

Registration No. :

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Total number of printed pages – 2

B. Tech
CPEE 5404

Seventh Semester (Special) Examination – 2013

POWER SYSTEM PROTECTION

BRANCH : EEE

QUESTION CODE : 397

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 × 10
 - (a) Why back up protection is required ?
 - (b) Mention the most commonly used protection scheme for alternators.
 - (c) What do you understand by ratio error and phase angle error of a CT ?
 - (d) Explain briefly the time grading of a radial feeder.
 - (e) What do you mean by 'reach' of a distance relay ? What is 'under reach' ?
 - (f) Draw the typical distance characteristic of offset mho relay.
 - (g) What are the incipient faults in transformer ?
 - (h) What do you mean by tripping carrier and blocking carrier ?
 - (i) Draw the block diagram of a numerical relay.
 - (j) What is a digital filter ? Explain.
2.
 - (a) Draw and explain the merz-price protection of alternator stator winding. 5
 - (b) A generator is protected by restricted earth fault protection. The generator ratings are 13.2 kV, 10 MVA. The percentage of winding protected against phase to ground fault is 85%. The relay setting is such that it trips for 20% out of balance calculate the resistance to be added in the neutral to ground connection. 5



P.T.O.

3. (a) What is carrier protection ? Briefly explain its merits and demerits. 5
 (b) Define the characteristics of amplitude and phase comparators. 5
4. (a) Draw the block diagram of a pilot protection scheme. What are the different types of pilots used ? 5
 (b) Define Plug Setting Multiplier and Time Multiplier setting. What considerations are taken into account while selecting the plug setting and time setting of the relays for a radial feeder ? 5
5. (a) With a neat diagram write about protection against generator rotor faults ? 5
 (b) Briefly explain the protection against loss of excitation using offset-mho relay. 5
6. (a) Explain the percentage differential relay with harmonic restraint in Connection with Transformer protection. 5
 (b) What is the correct method of selection of CT ratios in case of bus-bar differential protection scheme ? Justify your answer by means of an example. 5
7. (a) Explain briefly regarding numerical Over current protection by Drawing suitable block diagram. 5
 (b) State Shannon's sampling theorem. What do you mean by the term 'aliasing'? 5
8. Write short notes on any **two** of the following : 5×2
 (a) Protection of parallel feeders
 (b) Microprocessor based numerical protection
 (c) Buchholz Relay

