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Eighth Semester B.E. Degree Examination, May/June 2010 HVDC Transmission

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions.
2. Draw suitable sketches wherever necessary.
3. Assume relevant data if required.

- 1 a. Compare A.C. and D.C. transmission systems. (10 Marks)
b. What are the potential applications of D.C. transmission? (06 Marks)
c. Write a brief note on 'modern trends in D.C. transmission'. (04 Marks)
- 2 a. Based on the economic considerations, describe how do you choose voltage level for D.C. transmission. (10 Marks)
b. What are the limitations of D.C. transmission? (06 Marks)
c. Describe in brief the importance of current margin. (04 Marks)
- 3 a. Explain with the help of block diagram, how constant extinction angle control is accomplished. (08 Marks)
b. With the help of block diagram, explain the pulse frequency control used for converter control. (06 Marks)
c. Write a short note on 'control system hierarchy' used for HVDC system control. (06 Marks)
- 4 a. Describe the equation for the average output voltage of a 6 pulse converter for two and three valve conduction mode. (10 Marks)
b. A Graetz circuit is operating from 400 V, 3 phase, 50 Hz supply at a delay angle of 30 degrees. If the source reactance is 2mH and the overlap angle is 40 degrees. Calculate : i) Average D.C. voltage output and ; ii) D.C. current. (05 Marks)
c. State the functions of smoothing reactors. (05 Marks)
- 5 a. With the help of a suitable schematic and waveforms, explain the operating principle of D.C. circuit breaker. (08 Marks)
b. How is the overvoltage protection provided for a converter pole? (06 Marks)
c. Find the inductance of the D.C. reactor required to prevent consequent commutation failure in the inverter described below:

Number of bridges per pole	- 2	
Rated voltage per bridge	- 200 kV	
Rated current	- 1.8 kA	
I_{s2}	- 10 kA	
Frequency	- 60 Hz	
γ_n, γ_m	- $16^\circ, 8^\circ$	(06 Marks)
- 6 a. List the troubles caused by A.C. harmonics. (05 Marks)
b. Mention the procedure for design of single tuned A.C. filter. (08 Marks)
c. State the various A.C. harmonic filter configurations and their impedance characteristics. (07Marks)
- 7 a. Describe in brief 'modelling of HVDC systems for digital dynamic simulation'. (10 Marks)
b. What is a physical model of HVDC simulator? State the applications of D.C. simulator. (10 Marks)
- 8 Write short notes on :
a. VDCOL
b. Limitations of manual control.
c. MTDC systems
d. Graetz circuit. (20 Marks)
