

**M. TECH.-I (ELECTRICAL -POWER SYSTEM) (CBCS -- 2015
COURSE) : WINTER - 2017
SUBJECT: FACTS AND HVDC**

Day: Wednesday
Date: 17/01/2018

W-2017-2793

Time: 11.00 AM TO 02.00 PM
Max. Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Draw diagram **WHEREVER** necessary.
- 5) Assume suitable data if necessary.

SECTION-I

- Q.1** a) How does power flow is related to dynamic stability of transmission line. (05)
Describe simple two machine system with active and reactive power equation. Draw necessary diagrams.
- b) Describe the important requirements of power electronics devices used in FACTS controllers and their control issues. (05)

OR

- Q.1** a) What are the different topologies for DC link converter? Sketch and describe the specification and topology required for desired output voltage and desired harmonic level. (05)
- b) How voltage control of transmission line is done using tap changing transformer. Derive the algorithm for estimation of off nominal tap ratio at the sending end for complete compensation. (05)

- Q.2** Describe operation of SVC with diagram and mathematical expression. Sketch its characteristics How power flow is improved by use of SVC. (10)

OR

- Q.2** Describe operation of STATCOM with schematic and mathematical equation for current, voltage and power. Sketch its characteristics (10)

- Q.3** Draw and explain functional block diagram for active and reactive power control in UPFC. (10)

OR

- Q.3** With the help of phasor diagram, explain the conventional control capabilities of UPFC. (10)

SECTION-II

- Q.4** Compare between EHV and HVDC transmission system. (10)

OR

- Q.4** Derive the equation for HVDC power flow. (10)

- Q.5** Explain DC current interruption in detail. (10)

OR

- Q.5** Write down types and applications of HVDC circuit breaker. (10)

- Q.6** What are the different abnormal conditions in bipolar HVDC systems? (10)

OR

- Q.6** Describe any one scheme of protection of converters. (10)

* * * * *