Q11. Give the construction features, principle of working & characteristics of a directional over-current relay. What do you understand by IDMT relay? Draw the typical characteristics of an IDMT relay.

Q12. (a) Describe the operating principle of DC circuit breaker.

(b) Draw the current and voltage waveforms showing AC circuit breaking phenomenon. Show the following in the diagram and describe them:

(i) Major current loop

(ii) System voltage

(iii) Arc voltage

(iv) Restriking voltage

(v) Active recovery voltage

(vi) Recovery voltage.

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

Paper ID :121701 Roll No. | | | | | | | | | |

B.Tech.

(SEM. VII) THEORY EXAMINATION, 2015-16

SWITCH GEAR & PROTECTION

[Time:3 hours] **[MaximumMarks:100**

Section-A

Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short: (2×10=20)

(a) How induction cup type construction is superior to induction disc type?

(b) What is the need of relay coordination?

(c) What is Buchholz relay? For what type of fault it is employed?

(d) Why directional feature provided for impedance relay cannot be used for reactance relay?

(e) Why bus bar protection is important in power system?

(f) What factors govern choosing pilot-wire installation?

(g) Why are circuit breakers designed to have a short-time rating?

(h) State the formula for RRRV. At what instant its value is maximum?

(i) Why current chopping is not common in Oil circuit breaker?

(j) For a 132 kV system, the reactance and capacitance up to the location of the circuit breaker is 3 Ω and 0.015 μ F respectively. Calculate the maximum value of RRRV.

Section-B

Note: Attempt any five parts of the following: 5×10=50

Q2. What is a zone of protection? Discuss various zones of protection of a power system with the help of line diagram.

Q3. Describe in detail the synthesis of a Mho relay using static phase comparator.

Q4. Explain what is meant by transient overreach as applied to high set instantaneous overcurrent relay. What measures are taken to overcome these difficulties?

Q5. Write a detail note on pilot wire protection of a transmission line.

Q6. What is carrier current protection? For what voltage range is it used for the protection of transmission lines? With neat sketches discuss the phase comparison scheme of carrier current protection?

Q7. Explain the Arc phenomenon in Circuit breaker.

Q8. With the help of neat block diagram, explain the construction, operating principle and advantages of SF_6 circuit breaker.

Q9. With a neat schematic diagram explain the protection of transformer with differential protection scheme.

Section-C

Note: Attempt any two parts. Each part carries equal marks. (15×2=30)

Q10. (a) The current rating of an overcurrent relay is 5 A. PSM=2, TMS=0.3, CT ratio= 400/5, Fault current=4000 A. Determine the operating time of the relay. At TMS=1, operating time at various PSM are:

PSM	2	4	5	8	10	20
Operating time (sec)	10	5	4	3	2.8	2.4

(b) What are the design considerations in electromagnetic relay?