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Code No: A4902**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****M.Tech I Semester Examinations, March/April-2011****HVDC TRANSMISSION****(COMMON TO ELECTRICAL POWER ENGINEERING, POWER ELECTRONICS)****Time: 3hours****Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1. a) What are the different applications of D.C. transmission system? Explain them in detail.
 b) Explain the technical development in control and protection for better performance and reliability of D.C. transmission system. [12]
2. a) Compare A.C. and D.C. transmission system based on economic aspects and technical performance and reliability.
 b) Draw the connection diagram of two, three-phase converter transformers to a 12-pulse converter bridge. [12]
3. a) Draw the schematic circuit diagram of a Graetz's circuit and explain its principle of operation
 b) Explain the effect of overlap angle on the performance of converter circuit. [12]
4. a) Draw and explain a block diagram of a Hierarchical level of control of HVDC transmission system
 b) Explain the individual characteristics of a rectifier and inverter with sketches. [12]
5. a) Discuss the various sources of reactive power for HVDC converters
 b) Derive and explain the solution of AC/DC load flow problem using simultaneous method. [12]
6. a) Explain why the inverter end requires higher reactive power supply than the rectifier end
 b) Discuss the disturbances on AC side and DC side. [12]
7. a) How do you estimate the harmonic order based upon pulse number of HVDC converter station. Give a detailed harmonic analysis of a 12-pulse converter for characteristic harmonics.
 b) Mention the names of various types of filters that are used in HVDC converter station and draw their impedance characteristic and configuration. Give design aspect of one filter. [12]
8. Write short notes on the following
 a) Modern trends in DC transmission.
 b) Starting and stopping of DC link.
 c) Dynamic over voltages. [12]
