

Question Bank (K- scheme)

Unit Test II

Name of Course: SWITCH GEAR AND PROTECTION

Course code: (315334)

Course - SGP

Semester: V

Programme: EE

UNIT III: PROTECTIVE RELAYS (18M)

2 Marks Questions:

- 1) State any two disadvantages of static relays.
- 2) List the types of relays based on i) Characteristics ii) Scheme
- 3) Draw the block diagram of static relays.
- 4) Define the terms based on relay terminology i) Pickup current ii) reset current
- 5) Define PSM & TSM.
- 6) Write short note on numerical relay.

4 Marks Questions:

- 1) Explain any six quality requirements for better protective relaying
- 2) With a neat sketch explain solenoid type over current relay.
- 3) State any four salient features of microprocessor based protection relay. Draw block diagram of microprocessor based over current relay.
- 4) Explain PSM and TSM related to protective relays.
- 5) Explain time-current characteristics of IDMT relay
- 6) With the help of neat sketch explain the operation of distance protection scheme for the transmission line.
- 7) A 5A , 3Sec overcurrent relay has a plug setting of 125% and time setting multiplier of 0.8. The supplying CT is rated for 400:5A. Calculate the time of operation of the relay for a fault current of 4000A.

PSM	1.5	2.5	3	5	8	10.5
Time in Sec	10	8	5	3	2	1

UNIT IV: PROTECTION OF ALTERNATORS, TRANSFORMERS, MOTORS, BUS-BARS & TRANSMISSION LINE (24 M)

2 Marks Questions:

- 1) List two limitations of Differential-Protection scheme for transformer.
- 2) List any four faults occurs in alternator.
- 3) List any four faults occurring in transformer.
- 4) Define base KVA. State the formula.
- 5) What is Buchholz relay?
- 6) State two requirements of transmission line protection.
- 7) State four abnormalities that taking place in case of motors.
- 8) State any four abnormalities in bus-bars.
- 9) List protection schemes used for the bus-bar.
- 10) State the advantages of distance protection over other types of protection of feeders.

4 Marks Questions:

- 1) A three phase, 66/11KV, star-delta connected transformer is protected by Merz-Price system. The CT's on LV side have a ratio of 400/5. Find the ratio of CT's on the HV side.
- 2) Two 11KV, 3-phase, 3000KVA generators having reactance of 15% operate in parallel. The generator supply power to a transmission line through a 6000KVA transformer of ratio 11/22KV and having leakage reactance of 5%. Calculate fault current and fault KVA on H.T. side of transformer.
- 3) A 220V/22kV three phase transformer is connected in star/ delta. The protective transformers on 220V side have current ratio of 400/5. Calculate the CT ratio on 22kV side.
- 4) Two 11 KV, three phase 2500 KVA generators having reactance of 12% operate in parallel. The generators supply power to a transmission line through a 6000 KVA transformer of ratio 11/22 KV and having leakage reactance of 4%. Calculate fault KVA on H.T. side of transformer.
- 5) The neutral point of a three phase 18MVA, 11kV alternator is earthed through a resistance of 4.5 Ω . The relay is set to operate when there is an out of balance

current of 1.4A. The CTs have a ratio of 1000/5. What is the percentage of winding protected?

- 6) List four limitations of differential protection scheme for transformer.
- 7) A three phase transformer having line voltage ratio of 0.4 kV/11kV is connected Star / Delta and protective transformers on the 0.4 kV side have a current ratio of 500/5. Calculate the ratio of the protective transformers on 11 kV side. Draw a neat circuit diagram and indicate the given values at appropriate places.
- 8) Explain the conditions for setting up negative phase sequence currents in an alternator.
Draw the protective scheme to detect them and operate the CB.
- 9) With a neat sketch describe protection scheme of an alternator against inter-turn fault.
- 10) Describe 'Restricted Earth fault Protection' of a star connected, neutral earthed side of power transformer. Justify the name "Restricted".
- 11) The neutral point of a three phase 20 MVA, 11kV alternator is earthed through a resistance of 5Ω . The relay is set to operate when there is an out of balance current of 1.5A. The CTs have a ratio of 1000/5. What is the percentage of winding protected?
- 12) What are the faults likely to occur in a power transformer? What do mean by incipient faults and through faults?
- 13) A star connected, 3-phase, 10MVA, 6.6KV alternator is protected by Merz-Price circulating current principle using 1000/5 Ampere current transformers. The star point of the alternator is earthed through a resistance of 7.5Ω . If the minimum operating current for the relay is 0.5A, calculate the percentage of each phase of the stator winding which is unprotected against the earth faults, when the machine is operating at normal voltage.
- 14) Explain differential protection scheme for bus-bars with neat sketch.
- 15) Explain the working of single phasing preventer with neat diagram.
- 16) With the help of neat sketch explain the operation of distance protection scheme for the transmission line.
- 17) Explain with the help of sketches the working of protection schemes for motor against
 - i) Overload
 - ii) Phase failure

- 18) Why special attention is required for bus-bar protection? With a neat sketch explain the fault bus protection scheme.
- 19) Explain the principle of time graded protection of feeders using IDMT over-current relays. State its drawbacks.
- 20) Discuss about the various schemes of Bus-Zone protection and specify their relative merits and demerits.

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