

Exam. Code: 1018

Sub. Code: 35257

2056

M.E. Electrical Engineering (Power Systems)

Second Semester

EE-8202 (PS): EHV AC Transmission

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt any five questions. Missing data (if any) can be appropriately assumed.

x-x-x

- Q1 A)** Give ten levels of transmission voltages that are used in the world. (5)
- B)** Explain the power handling capacity and line losses in EHV lines and discuss the useful conclusions from it. (5)
- Q2 A)** Develop the equations for electric field, electrical potential and potential difference in the vicinity of a line conductor. (5)
- B)** Define the Geometric mean radius (GMR) of a bundle conductor. If  $N$  is the number of sub conductors in the bundle,  $r$  is the radius of sub conductor and  $R$  is the bundle radius, show that  $GMR = (N \cdot r \cdot R^{N-1})^{1/N}$  (5)
- Q3** Illustrate the method of calculation of capacitance of multi-conductor transmission line. Show that the product of line capacitance and line inductance is inversely proportional to the square of the velocity of light. (10)
- Q4 A)** Derive the expression for the self and mutual inductances in matrix form for multi conductor lines. (5)
- B)** A sphere of  $10 \mu\text{C}$  is placed at a distance of 2 metre from the centre of a sphere of radius 0.5 metre (one- metre diameter sphere). Calculate the magnitude polarity and location of a point charge  $Q_2$  which will make the sphere at zero potential. (5)
- Q5 A)** Describe the difference between a line spectrum and band spectrum for noise. What is the difference between a pure tone and broad-band spectrum? (5)
- B)** Describe the mechanism of formation of a positive corona pulse train. (5)
- Q6 A)** A voltage with magnitude 500kV (crest) is incident on a conductor whose corona inception voltage is 100 kV (crest) and capacitance  $C = 10 \text{ nF/km}$ . after a lapse of 120  $\mu\text{sec}$  (36km of travel), the measured amplitude is 110kV. Calculate  $\alpha$  and  $K_s$ . (5)
- B)** Explain cascade connection of components in shunt and series compensation. (5)
- Q7** Explain the terms (a) sub-transient reactance, (b) transient reactance, (c) synchronous reactance of a source, (d) a.c. component, (e) d.c. component, and (f) the interrupting current capacity of a circuit breaker. (10)
- Q8 A)** What is the reason for the existence of SSR in the steady state and transient conditions in series-capacitor compensated lines? (5)
- B)** Explain line loadability. Also write the effects of over loading. (5)

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