Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

PCEE 4401

Seventh Semester (Special) Examination – 2013

ELECTRICAL POWER TRANSMISSION AND DISTRIBUTION

BRANCH : EEE

QUESTION CODE : D 384

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) Why is the effect of ground on the capacitance of a line negligible ?

   (b) What is meant by grading of cables ?

   (c) What is equivalent spacing of a 3 phase line ? What is its significance ?

   (d) How is string efficiency of overhead line insulators improved ?

   (e) Why long lines usually need reactive power compensation equipments for proper operation ?

   (f) What are the limitations of Kelvin's law ?

   (g) Single core cables are usually not provided with steel armour. Give reason.

   (h) What is meant by a bipolar link in HVDC transmission system ?

   (i) What factors govern soil resistivity ?

   (j) Why is it necessary to earth neutral ?

2. (a) What are bundled conductors ? Discuss the advantages of bundled conductors, when used for overhead lines. 5

   (b) Derive an expression for the capacitance of a single phase overhead transmission line. 5

P.T.O.

3. (a) Derive the inductance of a three phase line with symmetrical spacing. 5

(b) A 3 phase, 132 kV, 200 km, 50 Hz, single circuit line has horizontal spacing with 3.5 m between adjacent conductors. The conductor diameter is 1.4 cm. Find the line capacitance per phase and charging current per phase. 5

4. A balanced three phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 power factor lag by means of a transmission line. The series impedance of a single conductor is $(20 + j40)\ \Omega$ and total phase-neutral admittance is 315×10^{-6} ℧. Use nominal Π method to determine :

(i) A,B,C,D constant of the line

(ii) sending end voltage V_S

(iii) regulation of the line 10

5. What are the major components of a HVDC transmission system ? Explain the function of each component. 10

6. (a) A 3-phase 4 wire supply with a line voltage of 400V is loaded as follows : A 3 phase load of 25 kW at a power factor of 0.8 lagging, single phase lighting loads of 10,15,20 kW on phases R,Y and B respectively. Determine the currents in all the conductors. 5

(b) What are the different types of feeders and distributors? Give their relative advantages and disadvantages. 5

7.. (a) Explain the procedure to design an earthing grid. 5

(b) Find the earthing resistance of a driven rod of length 2.5 m and diameter of 1.5 cm if soil resistivity is 50 ohm-m. 5

8.. Write short notes on any **two** of the following : 5×2

(a) Capacitance of a three phase line with equilateral spacing

(b) Reactive compensation of transmission line

(c) Testing of insulators

(d) Secondary distribution system.