

B.TECH SEM – V (2007 COURSE) (ELECTRICAL ENGG.) :
WINTER - 2017
SUBJECT: TRANSMISSION AND DISTRIBUTION OF ELECTRICAL ENERGY

Day: Thursday
Date: 18/01/2018

Time: 02.30 PM TO 05.30 PM
Max. Marks: 80

W-2017-2462

N.B:

- 1) **Q. No.1 and Q. No.5 are COMPULSORY.** Out of the remaining attempt **ANY TWO** questions from each section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answer to both the sections should be written in **SEPARATE** answer book.
- 4) Draw neat and labeled diagram **WHEREVER** necessary.
- 5) Assume suitable data if necessary.

SECTION-I

- Q.1**
- a) What are the different types of conductors used in transmission line? Write there properties. **(05)**
 - b) Explain skin effect and proximity effect in case of transmission line. **(05)**
 - c) Describe the methods to reduce the corona effect. **(04)**
- Q.2**
- a) Differentiate between pin type and suspension type insulators. **(06)**
 - b) A string of 4 insulators has a self capacitance equal to 6 times the pin to earth capacitance find:
 - i) Voltage distribution across various units expressed as a percentage of total voltage across the string.
 - ii) String efficiency
- Q.3**
- a) 3 conductors of 3 phase line are arranged at the corners of a triangle of sides 3m, 3.5m and 4.2m. Calculate the inductance per km of the line when the conductors are regularly transposed. Consider the diameter of each conductor to be 1.5cm. **(05)**
 - b) Explain nominal π and nominal T methods of representation of medium transmission line. Also draw its vector diagram. **(08)**
- Q.4**
- a) The towers of height 35 m and 95 m respectively support a transmission line conductor at river crossing. The span length is 500 m. If the tension in the line conductor is 1650 kg. Find the minimum clearance between conductor and water. Weight of the conductor is 1.6 kg/m. Assume the two supports are at same level. **(07)**
 - b) Define the following terms related to corona: **(06)**
 - i) visual critical voltage
 - ii) critical disruptive voltage
 - iii) power loss.

P.T.O.

SECTION-II

- Q.5** a) Compare the merits and demerits of underground system versus overhead system. (05)
- b) What is radial distribution system? What are its advantages and disadvantages? (05)
- c) Differentiate between indoor substation and outdoor substation. (04)
- Q.6** a) What is the most general criteria for the classification of cables? Draw the sketch of a single core low tension cable and label the various parts. (07)
- b) A single core cable has a conductor of diameter 1.2 cm and its insulation thickness 1.6 cm, the specific resistance of the insulating material is 7.5×10^8 M Ω cm. Calculate the insulation resistance per kilometer of a cable. If now this resistance is to be increased by 20 %. Calculate the thickness of the additional layer of insulation required. (06)
- Q.7** a) A single phase distributor 2 km long supplies a load of 120A at 0.8 p.f lagging at its far end and a load current of 80 A at 0.9 p.f lagging at its mid-point. Both power factors are referred to the voltage at the far end. The resistance and reactance per km (go and return) are 0.05 Ω and 0.1 Ω respectively. If the voltage at the far end is maintained at 230 V calculate:
i) Voltage at the sending end.
ii) Phase angle between voltages at the two ends. (07)
- b) Derive the equations of sending end voltages and sending end current if power factors referred to receiving end voltages. (06)
- Q.8** a) Explain in brief about the classification of substation write how the site and location is selected for a substation? (07)
- b) Write a short note on the substation equipment. (06)

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