**Sample Question Paper**

**Course Name : Diploma in Electrical Engineering Group**

**Course Code : EE/EP**

**Semester : Fifth**

**Subject Title : Switchgear & Protection**

**Marks : 100 Time: 3 hrs**

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1. All questions are compulsory

2. Illustrate your answers with neat sketches wherever necessary

3. Figures to the right indicate full marks

4. Assume suitable data if necessary

5. Preferably, write the answers in sequential order

**Q1.A) Attempt any THREE of the following: (3x4=12)**

a) List any eight essential features of effective protective system.

b) State any two advantages of using current limiting reactors. Show the any two locations

where reactors are used in power system using single line diagram.

c) Define the followings related to protective relay.

i) pick up current

ii) relay time

iii) plug setting multiplier

iv) reset current

d) Name internal and external causes of system over voltages.

**Q1.B) Attempt any ONE of the following: (1x6=6)**

a) Figure 1 shows single line diagram of three phase system. The percentage reactance of each

alternator is based on its own capacity. Find short circuit current that will flow in to a

complete three phase short circuit at F.



2)three phase, 33/6.6 KV, star/ delta connected transformer is protected by Mertz Price

circulating current system. If the C.T’s on low voltage side have ratio of 300/5, determine

ratio of C.T’s on high voltage side. Draw a neat diagram and indicate the given values at

appropriate places.

**Q2. Attempt any FOUR of the following: (4x4=16)**

a) Define the following terms

i) Arc voltage

ii) Recovery voltage

iii) Restriking voltage

iv)RRRV

b) Draw neat labeled diagram of single filament HRC fuse.

c) State any four types of lightning arresters with their particular application.

d) State the meaning of the term Resistance earthing. List its any three advantages.

e) Differential relays are more sensitive than overcurrent relays. True or False. Justify your

answer.

f) List the difficulties experienced in differential relay in Alternator protection. How are they

overcome?

**Q3. Attempt any FOUR of the following: (4x4=16)**

a) Describe the Arc interruption process in Air Break circuit breaker incorporating i) arcing horns

ii) arc splitters, with the help of diagram.

b) Distinguish between functions of isolator and circuit breaker.

c) Describe microprocessor based relay with the help of block diagram.

d) Describe the operation of Buchholz Relay with reference to Principle of operation and

Installation.

e) Draw the restricted earth fault protection scheme for 500 MVA star/ delta transformer.

**Q4.A) Attempt any THREE of the following: (3x4=12)**

a) Describe the principle of Negative Phase Sequence circuit for Alternator protection with

neat diagram.

b) Describe working of surge absorber with the help of neat labeled diagram.

c) “ELCB is must for an residential installation” Justify the statement.

d) State what is the basis of preferring directional relays on ring Main system for Transmission

line protection?

**Q4.B) Attempt any ONE of the following: (1x6=6)**

a) Describe suitable protection scheme used for overload protection of motors, with the help of

neat labeled diagram.

b) Describe fault bus protection of busbars, with neat labeled diagram.

**Q5.) Attempt any FOUR of the following: (4x4=16)**

a)Describe working principle of SF6 circuit breaker.

b)Describe the working of horizontal break isolator with neat diagram.

c)State the principle of operation of induction relays.

d)Study the given figure 2 of induction type over current relay. Redraw the figure showing

missing part and label the following points:

i) Direction of current on secondary side

ii) Trip circuit



e)Describe the construction of Induction type Directional Power relay, with the help of neat

diagram.

f) Describe the operation of solenoid type relay with the help of neat labeled diagram.

**Q6.) Attempt any FOUR of the following: (4x4=16)**

a) State what are the limitations under which differential protection scheme for transformers is

used?

b) State what are the conditions under which inverse time relay is adopted for distance

protection of transmission line? In Figure 2

c) “Relays can be used to sense Single phase open circuit fault in an alternator” State whether

true or false. Justify your answer.

d) Describe the basis for preferring biased differential protection scheme over simple

differential protection for transformer protection?

e) In the given figure 3, if fault occurs on i) feeder F and ii) near source. Redraw the separate

diagram for each condition showing changed in current direction.

