Code No: RR320205 **Set No. 1**

III B.Tech II Semester Regular Examinations, Apr/May 2006
POWER SYSTEMS-III
(Electrical & Electronic Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain about Bewley's Lattice diagrams and also mention the uses of these diagrams. [6+2]
   (b) A line of surge impedance of 400 ohms is charged from a battery of constant voltage of 135volts. The line is 300 metre long and is terminated in a resistance of 200 Ohms. Plot reflection lattice and the voltage across the terminating resistance. [4+4]
2. (a) What are the requisites of a good lightning arrester? [4]
   (b) Discuss the relative merits and demerits of
      i. rod gap
      ii. expulsion arresters
      iii. valve arresters [4+4+4]
3. (a) List out the advantages and disadvantages of HRC fuse
   (b) Explain fuse Characteristics in detail. [8+8]
4. Explain direct testing of circuit breakers with a neat diagram. [8+8]
5. (a) What is meant by directional feature of a directional over current relay? Describe the construction, principle of operation and application of a directional over current relay. [2+2+2+2]
   (b) What is the difference between a polarized mho and simple mho relay. What are self-polarized and cross-polarized mho relays? [4+4]
6. (a) Where are the relays having extremely inverse and very inverse characteristics used? What types of characteristics are used for protecting rectifiers, and for replacement of fuses? [4+4]
   (b) Explain how the mho characteristic realized using a sampling comparator? [8]
7. Discuss the percentage differential protection scheme of a transformer. [4+4+4+4]
8. Distinguish between unit protection and non unit protection. What are the various methods of protecting a transmission line by unit protection? [8+8]

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Code No: RR320205 **Set No. 2**

III B.Tech II Semester Regular Examinations, Apr/May 2006
POWER SYSTEMS-III
(Electrical & Electronic Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) A 500 kV, 2microsecond rectangular wave travels on a line having a surge impedance of 350 Ohm and approaches a termination with a capacitance C equal to 300 pF. Determine the magnitudes of the reflected and transmitted waves. [4+4]
   (b) From fundamentals obtain the expressions for reflection and transmission coefficient on a line terminated with load impedance equal to the surge impedance of the line. [4+4]
2. (a) Discuss the causes of switching surges .
   (b) Explain the selection of surge arresters with reference to switching surges . [8+8]
3. (a) Explain the factors which are influencing the performance of an air blast circuit breaker.
   (b) Explain with a neat sketch the working of a Air blast circuit breaker.[8+4+4]
4. Explain resistance switching in detail with relevant diagrams and derive the expression of damped oscillation. [4+8+4]
5. (a) What are the difficulties in the design of C.T for restricted earth fault protection? How are these difficulties overcome in high impedance protection? [4+4]
   (b) What are switched distance-relaying schemes? Explain them in detail? [2+6]
6. (a) Explain the merits and demerits of static relays.
   (b) Discuss how an amplitude comparator can be converted into a phase comparator and vice versa. [8+8]
7. Show in detail, the protection arrangement of a 60 MW generator provided with
   (a) Differential protection
   (b) Back-up over − current protection through faults
   (c) standby earth fault protection in neutral connection. [6+4+6]
8. (a) What is restricted earth fault protection for alternators? Explain the difference between primary protection and back up protection. [4+4]
   (b) What is meant by 3 Zone protection? Give such schemes of protection for

i. Short length lines
ii. Medium length lines
iii. Long lines. [2+2+2+2]

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Code No: RR320205 **Set No. 3**

III B.Tech II Semester Regular Examinations, Apr/May 2006
POWER SYSTEMS-III
(Electrical & Electronic Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Draw equivalent circuit for finding the transmitted voltage and current surges on a forked line. Derive expressions for the transmitted voltage and currents. [6+10]

2. (a) Explain station type surge arrester with a neat sketch.
   (b) Explain the tests conducted on surge arresters. [6+2+8]

3. (a) In what aspects is a minimum oil circuit breaker an improvement over the bulk oil breakers.
   (b) Discuss the performance of a circuit breaker when capacitive currents are interrupted. [8+8]

4. Explain resistance switching in detail with relevant diagrams and derive the expression of damped oscillation. [4+8+4]

5. (a) Explain how to provide directional feature of Impedance and Reactance relay. Explain why the directional feature provided for Impedance relay. [2+4+2]
   (b) Explain why attracted armature type relays are noisy? What measures are take to minimize the noise. [6+2]

6. (a) Explain the merits and demerits of static relays.
   (b) Discuss how an amplitude comparator can be converted into a phase comparator and vice versa. [8+8]

7. (a) Enumerate the relaying schemes which are employed for the protection of a modern alternator.
   (b) A 11KV, 100MVA generator is provided with differential scheme of protection. The percentage of the generator winding to be protected against phase to ground fault is 80 % . The relay is set to operate when there is 15 % out of balance current. Determine the value of the resistance to be placed in the neutral to ground connection. [8+8]

8. (a) Explain the directional impedance relay by means of its characteristics on R− X plane.
   (b) Explain how arc resistance introduces an error in distance measurement.[8+8]

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Code No: RR320205 **Set No. 4**

III B.Tech II Semester Regular Examinations, Apr/May 2006
POWER SYSTEMS-III
(Electrical & Electronic Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain about Bewley's Lattice diagrams and also mention the uses of these diagrams. [6+2]
   (b) A line of surge impedance of 400 ohms is charged from a battery of constant voltage of 135volts. The line is 300 metre long and is terminated in a resistance of 200 Ohms. Plot reflection lattice and the voltage across the terminating resistance. [4+4]

2. Explain clearly the meaning of resonant grounding. What are the requirements of the reactor in neutral connections of such a grounding? Draw the connection of arc suppression coil. [4+4+4+4]

3. (a) List out the advantages and disadvantages of HRC fuse
   (b) Explain fuse Characteristics in detail. [8+8]

4. Explain resistance switching in detail with relevant diagrams and derive the expression of damped oscillation. [4+8+4]

5. Determine the time of operation of the relays placed at location No. 1 and 2 assuming that fault current is 2000amps,C.T.ratio 200/1, relay 1 set at 100% and 2 at 125%and that the relay No.1 has a time multiplier of 0.2. The time grading margin between the relays is 0.5. sec for discrimination. Assume the relay to have 2.2 seconds I.D.M.T. Characteristic. As shown in figure 1. [8+8]

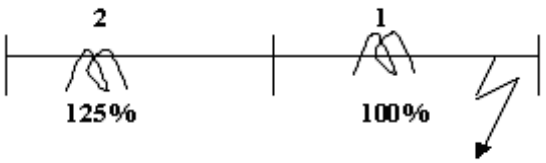

Figure 1:

6. (a) Where are the relays having extremely inverse and very inverse characteristics used? What types of characteristics are used for protecting rectifiers, and for replacement of fuses? [4+4]
   (b) Explain how the mho characteristic realized using a sampling comparator? [8]

7. (a) Enumerate the relaying schemes which are employed for the protection of a modern alternator.

(b) A 11KV, 100MVA generator is provided with differential scheme of protection. The percentage of the generator winding to be protected against phase to ground fault is 80 % . The relay is set to operate when there is 15 % out of balance current. Determine the value of the resistance to be placed in the neutral to ground connection. [8+8]

8. (a) Discuss the considerations which determine the need for a busbar protection.

(b) Discuss any one busbar protection scheme in detail. [8+8]

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