

Total No. of Questions : 10]

P3321

SEAT No. :

[Total No. of Pages : 2

[5670]-590

B.E. (Electrical Engineering)

HVDC AND FACTS

(2015 Course) (Semester - II) (Elective - III) (403149(B)) (Emd Sem.)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.
- 2) Figures to the right indicate full marks.

- Q1)** a) Explain effect of commutation overlap on dc voltage of six pulse bridge rectifier. Draw the equivalent circuit of bridge rectifier to simulate the drop in voltage due to overlap. **[5]**
- b) A three-phase six pulse HVDC bridge inverter has commutating reactance of 150 ohm. The current and voltage on dc side are 1100 A and 275 KV respectively. Calculate the extinction angle γ if ac line voltage is 342 KV. **[5]**

OR

- Q2)** Draw HVDC layout of components and explain function of each component. **[10]**

- Q3)** Compare HVDC classic with HVDC light and discuss the application of HVDC light for power supply to island. **[10]**

OR

- Q4)** State and explain the advantages of HVDC light over HVDC classic. **[10]**

- Q5)** a) Write note on back to back converter and state its applications. **[8]**
- b) Write the basic functions of power electronic controllers. **[8]**

OR

- Q6)** a) Explain what is meant by AC controllers. Draw the diagrams of three AC controllers and explain them. **[10]**
- b) Write note on dc link converter. **[6]**

P.T.O.

- Q7)** a) In TCSC for $\frac{X_c}{X_c} = 0.3$, find ranges of delay angle α over which TCSC is in capacitive and inductive mode. Also, find α at which resonance occurs. **[10]**
- b) Explain the conditions for transient free switching of TSC. **[8]**

OR

- Q8)** a) With diagram explain TCR. Draw waveforms of applied voltage and current with firing delay angle α . Write equations for fundamental component of current and the admittance of TCR. Plot characteristics showing the variation of admittance with α . **[10]**
- b) Write note on STATCOM. **[8]**

OR

- Q9)** a) Explain overall structure of UPFC. **[8]**
- b) With neat structure Explain steady state operational control and Characteristics of UPFC. **[8]**

OR

- Q10)** a) Explain relevant phasor diagram illustrating transmission control Capabilities of UPFC. **[8]**
- b) Explain power flow studies in UPFC embedded system with Operational constraint. **[8]**

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