Code No.: **40223** **MR14**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

IV B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **Fundamentals of HVDC and Fact Devices**

Branch: **EEE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Define peak inverse voltage
2. What is choice of converter configuration?
3. Write short notes on Shunt capacitors.
4. What are the losses in FACTS devices.
5. What is single phase leg pole operation?

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Explain in two lines about choice of voltage level in DC transmission
2. State the comparison of AC & DC transmission system?
3. What is meant by neglecting overlap in graetz bridge circuit
4. Explain the DC voltage harmonic.
5. How will protect the filter
6. Write short notes on shunt capacitor.
7. Write the comparison between simultaneous and sequential methods
8. Explain about the stability limitation capability.
9. Derive average output voltage equation of single phase full wave bridge converter
10. Draw the circuit for two machines with reactive compensator placed in line segments.

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. Explain reliability and performance of DC transmission system with economics.

OR

2. Explain about (a) A two terminal DC link (b) Back to back DC link along with AC feeder (c) Back to back DC line at boarder.
3. Show the rating of the valve used in gratez circuit is 2.094Pd where Pd is dc power transmitted.

OR

4. Explain the principle of Dc link control
5. What are the solutions of AC DC power flow?

OR

6. Compare the shunt and series capacitors
7. Write short notes on the Transmission interconnections.

OR

8. Explain the following FACTS controllers (a) Series controller (b) Combined series/series controller
9. Draw and explain three level voltage source converter.

OR

10. Explain the transformer connections for a 12-pulse operation of a voltage source converter.

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IV B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **EHV AC Transmission**

Branch: **EEE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Give properties of conductors.
2. Write the important properties of the field of potential point charge.
3. Write the Expression for Corona Current.
4. Write a short note on open circuit end voltage
5. Draw the phasor diagram of shunt compensation.

II. Answer ALL questions of the following **10x2Marks=20 Marks**

1. Write power equation based on average values of line parameters.
2. Write short notes on Dampers and Spacing.
3. What are parameters required for calculating Voltage Gradient.
4. What are the properties of field of a point charge?
5. How Corona Pulses are going to generate and explain their properties?
6. Write short notes on Audible Noise Measurement & Meters.
7. What are lumped parameters
8. Explain the step response of transmission line with neat wave form.
9. What is significance of series capacitor?
10. Explain the voltage control using synchronous condensers.

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. a) What is meant by thermal rating of EHV-lines? Discuss temperature rise of conductors and current carrying capacity of lines.

   b) A 400 kV line uses a 2-conductor bundle with dm =O.0318m for each conductor. The phase current is 1000 Amp. The area of each conductor is 515.7 mm2with Pa= 2.7 X 10-8Q-m at 20°C, a = 0.0045 Q/°C at 20°C. Take value of ambient temperature *ta* = 40°C & atmospheric pressure to be one. The wind velocity vm= 1m/s & e = 0.50 & neglect solar radiation. Calculate the final temperature of the conductor only due to FR-heating.

OR

2. Explain in detail sequence inductance and capacitance.

3. For a 400kv line, calculate the maximum surface voltage gradient on the center and outer phases in horizontal configuration at the maximum operating voltage of 420Kv, rms line to line. The other dimensions are : H = 13m, S= 11m, N= 2, r= 0.0159m, B=0.45m.

OR

4. A point charge Q= 10^{-6} Coulomb is kept on the surface of a conducting sphere of radius r=1cm, which can be considered as a point charge located at the centre of the sphere. Calculate the field strength and potential at a diameter of 0.5cm from the surface of the sphere. Also find the capacitance of the sphere, ϵ_r=1.
5. a) Discuss mechanism for minimisation of radio interference in EHV-lines.

   b) A 750 kV-line in horizontal configuration has H = 18m and phase spacing S = 15m. Conductors are 4 x 0.03m diameter with bundle spacing of 0.4572m. Compute radio interference-level at 15m at ground level from the outer phase at IMHz in average fair weather.

OR

6. Discuss the Measurement of RI, RIV, Excitation function by using neat diagrams.
7. a) Derive an expression for traveling wave for voltage/current in EHV lines.

   b) An overhead line with Zo = 450ohms continues into a cable with Zc=100ohms. A surge with a crest value of 750kV is connected towards the junction from the overhead line. Calculate voltage in cable.

OR

8. Explain magnetic field of 6-phase lines.
9. a) Explain shunt and series compensation techniques used in voltage control in EHV AC lines.

   b) Explain effects of sub synchronous resonance phenomenon in EHV lines.

OR

10. A 420 kV line is 750 km long. Its inductance and capacitance per km are L=1.5 mH/km and C=10.5 nF/km. The voltages at the two ends are to be held 420 kV at no load. Neglect resistance. Calculate:

    i) MVAR of shunt reactors to be provided at the two ends and at intermediate station midway with all four reactors having equal resistance.

    ii) The A, B, C, D constants for the entire line with shunt reactors connected.