**18EED31**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **December, 2021** | **Electrical and Electronics Engineering** | | |
| **Seventh Semester** | **HVDC & FACTS** | | |
| **Time:** Three Hours | | **Maximum:** 50 Marks | |
| *Answer Question No.1 compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer ONE question from each unit.* | | | (4X10=40 Marks) |
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| 1. | a) | What are the applications of HVDC transmission? | CO1 | 1M |
|  | b) | What is the breakeven distance for HVDC transmission lines? | CO1 | 1M |
|  | c) | Mention the advantages of voltage source converter over line commutated converter | CO1 | 1M |
|  | d) | What is a tuned filter? | CO2 | 1M |
|  | e) | How power reversal can be achieved in a HVDC link? | CO2 | 1M |
|  | f) | Define characteristic harmonics | CO2 | 1M |
|  | g) | What are the factors limiting loading capability of transmission lines? | CO2 | 1M |
|  | h) | State the drawbacks of FACTS devices | CO3 | 1M |
|  | i) | State any two objectives of series compensation | CO3 | 1M |
|  | j) | What are the different types of losses occur in STATCOM? | CO3 | 1M |
| **Unit -I** | | | | |
| 2. | a) | Compare HVAC & DC transmission | CO1 | 5M |
|  | b) | What are the types of HVDC links? Explain. | CO1 | 5M |
| **(OR)** | | | | |
| 3. | a) | Draw the schematic diagram of a typical HVDC converter station and explain the role of terminal equipment in HVDC system operation | CO1 | 6M |
|  | b) | Why HVDC transmission has a range for breakeven distance instead of a single value? Explain | CO1 | 4M |
| **Unit -II** | | | | |
| 4. | a) | Explain the operation of current control and constant extinction angle control | CO2 | 5M |
|  | b) | What are the types of MTDC systems? Explain with neat circuit diagrams | CO2 | 5M |
| **(OR)** | | | | |
| 5. | a) | What are the adverse effects of harmonics? Suggest methods to supress harmonics in HVDC systems | CO2 | 5M |
|  | b) | Explain about A.C filters used in HVDC systems. | CO2 | 5M |
| **Unit -III** | | | | |
| 6. | a) | Explain about AC power flow in parallel paths, what is the importance of transmission interconnections? | CO3 | 5M |
|  | b) | What are the parameters controlled during series and shunt compensation? | CO3 | 5M |
| **(OR)** | | | | |
| 7. | a) | Compare SVC and STATCOM | CO3 | 5M |
|  | b) | List the possible benefits & drawbacks with FACTS technology | CO3 | 5M |
| **Unit –IV** | | | | |
| 8. | a) | Find State the objectives of shunt compensation | CO4 | 5M |
|  | b) | Briefly explain the operation of STATCOM | CO4 | 5M |
| **(OR)** | | | | |
| 9. | a) | Explain the basic operating principle of UPFC | CO4 | 5M |
|  | b) | Explain the control structure of IPFC | CO4 | 5M |

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