

**R09****Code: 9A02702**

B.Tech IV Year I Semester (R09) Supplementary Examinations June 2016

**FUNDAMENTALS OF HVDC & FACTS DEVICES**

(Electrical &amp; Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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- 1 (a) Draw schematic diagram of a typical HVDC converter station and explain the functions of various components available.  
(b) Prove that the average valve rating of a 3-phase, two way bridge rectifier is  $2.094 \text{ pd}$  with the help of a relevant waveforms, where  $\text{pd}$  is the DC power. Mention the assumptions made.
- 2 Draw the complete converter control characteristics and explain the principle of power control in a DC link.
- 3 (a) Discuss about the alternate converter control strategies for reactive power control.  
(b) What are the adverse affects of harmonics produced by the HVDC converters?
- 4 Derive and explain the solution of AC/DC load flow problem using simultaneous method.
- 5 (a) Explain about loading capability limits.  
(b) Explain the concepts of power flow in parallel paths and meshed systems.
- 6 (a) Explain the operation of TCR and TSR with their characteristics.  
(b) Explain the functional control scheme of FC-TCR with necessary waveforms.
- 7 Explain various objectives of series capacitive compensation.
- 8 (a) Explain the basic operating principles of UPFC.  
(b) Explain how the UPFC can control real and reactive power flow in the transmission line.

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