KADI SARVA VISHVAVIDYALAYA

B.E. SEMESTER VII EXAMINATION (NOV/2016)

SUBJECT CODE: EE-703 **SUBJECT NAME:** POWER SYSTEM PROTECTION

DATE: 12/11/2016 **TIME:** 10: 30 a.m. to 1:30 p.m. **TOTAL MARKS:** 70

Instructions:

1. Answer each section in separate answer sheets.
2. Use of scientific Calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly the options you attempted along with the respective question number.
5. Use the last page of your supplementary for rough work.

Section – I

Q-1

A Discuss various zones of protection for a modern power system. Explain the difference between primary and back-up protection. **5**

B Explain the essential qualities of a Protection system. **5**

C Define the following terms related to relay: **5**

C.T Burden, C.T Accuracy, Reach, Time multiplier setting and Plug multiplier setting.

OR

C Classify and explain different types of Back-up relays. **5**

Q-2

A Write a short note on Percentage Differential Relay. What is stability ratio of a Percentage Differential Relay? **5**

B Explain the implementation of Over-current Relay using Induction disc principle. **5**

OR

A Explain various types of Over current relays along with their time-current characteristics **5**

B The current rating of an overcurrent relay is 5A. PSM= 2, TSM= 0.3, C.T ratio = 400/5, Fault current= 4000A. Determine the operating time of the relay at TSM= 1, operating time at various PSM are : **5**

PSM	2	4	5	8	10	20
Operating time in seconds	10	5	4	3	2.8	2.4

Q-3

A Explain Impedance relay operating principle with R-X diagram. **5**

B Explain Reactance Relay Using Universal torque equations with R-X diagram. **5**

OR

A Explain Mho relay operating principle with torque equations, also draw the characteristics in R-X plane. **5**

B Compare between different types of distance relays. **5**

Section – II

Q-4

A	State and explain in brief various faults and abnormal operating conditions of a Generator.	**5**
B	Draw and explain the block diagram of numerical relay.	**5**
C	Explain coupling of the Carrier on a Single Line-to-Ground basis with diagram.	**5**
	OR	
C	Explain carrier coupling on a Line-to- Line basis with diagram.	**5**

Q-5

A	What do you mean by loss of excitation (LOE) in the context of generator protection?	**5**
B	Explain different faults encountered in a transformer.	**5**
	OR	
A	What do you mean by over-fluxing in transformers.	**5**
B	What causes over-speeding in generators? Explains the remedial action that needs to be taken to prevent over-speeding.	**5**

Q-6

A	Explain Sampling theorem in detail.	**5**
B	Sketch and the high impedance Busbar differential protection for a three-phase busbar having two incoming and three outgoing feeders.	**5**
	OR	
A	What is Inrush phenomenon & derive the expression for flux in the transformer in the initial moments just after switching operation.	**5**
B	Explain Earth Leakage protection for 3-phase load.	**5**

**********ALL THE BEST**********

KADI SARVA VISHWAVIDHYALAYA

BE SEMESTER VII (EE)

Subject code: - EE 703 **Subject Name: - Power system protection**

Date: - 27 /11 /2015 **Time: - 3 hrs** **Total Marks:- 70**

Instructions:

1. Answer each question in separate Answer sheet.
2. Use of Scientific calculator is permitted.
3. All questions are **compulsory.**
4. Indicate **clearly,** the options you attempt along with its respective question number.
5. Use the last page of main supplementary of **rough work.**

Section – I

Q -1 (A) Explain essential qualities required for good protective system. [5]

(B) Explain implementation of overcurrent relay using Induction Disc. [5]

(C) Draw and explain characteristic of IDMT relay. [5]

OR

(C) Explain with diagram principle of Directional overcurrent relay. [5]

Q-2 (A) Explain the phenomenon of magnetizing inrush current in power Describe the method used for preventing tripping of the differential protection due to inrush of magnetizing current. [5]

(B) Explain with diagram Percentage differential relay. [5]

OR

(A) Explain the phenomenon of overfluxing in a transformer. What protection is used for the same? [5]

(B) Explain about Earth leakage protection. [5]

Q-3 (A) Discuss with an example as to what are incipient faults ? What type of protection is used in a transformer to cater to such type of faults? [5]

(B) Discuss differential protection of busbars. [5]

OR

(A) Enlist various faults and abnormal conditions in Generator. [5]

(B) Explain circuit model of saturated CT. [5]

Section - II

Q-4 (A) Explain Distance protection in brief. [5]

(B) Show the characteristics of following distance relays on R-X diagram. [5]
(i) Reactance relay (ii) Mho relay (iii) Impedance relay

(C) What are the drawback of over current relay ? [5]

OR

(C) Explain the basis of setting three step distance relays for the first, second and third zones of distance measurement. [5]

Q-5 (A) Explain the need for carrier aided protection. [5]

(B) Describe the block diagram of equipments used in carrier phase Comparison scheme. [5]

OR

(A) Explain briefly the functions of a coupling capacitor, a line trap, transmitter and receiver in the carrier current protection of a Transmission line. [5]

(B) Explain the directional comparison carrier current scheme. [5]

Q-6 (A) With the help of a block diagram, explain the organization of a numerical relay. [5]

(B) Discuss Numerical Distance protection of transmission line. [5]

OR

(A) Explain Numerical Overcurrent protection. [5]

(B) Explain Digital filtering used for numerical relay. [5]

---------- **All the Best** ----------