* R M - 7 7 5 1 / 1 0 0 *

RM-7751

B. E. IV (Sem. VIII) (Electrical) Examination

April / May – 2010

Power System Protection

Time : **3** Hours] [Total Marks : **100**

Instruction :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 4 (Sem. 8) (Electrical)**

Name of the Subject :

☛ **Power System Protection**

☛ Subject Code No. : **7 7 5 1** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Figures to the **right** indicate full marks.
(3) Supplement answer with help of neat sketches wherever **necessary**.
(4) Make assumptions wherever you feel required.
(5) Answer to the **two** sections must be written in **separate** answer books.

SECTION - I

1 (a) Answer in short : **6**

(i) Explain difference between fuse and protective relay.

(ii) Give the application of directional over current relay.

(iii) Define following terms.

(a) Pick up current

(b) Reset value

(b) Fill in the blanks by inserting appropriate words / figures : **4**

(i) Preventing the protective relay from tripping is known as_____

(ii) Relay used in differential protection should operate only for _____faults.

(iii) A 1 VA relay is _____sensitive than a 3VA realy.

(iv) The main cause of over speed in alternator is _____

(c) Write short note on loss of excitation of alternators. **8**

(d) Explain the terms sensitivity and selectivity with respect to their use in the protective relaying field. **2**

2 (a) Describe construction, principle and operation of induction type over current relay. **8**

(b) What are the abnormal conditions in large alternator? Explain protection against various abnormal conditions in brief. **8**

OR

2 (a) Explain various test on CTs and PTs **8**

(b) Explain the thermal relay witht the help of sketch. **8**

3 Attempt any **two**. **14**

(a) Compare static relay with electromagentic relay.

(b) Explain primary and secondary injection methods of testing protective gear.

(c) Explain biased differential protection for alternators.

SECTION - II

4 (a) Answer in short (3 to 4 lines) **10**

(i) Justify : There is no need to provide harmonic restrain with differential protection of generator transformer.

(ii) Differential relay should be connected at the equipotential points on the pilot wires. Why?

(iii) List out the complete family of distance relays.

(iv) What is PLCC?

(v) Justify: Pilot-wire differential protection scheme can be applied only to short-transmission lines.

(b) Discuss: Different principles of carrier current protection applied for transmission line in brief. **5**

(c) Giving torque equation for an impedance relay, derive the condition for operation of this relay. **5**

5 (a) Write a short note: Restricted earth fault protection for transformer. **8**

(b) Discuss the different transformer faults. What are the various protection schemes available for transformer? **7**

OR

5 (a) What is magnetic inrush in case of transformers? Discuss inrush phenomenon along with diagrams and mathematical derivations. 8

(b) Why is a harmonic restrained relay required for protecting a large tranformer? Describe the construction and working of harmonic restrained relay. 7

6 Answer any **three** : 15

(i) Discuss the suitability of traditional distance relay characteristics under power swing condition and also suggest the method for further improve the performance most suitable of these characteristics.

(ii) What are the different types of faults taking place on the bus-bars? Also discuss frame leakage (earth) protection used for bus-bars.

(iii) Describe one method of carrier aided distance protection.

(iv) Write a short note on reactance relay.

(v) Discuss the various problems faced in the over current protection scheme of transmission lines in short.
