1129
B.E. (Electrical and Electronics Engineering)
Fifth Semester
EE-501: Power Systems – II

Time allowed: 3 Hours   **Max. Marks: 50**

NOTE: *Attempt* <u>*five*</u> *questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I.   Explain briefly:-

a) Draw sequence networks of synchronous machines.

b) Write the properties of SF6 gas.

c) Define the term Making Capacity of a circuit breaker.

d) Explain the step voltage, touch voltage.

e) Write the advantages of digital relays over conventional relays.   (5x2)

UNIT – I

II.   a) What do you understand by symmetrical components of unbalanced phasors? Deduce the expressions for symmetrical components.

b) A three phase alternator running unloaded with resistance and transient inductance per phase R and L respectively is suddenly short circuited across all its terminals at $t = 0$. If the alternator is considered as an emf $\sqrt{2}V \sin(\omega t + \alpha)$ per phase in series with R and L. derive the expression for the short circuit current per phase. Hence explain the following terms (i) symmetric short circuit current (ii) dc offset and (iii) doubling effect.   (2x5)

III. a) Describe with neat diagrams, the construction, working and applications of induction type directional over current relay.

b) What is meant by percent bias? How is this achieved in practice in a differential relay? Under what circumstances is a percentage differential relay preferred over the differential relay for (i) internal fault and (ii) through fault.   (2x5)

IV.   a) What are the various components of a protection system? Briefly describe their functions with the help of a schematic diagram.

b) A generator is protected by restricted earth fault protection. The generator ratings are 13.2KV, 10MVA. 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.   (2x5)

UNIT – II

V. a) Explain high resistance method and current zero interruption methods of arc interruption. Also explain the terms "Restriking voltage and "rate of rise of restriking voltage". What is their significance in the operation of circuit breaker?

b) With neat diagram describe the functioning of SF6 circuit breaker. State the advantages of the breaker. (2x5)

VI. a) Compare solid grounding and resistance grounding of the power systems neutral with the help of suitable diagrams.

b) Describe the protection of stations and sub-stations against direct lightning Stroke. (2x5)

VII. Write short notes on:-

a) Insulation coordination

b) Importance of Neutral grounding practice (2x5)

x-x-x