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Set No. 1

Code No: **R41023**

IV B.Tech I Semester Supplementary Examinations, March – 2017

SWITCH GEAR AND PROTECTION

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions All Questions carry equal marks

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|---|----------|--|------------|
| 1 | a) b) | Describe the current interruption phenomenon for AC systems. In a 400 KV system, the reactance and capacitance up to the location of the CB are 15 Ω and 0.045 μ F respectively. The value of external switching resistance is 750 Ω . Calculate the following. i) neutral frequency of oscillations. ii) value of critical resistance and iii) value of switching resistance. | [8] |
| 2 | a) b) | Explain the process of arc development and its extinction in a vacuum circuit breaker. | [8] |
| | 0) | Discuss the operating principle of Si ⁴ circuit breaker. | [/] |
| 3 | a) | Derive the general equation of an electromagnetic relay at the threshold of operation and show it characteristics on the complex plane. | [8] |
| | 0) | they overcome? Explain. | [7] |
| 4 | a) | Describe with a neat sketch the percentage differential protection of a modern alternator. | [8] |
| | b) | The neutral point of a 3-phase, 25MVA, 11KV alternator is earthed through a resistance of 5 Ω . The relay is set to operate when there is an out of balance current of 1.5 A. The CT's have a ratio of 1000/5. What percentage of winding is protected against an earth fault and what should be the minimum value of earthing resistance to protect the 90 percentage of the winding | [7] |
| | | resistance to protect the 50 percentage of the winding. | ['] |
| 5 | a) b) | Explain the protection scheme for the transformer that takes care of magnetizing inrush current without effecting the sensitivity. A 3-phase transformer of 230/11000V line voltage is connected in star-data the | [8] |
| | , | protective transformers on 230V side have a CT of 600/5. What should be CT ratio 11000V side? Show how shall they be connector. | [7] |
| 6 | | Describe in details the protection of parallel feeder and ring mains. | [15] |
| 7 | a) b) | Draw a block diagram of static definite time over current relay? Discuss. Explain the static distance relays. | [8] [7] |
| 8 | a) | What are the causes of over voltages in power system? Discuss. Bring out the functions of ground wire in transmission lines. | [8] |
| | b) | Why is insulation coordination required in a large power system? What is meant by BIL of an equipment. | [7] |