Exam. Code: 1018
Sub. Code: 7477

Max. Marks: 50

2054

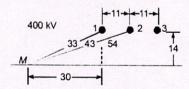
M.E. Electrical Engineering (Power Systems) Second Semester

EE-8202: EHV AC Transmission

Time allowed: 3 Hours

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

x-x-xWhat is the necessity of EHVAC Transmission? Explain its advantages. (5) B) Illustrate the power handling capacity and line loss of EHVAC lines with various voltage levels. (5) Q2 A) Explain in briefly about field of line changes and properties. (5) What are the properties of Bundled conductors and explain with neat sketches? (5) Q3 A 3-phase 750 kV horizontal line has minimum height of 12 m, sag at mid span = 12 m. Phase (10)spacing S = 15 m. Conductors are 4×0.035 m with bundle spacing of B = 0.4572m. Calculate per kilometer: i) The matrix of Maxwell's Potential coefficients for a untransposed configuration. ii) The inductance and capacitance matrices for un transposed and transposed configurations. iii) The zero-, positive-, and negative-sequence inductances and capacitances for transposed line. iv) The ground-return resistance and inductance matrices at 750 Hz taking $\rho_s = 100$ ohm-meter. Q4 A) Derive general expression for the charge-potential relations for multi conductor lines: Maximum (5) Charge Condition on a 3- Phase Line. A sphere gap with the spheres having radii R = 0.5 m has a gap of 0.5 m between their surfaces. B) (5) (i) Calculate the required charges and their locations to make the potentials 100 and 0. (ii) Then calculate the voltage gradient on the surface of the high-voltage sphere. Q5 A) Draw the circuit diagram for measuring Radio Influence Voltage (RIV) with respect to E.H.V. (5) B) For a 400-kV line, calculate the maximum surface voltage gradients on the centre and outer phases (5) in horizontal configuration at the maximum operating voltage of 420 kV, r.m.s. line-to-line. The other dimensions are H = 13 m, S = 11 m, N = 2, r = 0.0159 m, B = 0.45 m. Why does line-generated corona noise not interfere with TV reception or FM radio reception? What (5) causes interference at these frequencies? B) What is the purpose of synchronous condenser and how voltage profile increases using synchronous (5) condenser also the design of the rating of the synchronous phase modifier (or condenser for short)? Explain the methods used for the reduction of switching surges on EHV systems. Q7 A) Explain the static reactive compensating systems (Static VAr) used in EHVAC transmission B) system. A 400-kV line has conductors in horizontal configuration at average height H = 14 m and phase (5) spacing S = 11 m, as shown in Figure 1. The conductors of each phase are 2×0.0318 m diameter at



B = 0.4572 m spacing. Calculate the RI level of each phase at a distance of 30 m from the outer

Figure 1

B) Explain line loadability. Also write the effects of over loading.

phases at ground level at 0.5 MHz at 420 kV using the CIGRE formula.

(5)