8E4111

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B. Tech. (Sem. VIII) (Main/Back) Examination, April/May-2012
Electrical Engg.
8EE3 Switchgear & Protection

Time : 3 Hours] [Total Marks : 80
[Min. Passing Marks : 24

*Attempt any **five** questions.*
*Selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*
Unit of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)
1. Nil 2. Nil

UNIT I

1 (a) Describe how the amplitude comparator can be converted to phase comparator and vice-versa. 8

(b) Explain the vector product type phase comparators with the help of diagrams. 8

OR

1 (a) Explain with the help of block diagram, the working of definite time static overcurrent relay. 8

(b) Briefly describe the static directional overcurrent relay with the help of neat diagram. 8

UNIT II

2 (a) Explain how the reactance relay characteristics can be realised using the static comparator. 8

(b) With the help of diagram explain how an alternator is protected through percentage differential protection. 8

OR

2 (a) Briefly explain the angle impedance relay. Discuss how its characteristics can be realized using the static comparators. 8

(b) Explain the operation and working of the static distance relays in brief. 8

UNIT III

3 (a) What is out of step blocking ? Discuss the operating principle of an out-of-step blocking relay. 8

(b) Explain how the power swings effects the performance of distance protection with the help of diagrams. 8

OR

3 (a) Why elliptical characteristics are used as a backup protection ? How these characteristics are realized using the static comparators ? 8

(b) Discuss the operation of the phase comparison carrier current protection with the help of block diagram. 8

UNIT IV

4 (a) What is resistance switching ? Derive the expression for critical resistance in terms of system inductance and capacitance, which gives no transient oscillation. 8

(b) Briefly describe the following :
(i) Energy balance theory
(ii) Recovery rate theory (4,4)

OR

4 (a) Explain the construction, principle and operating principle of the minimum oil circuit breakers.

8

(b) Briefly explain restricting voltage and RRRV. Derive expression for restricting voltage and RRRV in terms of system volatage, inductance and capacitance.

(3,5)

UNIT V

5 (a) With the help of diagram, explain the working of an axial air blast type circuit breaker.

8

(b) Briefly explain the important features which differentiates the digital relay from conventional relays.

8

OR

5 (a) Explain the operation and working of SF_6 circuit breakers. List the advantages of it over other types of circuit breakers.

(6,2)

(b) Briefly describe the following with reference to the rating of CB.

(i) Breaking capacity

(ii) Short time current rating.

(4,4)
