

Exam. of Electrical Power
For Third Grade Communication Dept.

(استخدم القلم الجاف الأزرق والأسود فقط في الإجابة)

Answer All the Following Questions:-

Q1: Calculate the max. voltage drop point, branch currents, max. % regulation and efficiency in the network shown in Fig. 1. Impedance of interconnector is $0.2 + j 0.05 \Omega$. (12)

Q2:i- Complete:-

- a- Hard Porcelain containing----- (1)
b- Glass has a lower coefficient of ----- (1)
c- Puncture occurs when----- (1)
d- String efficiency = ----- (1)
e- The phenomenon of skin effect is----- (1)

- ii- a- Determine the voltage across each disc of suspension insulators as% of the line voltage to earth The self and capacitance to ground of each disc is C & $0.2C$ resp. The capacitance between the link pin the guard ring is $0.1C$.
b- If the capacitance to the line of the lower link pin were increased to $0.3C$ by means of a guard ring, determine the redistribution of voltage. Also determine the string efficiency in each case. (10)

Q3: A 3- Φ , 50-Hz overhead line is 100 km long. The phase values of resistance, inductance and capacitance per mile are 0.25Ω , 2 mH & $0.0145 \mu\text{F}$. Calculate, using the nominal T method, the receiving voltage & current, Power factor and % reg. when $V_s = 155 \text{ kV}$, $P_r = 70 \text{ MW}$ & $\cos \Phi_r = 0.8 \text{ lag}$. (14)

Q4:i- Find the outer single-core cable radius, if conductor dia. is 1.5 cm & also, if conductor radius 0.5 inch . Electric stress on the surface of conductor is 110 kV/cm and phase voltage (3-ph.) is 173 kV . (7)

ii- 3-ph. line, 50 Hz, 100 mile long, 132 kV , $P_r = 25 \text{ MW}$, 0.8 lag . P.F. (Fig.2). Conductor radius 5 mm calculate induced voltage in telephone ct ST due to electromagnetic effect. Also, calculate telephone conductor's voltage due to electrostatic effect. (7)

Q5:i- Write in the following:-

- a- Inductive interference with neighboring communication circuits. (3)
b- Circuit breakers. (3)
ii- A conductor hangs in the form of a catenary $y = c \cosh x/c$, where c is 5000 ft . The horizontal distance between the supports is $c/5$ and the conductor weighs 1.25 lbf/ft . If the horizontal distance between the lowest point in the catenary & the lower support is 180 ft , calculate: the tension of each support; the min. tension and the difference in levels of the supports. (8)

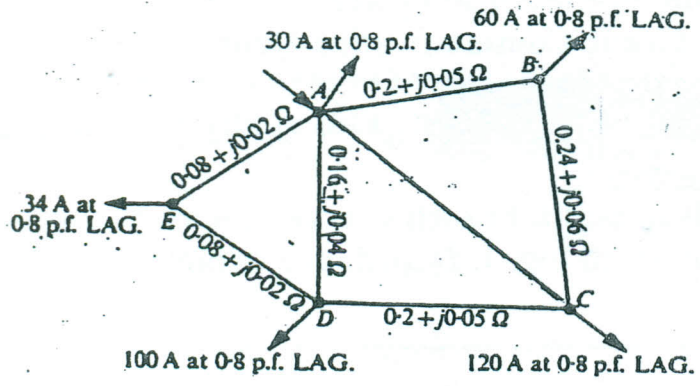


Fig. 1

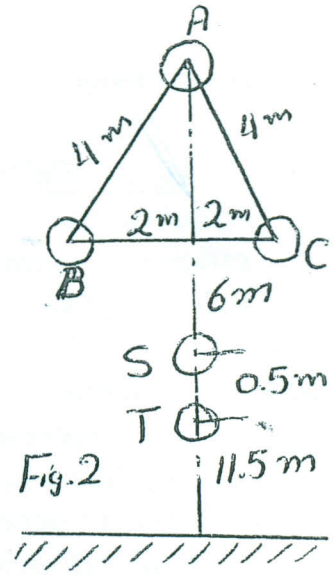


Fig. 2