KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

ELECTRICAL ENGINEERING DEPARTMENT

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EE-465

Key Solutions

Quize # 2 Serial # Name: I.D.#

Circle the correct answer.

1) A hydroelectric power plant producing 9000 MW. It needs to be transmitted to a load center located 500 km from the plant. Assuming that Vs = 1.0 per-unit, V_R = 0.95 per-unit, the phase-angle between the sending-end and receiving-end is $\delta = 35^o$, and negligible mutual coupling between the lines. Based on the practical line loadability criteria, the number of three-phase, 60 Hz lines required to transmit this power, with one line out of service, will be for a 500 kV lines with Z_c = 277 Ohm is

a. 9
b. 10
c. 11
d. 12

(5 Marks)

2) Shunt inductors are commonly installed at selected points along lines. They
a. deliver reactive power and reduce over-voltages during light load conditions.
b. absorb reactive power and reduce over-voltages during light load conditions.
c. deliver reactive power and reduce over-voltages during heavy load conditions.
d. absorb reactive power and reduce over-voltages during heavy load conditions.

(5 Marks)

Hints:

$SIL = (V_{rated})^2 / Z_c$

$P = [V_{S.p.u.} V_{R.p.u.} SIL \sin \delta] / \sin (2\pi l / \lambda)$

λ = 5000 km