8E8041

B.Tech. VIII Semester (Main/Back) Examination, April/May-2017

Electrical and Electronics Engineering

8EX1A EHV AC/DC Transmission

Common with 8EE1A

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable by assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) Estimate the corona loss for a 3ϕ, 110kV, 50Hz, 150km long transmission line consisting of three conductors each of 10mm diameter and spaced 2.5m apart in an equilateral triangle formation. The temperature of air is 30°C and the atmospheric pressure is 750mm of mercury. Take the irregularity factor as 0.85. Ionization of air may be assumed to take place at a maximum voltage gradient of 30kv/cm. **(8)**

    b) Explain how the power handling capacity of EHV lines (AC) can be calculate? **(8)**

OR

1. a) What is the need of EHV transmission and what are the problems associated with it? **(8)**

    b) Describe in brief the surge impedance loading of a transmission line. **(8)**

Unit-II

2. a) Two generators are rated at 200MW and 400MW are operating in parallel. The drop characteristics of their governor are 4% and 5% respectively from no load to full load. The speed changer are so set that the generator operates at 50Hz sharing the full load of 600MW in the ratio of their rating. If the power reduce to 400MW how it will be shared among the generator and what will be the system frequency? Assume free governor operation. **(8)**

b) Draw schematic diagram of a speed governing system to control the real power flow in the power system and briefly explain it. **(8)**

OR

2. a) Explain flat tie line load control and the line load bias control method of load frequency control for the interconnected power system. **(8)**

b) Explain the two-area load frequency control with the help of block diagrams. **(8)**

Unit-III

3. a) What is shunt compensation? What is the role of shunt compensation in power system? How it is different from series compensation? **(8)**

b) Explain the various conventional methods of voltage control along with advantages and disadvantages. **(8)**

OR

3. a) Briefly explain the various types of shunt reactors used to limit voltage rise. **(8)**

b) What is the role of reactive power on voltage and voltage regulation? What are the components which are responsible for generation and absorption of reactive power in the system. **(8)**

Unit-IV

4. a) What are the benefits of using FACTS devices? Give the types of FACTS controllers and quantities/parameters being controlled by these. **(8)**

b) Explain static VAR compensator with the help of schematic diagram. **(8)**

OR

4. a) Draw and explain the V-I characteristics of the STATCOM. **(8)**

b) With the help of characteristics curves explain the operation of TCSC. **(8)**

Unit-V

5. a) What is ground return? What are the problems associated with the use of ground as the return conductor? **(8)**

   b) An existing Sϕ, double circuit AC lines is to be converted to three-circuit DC line. Assuming the same insulation level and unity power factor in the AC systems. Show that : **(8)**

   i) the ratio of power transmitted by DC to that by AC is equal to $\sqrt{2}$ and

   ii) the ratio of % loss by DC to that by AC is equal to $1/\sqrt{2}$.

OR

5. a) Explain briefly the various types of DC link used for HVDC transmission. **(8)**

   b) Draw and explain converter control characteristics. **(8)**