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(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 120612 Roll No. | | | | | | | | | |

B.TECH.

Theory Examination (Semester-VI) 2015-16

SWITCHGEAR & PROTECTION

Time : 3 Hours *Max. Marks : 100*

Section-A

1. Attempt all parts of the following: (10×2=20)

(a) What is selectivity?

(b) Differentiate between the terms overreach and under reach.

(c) Name of the materials used for contacts of vacum circuit breakers.

(d) Give the examples of unit and non-unit scheme of protection.

(e) What is primary and back-up protection?

(f) What is meant by the term arc quenching?

(g) How does a circuit breaker differ from Isolator?

(h) Discuss problems related with the attracted armature type relays.

(i) Where is negative phase sequence relay employed?

(j) A relay is connected to 400/5 ratio current transformer with current setting of 150% calculate the plug setting multiplier when circuit carries a fault current of 4000A.

Section-B

2. Attempt any five parts of the following. All parts carry equal marks: (5×10=50)

(a) Derive the characteristics equations of impedance, Reactance and offset mho relays.

(b) Explain with reasons the connection of CTs for protecting a delta/star transformer. Justify the scheme of protection for :

(i) Internal fault

(ii) External fault by showing current distribution in the scheme.

(c) A 50 hz, 11kv, 3ϕ alternator with earthed neutral has reactance of 10 ohm per phase and is connected to bus for through

a circuit breaker. The capacitance to earth between the alternator and the circuit breaker is 0.05 μf per phase. Assuming the resistance of the generator to be negligible calculete the following.

(i) Maximum restriking voltage across the contact of circuit breaker.

(ii) Frequency of oscillation.

(iii) Maximum value of RRRV

(iv) The average value of RRRV up to the first peak.

(d) Discuss the advantages and disadvantages of air blast circuit breakers. Describe its methods for interrupting the fault current.

(e) (i) What are the design considerations in electromagnetic relay?

(ii) Describe any vibration-less attracted armature type relay.

(f) Give the constructional view of SF6 circuit breaker with multiple breaks and explain its principle of working.

(g) Explain "current chopping" and "Capacitive Current breaking.

(h) Describe the principle of merge price scheme of protection applied to the alternator. What are the shortcomings of this scheme and how are they overcome?

Section-C

Attempt any two questions from this section. (2×15=30)

3. (a) Explain in detail about longitudinal percentage biased differential protection. (8)

   (b) What are the advantages of static relays over electro-mechanical relay? discuss. (7)

4. Briefly describe miniature circuit breaker (MCB) and moulded care circuit breaker (MCCB). What are their advantages over conventional breakers and fuse-switch units. (15)

5. In 130kv transmission system, the phase to ground. Capacitance is 0.02μf. The inductance being 8H. Calculate the voltage appearing across the pole of a circuit breaker if a magnetizing current of 12A is interrupted. Find the stiking voltage transient. (15)