



TECHNICAL UNIVERISTRY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

DIPLOMA IN ELECTRICAL POWER ENGINEERING (DEPE 6)

EEP 2305: SWITCH GEAR & PROTECTION

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2014

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

Question One (Compulsory)

- a) (i) State the function of relays in a power system.
(ii) Describe FIVE fundamental requirement of protective relays. **(7 marks)**
- b) Define the following:
(i) Pick up current
(ii) Current setting **(4 marks)**
- c) (i) Draw the time/current characteristics of an inverse current relay.
(ii) Explain THREE ways of achieving time delay in inverse time relays **(9 marks)**

Question Two

- a) With the aid of diagrams, explain the following relays:
(i) Combined over current and earth leakages
(ii) Over current with separate earth
(iii) Magnetic core balance
(iv)Electrical core balance **(12 marks)**
- b) Explain the following:
(i) Primary protection
(ii) Backup protection **(4 marks)**
- c) State TWO application of differential relays **(2 marks)**
- d) Explain the use of relay co-ordination **(2 marks)**

Question Three

- a) (i) State the failures a turbo alternator is likely to be subjected to.
(ii) State the cause of alternator over speed and how it is protected against.
(iii) State the main stator winding faults **(9 marks)**
- b) (i) Explain the limitations of merz price protection
(ii) Explain the working principle of distance relays **(11 marks)**

Question Four

- a) Explain how an arc is initiated in a circuit breaker and the 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 Five

- a) State the faults that affect an alternator. **(8 marks)**
- b) State:
(i) The function of oil 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)**