Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-VII EXAMINATION – WINTER 2015

Subject Code: 170905

Subject Name: Advanced Power System - I

Time: 10:30am to 1:00pm

Total Marks: 70

Date: 04/12/2015

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- 0.1 (a) What are the different types of conventional control mechanisms for Electrical 07 Transmission Networks? Explain modern excitation controller. 07
 - (b) Explain the types of HVDC systems.
- An existing 400 kV 3- Φ AC line transmitting a power of 100 MW at 0.9 power Q.2 07 **(a)** factor is converted into bipolar DC line. Estimate the DC voltage/pole and DC line losses, if the resistance of each conductor is 0.01Ω .
 - (b) Explain series and shunt compensation. Which are the factors affect the series 07 compensation?

OR

- (b) Explain the features and characteristics of IGBT. 07
- **Q.3** 07 For lossless distributed parameters lines, derive the equation of power flow (a) from sending end to receiving end.

$$P = \frac{V_s V_R \sin \delta}{Z_o \sin \beta a}$$

(b) Draw and explain the operating characteristics of a TCR without voltage control 07 and with voltage control.

OR

- Draw a layout of Saturated Reactor (SR) compensator. Discuss the operating **Q.3** 07 (a) characteristics of SR.
 - (b) Enlist the FACTS devices used in transmission lines. Provide differences 07 among FACTS devices.
- Sketch the 12 pulse converter circuit diagram and AC current waveform with Q.4 **(a)** 07 30° shift. What is expression of Peak to Peak ripples in terms of dc voltage?
 - (b) Provide comparison between Classical HVDC and HVDC VSC systems. 07
 - OR
- **Q.4** Explain extinction angle control. What are its limitations under asymmetrical 07 **(a)** fault?
 - (b) Explain Power Reversal in DC Link.
- List the advantages and disadvantage of E.H.V.A.C transmission and HVDC Q.5 (a) 07 transmission network for bulk power transmission.
 - (b) Explain transformer as a source of harmonics in HVDC system. 07

OR

- Discuss the application of synchronous condensers. Q.5 **(a)** 07
 - Explain conduction sequence in 6-pulse converter configuration used for 07 **(b)** HVDC system.

07