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Total number of printed pages – 3

B.Tech
PCEE 4301

Sixth Semester Examination – 2013

TRANSMISSION AND DISTRIBUTION SYSTEM

BRANCH : ELECTRICAL

QUESTION CODE : A 204

Full Marks – 70

Time : 3 Hours

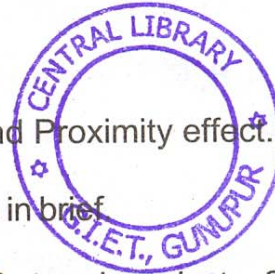
*Answer Question No. 1 which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions :

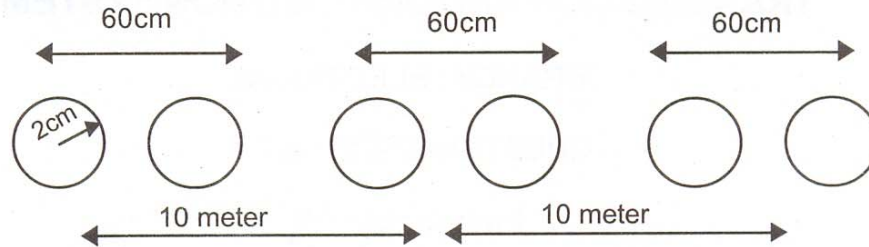
2×10

- (a) Distinguish between Skin effect and Proximity effect.
- (b) What is Surge impedance ? Explain in brief.
- (c) What do you understand GMR of a 3 strand conductor ?
- (d) Define the transmission efficiency of a transmission line.
- (e) Write down the main components of HVDC system.
- (f) Why HVDC line do not require any reactive power compensation ?
- (g) What is a guard ring and why it is required ?
- (h) What is ring main distribution system ?
- (i) Write down four causes for insulator failure.
- (j) Differentiate between Primary and Secondary transmission.



P.T.O.

2. (a) A 400 KV, 50 HZ, 3Ph transmission line has 2 sub conductors per phase and is arranged in a horizontal configuration as shown below. Take radius of each sub conductor of bundle as 2 cm .centre to centre distance between adjacent phase is 10meter. Distance between bundle conductors is 60cm.



Find the inductance and inductive reactance per phase per Km of the line. 5

- (b) Explain transposition of line conductors in three phase power transmission system. 5
3. (a) Derive A, B, C, D parameters of a medium transmission line, assuming that entire capacitance is concentrated at the receiving end. 5
- (b) A short transmission line has an impedance of $0.2 + j0.45 \Omega$ per phase. The sending end voltage being 3.3kV (L.L) and the load at the receiving end being 500kW per phase at 0.8 p.f (lag). Calculate 5
- (i) The receiving end voltage
- (ii) The Line current
- (iii) Transmission efficiency
4. (a) Estimate the vertical sag for an over head line with the following data : ACSR conductor diameter 2.226cm, weight 1.1kg/m, permissible Tension $3.5 \times 10^4 N$, wind pressure $400 N/m^2$ of projected area, ice coating 0.96cm thick, weight of ice $8900 N/m^3$ and span =325m. 5
- (b) Write various causes for origin of flicker voltage. 5

5. (a) Explain why the voltage across the insulator string is not equal and also describe practical methods to improve them. 5
- (b) Determine the string efficiency of a string insulator of three units having self capacitance equal to 5 times the pin to earth capacitance. 5
6. (a) Why Grading of cable is necessary? Explain capacitance grading of cables with necessary diagrams. 5
- (b) How can the current rating of a cable be determined? What are the factors affecting this? 5
7. (a) Find the most economical size of a 2 conductor cable which has to supply a constant load of 200Amp. The cost of the cable including installation is $(20a + 30)$ / meter where 'a' is the area of each conductor in cm^2 , cost of the energy is 5 paisa / kWh and the interest and depreciation charges amounts to be 10%. (Specific Resistivity of conductor is $2 \mu\Omega - \text{cm}$). 5
- (b) Draw a suitable diagram for Ring main distributor and explain in brief. 5
8. Answer any two of the following : 5×2
- (a) Suspension type insulator
- (b) HVDC cables
- (c) Earthing Grid Design.

