



Name :

Roll No. :

Invigilator's Signature :

CS/M.Tech (EE-NEW)/SEM-2/EDPM-201/2011

2011

EHV AC POWER TRANSMISSION

Time Allotted : 3 Hours

Full Marks : 70

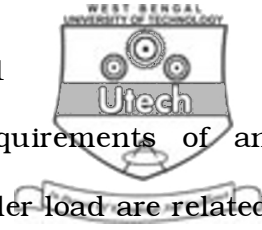
The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

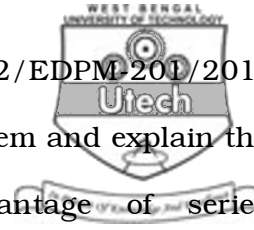
Answer any *five* questions.

5 × 14 = 70

1. a) Explain the needs of EHV transmission. 3
- b) What are the limitations of EHV AC power transmission ? 5
- c) Deduce the “telephonists equations” of a loss-less transmission line. 6
2. a) What do you understand by surge impedance and natural loading of transmission line ? 4
- b) What is Ferranti effect ? 2



- c) Show that the reactive power requirements of an uncompensated symmetrical line under load are related to the mid-point voltage. 4
- d) What is steady state stability limit ? Draw the power vs transmission angle characteristics of an uncompensated transmission line and hence explain the steady state stability limit. 1 + 3
3. a) What is reactive power compensation ? 2
- b) What do you understand by series compensation ? 3
- c) With the help of phasor diagram and simplified equivalent circuit explain power transfer characteristics and maximum transmissible power in series compensated line. 9
4. Explain the working principle of a single-phase thyristor controlled reactor (TCR) with simple schematic diagram. Draw the voltage and current waveform across the thyristor and the reactor for firing angle of 150° . What are the harmonics present in 3-phase TCR and how are they eliminated ? 6 + 4 + 4



5. Draw the schematic diagram of UPFC system and explain the working principle. Write one disadvantage of series compensation. What is sub-synchronous resonance ? Explain briefly. 7 + 3 + 4
6. Give some examples of FACTS controllers for enhancing power system control. What are benefits of such control ? Explain the V-I and V-Q characteristics of SVC with necessary diagram. 2 + 4 + 8
7. Deduce the relation between the reactive power and system voltage. Explain load compensation and system compensation scheme for controlling voltage in a short transmission line with diagram. 4 + 10
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