6E3111

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B.Tech VI Semester (Main/Back) Exam. May, 2012

Electrical Engineering.

6EE 3 Protections of Power Systems

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five questions,** selecting one question from each unit. All Question carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clerly.

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

1. **Nil** 2. **Nil**

Unit-I

1. (a) What are switching over-currents in power systems ? What are the reasons of their occurrence and effects in power systems? 07

(b) Draw neat diagram showing the zones of protection. Explain primary and back up protection. Describe the trip circuit operation in a circuit Breaker. 03+03+03=09

Or

1 (a) Describe the transient errors in current transformers. 07

(b) Describe the steady-state ratio and phase angle errors in potential transformers. With regard to excitation characteristics describe the differences between measuring and protective current transformers. 06+03=09

Unit-II

2 (a) Describe the principle of operation of induction disc type relays. 07

(b) Describe the incremental developments in the protection area starting from fuse to modern protective relays. Draw various overcurrent relay characteristics. 06+03=09

Or

2 (a) Describe the directional over current relay connections. 07

(b) Describe the combined "current and time" grading protective scheme of over current relays. How the protection of ring-main feeder is provided by directional and non- directional overcurrent relays. 06+03=09

Unit-III

3 (a) What are the sources which give rise to harmful unbalanced conditions in Generator? Describe the working of protection scheme against unbalanced loading generally used for Generator. 06+03=09

(b) Briefly describe the protection scheme excitation & prime mover failure with regard to generator rotor protection . 07

Or

3 (a) Describe the protection scheme generally employed for generator stator overheating. Also explain restricted Earth faults and protection scheme for this generator. 06+03+=09

(b) What are requirements of generator differential protection and how these are fulfilled ? 07

Unit-IV

4 (a) Describe the harmonic restraint scheme with regard to protection against magnetizing inrush current in transformer. 07

(b) Draw a detailed biased differential protection scheme for a 11/132KV,150 MVA, DY-1 power transformer. Suggest suitable current transformer ratios. 07+02=09

Or

4 (a) Describe the Buchholz relay construction and principle of its operation. Draw neat diagram for this. 07

(b) Draw neat circuit diagram showing high impendence three-phase bus bar differential protection. 06+03=09

Unit-V

5 (a) Describe the construction & principle of operation of electromagnetic impedance relay. 07

(b) Describe the trip laws mathmatically for impedance, reactance,and mho relays with the help of generic torque equation. Draw characteristics for each of these relays. 06+03=09

Or

5 (a) Describe the overcurrent and Earth fault protection schemes for Induction motors. 07

(b) Describe the abnormal operating condition from supply side with regard to Induction motors. 06+03=09
