Code No: RR420202 **Set No. 1**

**IV B.Tech II Semester Regular Examinations, Apr/May 2007**
**HVDC TRANSMISSION**
**(Electrical & Electronic Engineering)**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) For a fixed power of transmission explain how the economic choice of voltage level is selected in D.C. transmission system. [8]
   (b) Explain the technological development in control and protection, for better performance and reliability of D.C. transmission system. [8]
2. Draw the schematic circuit diagram of a 6 - pulse Graetz's circuit and explain its principle of operation. [16]
3. Explain the individual characteristics of a Rectifier and an Inverter with sketches. [16]
4. With block diagram, discuss the principle of operation of a basic power controller. [16]
5. (a) Derive the mathematical model of d.c. link controllers of a d.c. link. [8]
   (b) Write the mathematical model of a d.c. converter. [8]
6. (a) What are the basic principles of over current protection. [8]
   (b) Discuss the various faults exist in converter station? Explain. [8]
7. It is required to eliminate harmonics of order 10 and below 10 other than fundamental in a 12 pulse converter. Suggest a suitable transformer configuration and derive an equation for primary current of transformer. [16]
8. What are the various types of filters that are employed in HVDC converter station? Discuss them in detail. [16]

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Code No: RR420202 **Set No. 2**

**IV B.Tech II Semester Regular Examinations, Apr/May 2007**
**HVDC TRANSMISSION**
**(Electrical & Electronic Engineering)**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) For a fixed power of transmission explain how the economic choice of voltage level is selected in D.C. transmission system. [8]
   (b) Explain the technological development in control and protection, for better performance and reliability of D.C. transmission system. [8]
2. Draw the schematic circuit diagram of a 6 - pulse Graetz's circuit and explain its principle of operation. [16]
3. Discuss in detail the effect of source inductance on HVDC systems. [16]
4. With block diagram, discuss the principle of operation of a basic power controller. [16]
5. Write a short notes on
   (a) Modelling of H.V.D.C. links [8]
   (b) P.U. system for d.c. quantities [8]
6. (a) What are the basic principles of over current protection. [8]
   (b) Discuss the various faults exist in converter station? Explain. [8]
7. It is required to eliminate harmonics of order 10 and below 10 other than fundamental in a 12 pulse converter. Suggest a suitable transformer configuration and derive an equation for primary current of transformer. [16]
8. Give a detailed account of design aspects of the following filters: [8+8=16]
   (a) Single tuned filter
   (b) Double tuned filter.

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Code No: RR420202 **Set No. 3**

**IV B.Tech II Semester Regular Examinations, Apr/May 2007**
**HVDC TRANSMISSION**
**(Electrical & Electronic Engineering)**

**Time: 3 hours** **Max Marks: 80**

**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. [8]
   (b) With neat sketches explain the different kinds of D.C. links available. [8]
2. For a 3-$\phi$, 6 pulse Graetz's circuit, draw the timining diagram considering overlap angle is less than $60^0$ and without overlap for the following: . [16]
   (a) Voltage across load
   (b) Voltage across any two pair of conduction values
3. Explain the individual characteristics of a Rectifier and an Inverter with sketches. [16]
4. Explain in detail, the concept of reactive power requirement in HVDC converters. [16]
5. (a) Compare simultaneous and sequential methods of power flow analysis. [8]
   (b) Draw the flow chart for AC/DC load flow. [8]
6. (a) What are the basic principles of over current protection. [8]
   (b) Discuss the various faults exist in converter station? Explain. [8]
7. Write short notes on the following: [8+8=16]
   (a) Telephone influence factor.
   (b) Harmonic distortion.
8. What are the filter configurations that are employed for HVDC converter station? Give design aspect of one such filter. [16]

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Code No: RR420202 **Set No. 4**

**IV B.Tech II Semester Regular Examinations, Apr/May 2007**
**HVDC TRANSMISSION**
**(Electrical & Electronic Engineering)**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) For a fixed power of transmission explain how the economic choice of voltage level is selected in D.C. transmission system. [8]
   (b) Explain the technological development in control and protection, for better performance and reliability of D.C. transmission system. [8]
2. (a) Show that rating of the valve used in Graetz circuit is 2.094 Pd, where Pd is d.c power transmitted. [8]
   (b) Explain the effect of overlap angle on the performance of converter circuit . [8]
3. Explain in detail the converter control characteristics of HVDC systems. [16]
4. Write a note on the following sources of reactive power [8+8=16]
   (a) Synchronous condensers
   (b) Static VAR system
5. (a) Classify the solution methodology for AC-DC load flow and explain. [8]
   (b) Explain the per unit system for DC quantities. [8]
6. (a) What are the basic principles of over current protection. [8]
   (b) Discuss the various faults exist in converter station? Explain. [8]
7. Give reasons for selecting star-star and star-delta transformer configuration instead of two star-star configurations for 12 pulse converter. Derive an equation for primary current. [16]
8. Derive an equation for harmonic voltage and current for single tuned filter and discuss the influence of network admittance on design aspects. [16]

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