**Duration – 3 Hours**   **Total Marks - 80**

N.B.: - (1) Question No.1 is compulsory.
      (2) **Attempt** any **Three** questions out of remaining **five** questions.
      (3) Assume suitable data if necessary and justify the same.

Q 1.   Answer **all questions**.   20

A) Explain Sequence impedances of transmission line.

B) Define critical disruptive voltage, visual critical voltage and corona loss.

C) Explain attenuation of travelling waves.

D) What is tower footing resistance?

Q 2 a) Discuss Z_{BUS} building algorithm.   10

Q 2 b) Derive the equation for fault current for LG fault.   10

Q 3 a) What is "capacitance switching"? Explain its effect on the performance of the 10
circuit breaker.

Q 3 b) Explain clearly how lightning arrester is selected? What is the best location 10
of a lightning arrester and why?

Q 4 a) Explain in brief Selection of circuit breakers and short circuit MVA. 10

Q 4 b) Explain protection against surges and discuss the role of surge arresters, 10
surge capacitor.

Q 5 a) Discuss the maximum power transfer and stability considerations in 10
transmission line.

Q 5 b) Describe the phenomenon of corona. Explain radio interference due to 10
corona.

Q 6 b) The system shown in fig. is delivering 50 MVA at 11 Kv, 0.8 lagging power 10
factor into a bus which may be regarded as infinite. Particulars of various
system components are:
Generator: 60 MVA, 12 Kv, $X_d = 0.35$ pu
Transformers (each): 80 MVA, 12/66 KV, X=0.08 pu
Line: Reactance 12 ohms, resistance negligible.
Calculate the symmetrical current that circuit breakers A& B interrupt in the
event of a three phase fault occurring at F near the circuit breaker B.
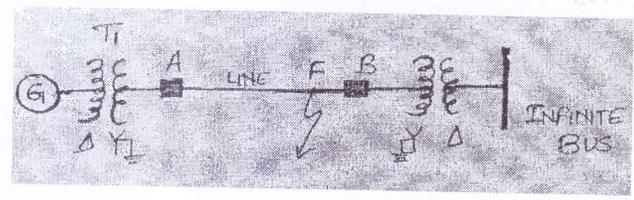
Derive the expressions of coefficients for reflection and refraction of travelling waves. **10**

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