325712(25)

B. E. (Seventh Semester) Examination, April-May 2016

(Old Scheme)

(EEE Branch)

(Specialization : Electrical & Electronics)

POWER SYSTEM PROTECTION & SWITCHGEAR

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

***Note** : Part (a) of each question is compulsory. Attempt any two questions from (b), (c) and (d) from each question.*

1. (a) Define PSM & TMS used for inverse time overcurrent relays. 2

(b) Explain the construction & working of reactance relay. 7

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(c) Explain the directional feature of a directional relay. Describe the construction principle of operation & application of directional overcurrent relay. 7

(d) Explain the working of differential relay for internal fault & a through fault. 7

2. (a) Enlist the abnormal operating conditions in large alternators? 2

(b) Discuss the protection of alternator in the event of : 7

(i) Loss of Prime Mover

(ii) Loss of Excitation

(c) A 3 phase transformer 0.433/11 kV, is connected in Y/Δ respectively. The transformer on the 0.433 kV side has a current ratio of 600/5. What must be the current ratio of current transformers on the hv side & how they should be connected? Draw neat labelled circuit diagram. 7

(d) Explain the inter turn fault protection scheme of alternators. 7

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3. (a) What are different protection schemes used for transmission lines? 2

(b) Discuss the protection of parallel feeders & ring main feeder in brief. 7

(c) Sketch on the R-X plane, the various characteristics which are usually employed in distance protection state their advantages & limitations briefly. 7

(d) What is the demerit of a blocking carrier scheme for protection of a transmission line? Discuss. 7

4. (a) Describe the principle of operation of hall effect phase comperator. 2

(b) Discuss the duality between amplitude & phase comparators. 7

(c) Design a static reactance relay. 7

(d) Discuss the block spike phase comparator. 7

5. (a) Which is the most suitable circuit breaker for having auto-reclosure? 2

(b) Write short notes on the following : 7

(i) Merits of SF_6 gas as an insulating & are quenching medium.

(ii) Properties of SF_6 gas.

(c) A 11 kV, 50 Hz alternator is connected to a system which has inductance & capacitance per phase of 10 mH & 0·01 μF, respectively. Determine : 7

(i) maximum voltage across the breaker contacts.

(ii) frequency of transient oscillations.

(iii) the average RRRV.

(iv) the maximum RRRV.

(d) Discuss the circuit breaker ratings. 7