TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

Department of Electrical and Electronic engineering

UNIVERSITY EXAMINATION:

Diploma in Electrical Power Engineering (DEPE 6)

ELECTRICAL SWITCHGEARAND PROTECTION

EEP 2305

END OF SEMESTER IV EXAMINATION

SERIES: MAY 2016

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **five** Questions;. Attempt any THREE Questions.

Do not write on the question paper.

Question ONE

(a) State TWO applications of differential relays (2 marks)

(b) Explain the following

(i) Relay coordination in a protective system

(ii) THREE ways of achieving time delay in inverse time relays

8 marks

(c) Explain the operational difference between an electromechanical and a solid state relay

4 Marks

(d) State three

(i) Disadvantages of an EMR relay as compared to the SSR relay.

(ii) Merits of SSR relay

6 marks

Question 2

(a) Explain

(i) how an arc is initiated in a circuit breaker

(ii) methods used to extinguish it.

8 marks

(b) Define the following as applied to circuit breakers:

(i) Breaking capacity

(ii) Recovery voltage

(iii) Restriking voltage

6 marks

(c) Explain;

(i) Current chopping in CB's

(ii) Why self blast oil circuit breakers take longer to interrupt overloads than short circuits.

6 marks

Question 3

(a) Explain:

(i) Resistance switching

(ii) Electronegativity of SF_6 gas

(iii) Characteristics of SF_6 gas making it suitable for protection

8 marks

(b) (i) State the purpose of the resistor- capacitor snubber circuit network in an SSR

(ii) Draw the time /current characteristic of an inverse current relay

(iii)Explain three ways in which time delay in inverse time relays is achieved.

(12 marks)

Question FOUR

(a) State the

(i) failures a turbo alternator is likely to be subjected to.

(ii) cause of alternator over speed and how it is protected against.

(iii) main stator winding faults

(9 marks)

b) Explain the

(i) limitations of merz price protection

(ii) working principle of distance relays

(11 marks)

Question FIVE

(a) State the faults that an alternator can be subject to in a power system (8 marks)

(b) State:

(i) The function of oil in a circuit breaker

(ii) Hazards of oil when used as an arc quenching medium (4 marks)

(c) State:

(i) The advantages of minimum oil CB over bulk oil CB

(ii) The disadvantage of MOCB over bulk oil circuit breaker

(iii) Advantages of air blast circuit breaker over oil circuit breakers

(iv) Demerits of using air as an arc quenching medium

(8 marks)