Total No. of Questions : 8]

SEAT No. :

PC2401

[Total No. of Pages : 2

[6354]-518
B.E. (Electrical Engineering)
SWITCHGEAR AND PROTECTION
(2019 Pattern) (Semester - VIII) (403148)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable additional data, if necessary.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) Explain following ratings of circuit breaker. **[6]**

i) Making capacity

ii) Breaking capacity

iii) Short time rating

b) State disadvantages of Air circuit breaker **[4]**

c) State properties of SF_6 gas **[8]**

OR

Q2) a) Write a note on Auto - reclosing **[4]**

b) Explain advantages of GIS over conventional substation **[6]**

c) An 11 KV, 500 MVA, 3 sec CB suddenly closes on occurring of fault. **[8]**
Determine

i) Symmetrical breaking current

ii) Asymmetrical breaking current assuming 50% DC component

iii) Peak making current

iv) Short time current rating

Q3) a) Draw block diagram of PMU. **[3]**

b) State and Explain Sampling Theorem. **[6]**

c) State advantages and disadvantages of static relay. **[8]**

OR

Q4) a) State advantages of Numerical Relay. **[3]**

b) Explain Antialising Filter with neat diagram. **[6]**

c) Draw and explain block diagram of Numerical Relay. **[8]**

P.T.O.

Q5) a) What are the problems encountered in differential protection. **[4]**

b) Explain overload protection in case of three phase Induction motor. **[6]**

c) The neutral point of a 3 phase, 20 MVA, 11 KV alternator is earthed through a resistance of 5 ohm. The relay is set to operate when there is an out of balance current of 1.5 Amp. The CT's have a ratio of 1000/5. What is the percentage of winding protected? Also calculate the earthing resistance required to protect 90% of the winding. **[8]**

OR

Q6) a) A three phase power transformer having line voltage ratio of 400 V to 33 KV is connected in star - delta. The CT's on 400 V side have current ratio as 1000/5. what must be the CT ratio on 33 KV side. Assume current on 400 V side to be 1000 A. **[4]**

b) Explain short circuit protection in case of three phase Induction motor. **[6]**

c) What is transverse protection of an alternator? What type of fault is this scheme of protection employed? With a neat sketch discuss the working principle of this scheme. **[8]**

Q7) a) What do you mean by term Directional and Non - Directional overcurrent relay. **[3]**

b) Explain the effect of Arc resistance on. **[6]**

i) Impedance relay

ii) MHO relay

c) Draw block diagram of PLCC scheme used for transmission line protection and briefly explain its components. **[8]**

OR

Q8) a) Draw flowchart of Numerical algorithm. **[3]**

b) Explain three stepped distance protection. **[6]**

c) Draw the characteristics of the following distance relays in the R-X diagram and explain. **[8]**

i) Mho - relay

ii) Reactance relay

iii) Quadrilateral - relay

iv) Impedance-relay

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