function of the following parts of a d.c machine

i) Yoke

ii) Armature windings

iii) Shoe poles

iv) Commutator (8 marks)

c) List the THREE classifications and applications of D.C motors (6 marks)

d) Explain THREE areas of application of D.C shunt motors (5 marks)

e) A 200v d.c motor has a shunt resistance of100Ω .The armature resistance is 0.5Ω .The supply current is 10A .Calculate the back e.m.f (5 marks)

QUESTION TWO

a) Explain the following terms a applied in machines

i) Stator

ii) Rotor (6 marks)

b) From the first principles ,derive an expression for emf of a d.c motor (8 marks)

c) A 240V ,d.c motor has a shunt resistance of 30Ω,the motor is run at a speed of 1000rpm with an armature resistance of 0.5 Ω and a full load current of 100A.If the speed is changed at a supply current of 50A Determine the new speed (6 marks)

QUESTION THREE

a) Explain the operation of a single phase transformer (5 marks)

b) List any Five applications of transformers (5 marks)

c) A single phase transformer has a supply voltage of 150/x volts. The ratio of primary to secondary turns is 2;1 .The ratio of the secondary flux to primary is 50%. Calculate the value of x (5 marks)

d) From the first principles, derive an expression for e.m.f of a single phase transformer (5 marks)

QUESTION FOUR

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 ventilations for motors (4 marks)

QUESTION FIVE

a) List any FIVE areas of application of squirrel cage motor (5 marks)

b) With the aid of a power and circuit diagrams explain the DOL starting of induction motors (10 marks)

c) List any reasons for skewing rotor bar of induction motors (5 marks)