



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-II Summer 2025	
Exam Seat No.:	
Academic Year: 2024-2025	Semester: VI
Class: TY	Program: B.Tech
Branch Code: ELE	Pattern: 20
Name of Course: Applications of Power Electronics in Power System	Course Code: ELE223014B
Max. Marks: 30	Duration: 1.15 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last column indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Marks CO

Question No. 1

- 1 a) In a transmission line, voltage at sending and receiving end is 1 pu with angle difference is 30° and line reactance is 0.5 pu. A series compensation of $0.1 \angle 105^\circ$ pu is injected in the line, calculate (7) CO4

- (i) Current through line (2 Marks)
- (ii) Power transfer before and after compensation (3 Marks)
- (iii) Impedance offered by series compensation (2 Marks)

Question No. 2

- 2 a) List the different types of HVDC links. Explain any two in details. (8) CO1

OR

- 2 b) What are the different types of FACTS controller? Explain each in details. (8) CO1

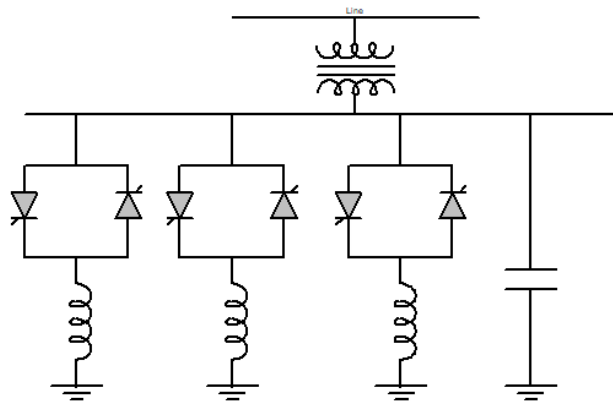
Question No. 3

- 3 a) With circuit diagram and VI characteristic explain the working of TCR scheme. Also derive the formula of susceptance offered by the TCR. (7) CO2

Question No. 4

- 4 a) A SVC scheme is shown in following figure. It consists of 3-TCR and 1-FC. This scheme is designed to provide 1 pu capacitive susceptance and 0.4 pu inductive susceptance. The susceptance of the step down transformer is 4 pu and the system voltage is 1 pu. Calculate (8) CO4

- (i) The susceptance rating of each TCR unit and FC. (4 Marks)
- (ii) The susceptance offered and current provided by scheme when 2 TCR and FC are ON. (2 Marks)
- (iii) The susceptance offered and current provided by scheme when 2 TCR are ON and FC is OFF. (2 Marks)



OR

- 4 b) In TCSC scheme, the fixed capacitor is of 50 Ohm. (8) CO4

Calculate

- (i) The impedance offered by TCSC if inductive reactance of TCR is 1.5 times reactance offered by fixed capacitor. Also calculate the current through TCR in terms of line current. (4 Marks)
- (ii) The impedance offered by TCSC if inductive reactance of TCR is 0.75 times reactance offered by fixed capacitor. Also calculate the current through TCR in terms of line current. (4 Marks)

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