SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

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B.Tech. || EE || 6ᵗʰ SEM.

Power System 1

(RG)

Subject Code: BTEE-602A

Paper ID: M\18

(2015)

Time allowed: 3 Hrs   Max Marks: 60

Important Instructions:
- All questions are compulsory
- Assume any missing data
- Additional instructions, if any

Q. 1.   Short-Answer Questions:

a) What are the limitations of AC transmission system.
b) Why sag is called necessary evil in transmission lines?
c) On what factors does the skin effect depends?
d) What is voltage regulation?
e) Why VIR cables are preferred over paper cables?
f) Draw the cross-sectional view of a typical cable?
g) What is stringing chart?
h) On what factors the conductor spacing ground clearance depends?
i) What are the causes of failure of insulator?
j) How line losses depend upon the transmission voltage of a line?

PART B (5×8marks)

Q. 2.   Discuss the comparison of conductor material required in single phase two   CO1
wire system and three phase three wire system.

OR

Discuss the comparison of conductor material required in DC phase two wire
system and three phase three wire system.

Q. 3.   A transmission line has a span of 200 m between level supports. The cross   CO1
sectional area of 1.29 cm sq. weight 1170 kg/km and has a breaking stress is
4218 kg/cm sq. calculate sag if the safety factor is 5, allowing wind pressure
of 122 kg/ sq. m area. What is vertical sag?

OR

A string of four insulators has a self capacitance. Calculate (i) the voltage
distribution across each unit as a percentage of total voltage across the string.

(ii) string efficiency.

Q. 4. Derive an expression for capacitance of three core cable.   CO3

OR

Write a note on laying of cables.

Q. 5. Derive an expression for calculation of sending end voltage and current in   CO2
terms of receiving end parameters for nominal T model.

OR

Derive an expression for calculation of sending end voltage and current in
terms of receiving end parameters for nominal π model.

Q. 6. Calculate sending end voltage of a three phase 50Hz, 100 km long CO4
transmission line, supplying a load of 20 MW at 0.8 power factor lag, at
66kV. The resistance per phase is 100 ohm; the inductance per phase is 111.7
mH; and capacitance per phase is 0.9954 micro farad. Use nominal T model.

OR

Calculate the loop inductance per km of a single phase line comprising of 2 parallel
conductor 1 meter apart and 1 cm in diameter, when the material of conductor is
(i)copper and (ii) steel with relative permittivity 50.