U.S.N | | | | | | | | | | |

P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution under VTU, Belgaum)

Eighth Semester, B.E. – Electrical and Electronics Engineering

Semester End Examination; June/July - 2015

HVDC Power Transmission

Time: 3 hrs *Max. Marks: 100*

Note: *i) Answer any **FIVE** full questions, selecting at least **TWO** full questions from each part*
ii) Smith chart will be provided.

PART – A

1. a. Compare AC and DC transmission based on their relative, technical performance and reliability. 10

   b. Mention the principle applications and limitations of DC transmission. 6

   c. Explain the various types of DC links along with their schematic connections diagrams. 4

2. a. Discuss the turn- on and turn – off switching characteristics of thyristor. 10

   b. Discuss the properties of converter circuits. 5

   c. Define pulse number and comment on choice of best converter configuration. 5

3.a. State any three HVDC projects in India and mention their technical specifications. 6

   b. Bring out the comparison between AC and DC transmission systems on the economics of power transmission front. Explain the significance of 'Breakeven distance' in this context. 6

   c. Discuss the choice of optimum system voltage for a fixed power transfer over long distance transmission lines. 8

4.a. Perform the analysis of Gratez circuit (i) with no overlap, and (ii) with overlap less than 60 degrees. Obtain the expression for average direct voltage in each case. 12

   b. A bridge connected rectifier is fed from 220 kV / 110 kV transformer with primary connected to 220 kV. Determine the DC output voltage when the communtation angle is 15^o and delay angle is 30^o. 8

PART – B

5.a. Explain the basic principles of controlling the voltage at any point on the DC line and the current. Mention the considerations influencing the selection of control characteristics. 10

   b. Discuss the actual characteristics of converter control. In this context, explain the significance of current margin and its range. 6

   c. Explain the general forms of equations for average DC current and average DC voltage in terms of ignition advance angle β and extinction advance angle γ leading to equivalent circuit representation for the inverter. 4

Contd 2…

6. a.	Mention the limitations of manual control.	5
b.	What are MTDC system? Explain the two configurations of MTDC systems.	5
c.	What is mode ambiguity and in this context explain the modification of V-I characteristic for mode stabilization.	10
7. a.	With suitable assumptions, analyze and workout the expression for optimal value of resistance for damping the oscillations in the DC line.	10
b.	Discuss the procedure for clearing the line faults and re-energizing the line.	10
8. a.	Define Characteristic and Non-characteristic harmonics. Explain the troubles caused by harmonics and functioning of harmonics filters.	10
b.	Explain the phenomenon of 'Telephone interference' and the factors affecting it in detail.	10

* * * * *