Code No: **RT41022** **R13** **Set No. 1**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

HVAC & DC TRANSMISSION

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
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PART–A *(22 Marks)*

1. a) Write on Necessity of EHV AC transmission. [3]
   b) Discuss on corona pulse generation properties and limits. [3]
   c) Write the applications of DC Transmission systems. [4]
   d) Write briefly on starting and stopping of DC Link. [4]
   e) Explain synchronous condensers in the reactive control of HVDC Transmission. [4]
   f) Write short notes on design of high pass filter. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain standard Transmission voltage levels that are recognized in India and give its significance. [8]
   b) Explain the effect of conductor resistance on extra high voltage lines. [8]

3. a) Explain frequency spectrum of radio noise in EHVAC Transmission lines. [8]
   b) Explain the Corona generating function or the excitation function caused by injected current at radio frequencies from corona discharges with a neat circuit. [8]

4. a) Discuss various types of HVDC links and their relative merits. [8]
   b) Compare AC and DC Transmission system based on technical and economical aspects. [8]

5. a) Explain the conventional control strategy employed in HVDC systems. Write a note on Alternate control strategies. [8]
   b) Explain Basic means of control and firing angle control. [8]

6. a) What is meant by reactive power control? How it is achieved? Explain in detail in HVDC Systems. [8]
   b) Explain the effect of source inductance on 6 pulse Graetz circuit in HVDC system. [8]

7. a) Explain characteristic of harmonics and uncharacteristic of harmonics. [8]
   b) What are the orders of harmonic voltages in six pulse converter? What is the effect of overlap angle on these harmonics? [8]

Code No: **RT41022** **R13** **Set No. 2**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

HVAC & DC TRANSMISSION

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) Write the role of Extra high voltage ac Transmission in the present world scenario. [3]
   b) Write the limits and measurements of audible noise. [3]
   c) Write apparatus required various HVDC Systems. [4]
   d) Write detailed notes on Power control of HVDC converters. [4]
   e) Write about reactive power requirements in the control of HVDC Transmission. [4]
   f) Write objectives of Filters employed in HVDC station. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Derive the equation for the maximum surface voltage gradients for more than or equal to 3 sub-conductor bundle. [8]
   b) List some of the important properties of the Bundled Conductors. [8]

3. a) With a simple block diagram, explain the Audible noise measuring circuit in Extra high voltage ac lines. [8]
   b) Explain the different factors on which the audible noise generated by a line Depends? [8]

4. a) Discuss in detail the advantages and disadvantages of HVDC transmission system over HVAC system. [8]
   b) Explain different modern trends in HVDC Transmission Systems. [8]

5. a) Show that rating of the valve used in Graetz circuit is 2.094 Pd, where Pd is d.c power transmitted. [8]
   b) Draw a schematic of a 6 pulse converter circuit and derive from fundamentals, the expression for voltage and currents for the operation of converter as a rectifier and inverter with relevant waveforms. [8]

6. a) Discuss the conventional controls strategies of reactive power controllers in HVDC systems. [8]
   b) What is the role of AC filters and shunt capacitors in reactive power control.. [8]

7. a) How do you estimate the harmonic order based upon pulse number of HVDC converter station. [8]
   b) Discuss various types of AC filters employed in HVDC systems. [8]

Code No: **RT41022** **R13** **Set No. 3**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

HVAC & DC TRANSMISSION

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) Write the properties of the Bundled Conductors. [3]
   b) Discuss on corona pulse generation properties and limits. [4]
   c) Write apparatus required various HVDC systems. [3]
   d) Write the effect of source inductance on HVDC power converter. [4]
   e) Write short notes on conventional control strategies in the reactive control of HVDC Transmission. [4]
   f) Write about adverse effects of harmonics. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Prove that a one 750 KV line power handling capacity of a.c transmission line carry as much power as four 400 KV circuits for equal distance of transmission. [8]
   b) Explain different mechanical considerations that are taken in to account for Transmission line performance. [8]

3. a) A 3- phase line yields AN levels from individual phases to be 65dB, 62dB, and 58dB.Find the resulting AN level of the line. [8]
   b) What do you mean by Corona discharge and explain the different types of corona discharge from transmission line conductors. [8]

4. a) Discuss various types of HVDC links and their relative merits. [8]
   b) Compare AC and DC Distribution Systems and write various applications of DC Transmission systems. [8]

5. a) Draw the connection diagram of two, 3 phase converter transformers to a 12 pulse converter bridge. [8]
   b) With block diagram, explain the hierarchical control structure for a DC link. [8]

6. a) Explain the role of shunt capacitors in reactive power control of HVDC systems. [8]
   b) Briefly discuss the sources of reactive power in HVDC systems. [8]

7. a) Discuss in brief the effect pulse number and harmonics in converter circuits. [8]
   b) Discuss the design aspects of High Pass filter. [8]

Code No: **RT41022** **R13** **Set No. 4**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

HVAC & DC TRANSMISSION

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) Write on Necessity of EHV AC transmission. [3]
   b) Derive Corona loss formule. [3]
   c) Compare AC Transmission and DC Transmission. [4]
   d) Write briefly on starting and stopping of DC Link. [4]
   e) What is the necessity of ac filters in HVDC system? [4]
   f) Explain calculation of voltage and current harmonics. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain the role of Extra high voltage ac Transmission in the present world scenario. [8]
   b) Explain the effect of skin effect on the overhead line conductors. [8]

3. a) Explain the limits for Radio interference fields that occur in EHVAC transmission lines. [8]
   b) With a neat diagram explain the measurement of Radio influence Voltage (RIV). [8]

4. a) State the advantages and disadvantages of dc transmission system in terms of economics, reliability and performance. [8]
   b) Discuss various types of HVDC links and their relative merits. [8]

5. a) Explain the principle of dc link control in HVDC system. [8]
   b) Discuss briefly about constant extinction angle control in HVDC systems. [8]

6. a) Explain in detail about reactive power requirement in HVDC converters. [8]
   b) Briefly discuss the sources of reactive power in HVDC systems. [8]

7. a) What are different non-characteristic harmonics? Explain their adverse effects. [8]
   b) Derive an equation for harmonic voltage and current for single tuned filter and discuss the influence of network admittance. [8]