

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

Paper ID : 120612

Roll No.

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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 vacuum 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, 3 ϕ 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 μ f per phase. Assuming the resistance of the generator to be negligible calculate 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 case 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 $0.02\mu\text{f}$. 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)