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

Total Number of Pages : 02 **B.Tech.**
PCEE4301

6th Semester Back Examination 2017-18
TRANSMISSION AND DISTRIBUTION SYSTEM
BRANCH : ELECTRICAL
Time : 3 Hours
Max Marks : 70
Q.CODE : C142

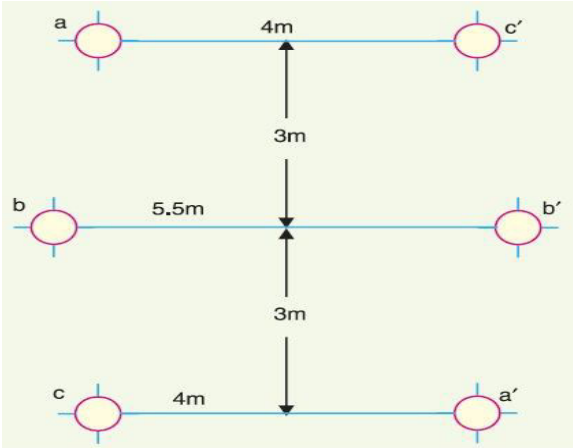
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1. **Answer the following questions:** **(2 x 10)**

a) What do you understand by GMR and GMD of stranded conductor?
b) Differentiate between skin effect & proximity effect.
c) What is bundled conductor? Explain with diagram.
d) Which distribution system is more reliable, ring or radial? Justify.
e) Draw the phasor diagram of medium transmission line (PI method).
f) What is strain type insulator? Where it is used? Draw a neat sketch to show its location in transmission line.
g) What are the effects of low power factor, active power demand remaining same?
h) What do you mean by Ferranti effect? How to reduce it?
i) What are the factors which affect corona?
j) Why we need per unit system in case of analysis of transmission system?

Q2. **a)** Derive Inductance of a 3-phase overhead line with unsymmetrical spacing and show how transposition helps in overcoming the demerits. **(5)**

b) Find the inductance per phase per km of double circuit 3-phase line shown in Fig. The conductors are transposed and are of radius 0·75 cm each. The phase sequence is ABC. **(5)**



Q3. **a)** Draw the equivalent circuit diagram and phasor diagram of medium transmission line using nominal T method and hence determine the ABCD parameters for it. **(5)**

b) A 100-km long, 3-phase, 50-Hz transmission line has following line constants : Resistance/phase/km = 0·1 ohm, Reactance/phase/km = 0·5 ohm, Susceptance/phase/km = 10 × 10− 6 S. If the line supplies load of 20 MW at 0·9 p.f. lagging at 66 kV at the receiving end, calculate by nominal π method :(i) sending end power factor (ii) regulation(iii) transmission efficiency **(5)**

Q4. **a)** What do you mean by string efficiency? Can it be 100%? Discuss different methods of improving string efficiency. **(5)**

b) Each line of a 3-phase system is suspended by a string of 3 similar insulators. If the voltage across the line unit is 17·5 kV, calculate the line to neutral voltage. Assume that the shunt capacitance between each insulator and earth is 1/8th of the capacitance of the insulator itself. Also find the string efficiency. **(5)**

Q5. **a)** The towers of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductor is 1600 kg, find the minimum clearance of the conductor and water and clearance mid-way between the supports. Weight of conductor is 1·5 kg/m. Bases of the towers can be considered to be at water level. **(5)**

b) A transmission line has a span of 275 m between level supports. The conductor has an effective diameter of 1·96 cm and weighs 0·865 kg/m. Its ultimate strength is 8060 kg. If the conductor has ice coating of radial thickness 1·27 cm and is subjected to a wind pressure of 3·9 gm/cm^2 of projected area, calculate sag for a safety factor of 2. Weight of 1 c.c. of ice is 0·91 gm. **(5)**

Q6. **a)** Derive the condition for most economical conductor size in a cable. **(5)**

b) A 2-wire d.c. distributor AB is fed from both ends. At feeding point A, the voltage is maintained as at 230 V and at B 235 V. The total length of the distributor is 200 metres and loads are tapped off as under : **(5)**

25 A at 50 metres from A ; 50 A at 75 metres from A

30 A at 100 metres from A ; 40 A at 150 metres from A

The resistance per kilometre of one conductor is 0·3 Ω. Calculate :

(i) currents in various sections of the distributor

(ii) minimum voltage and the point at which it occurs

Q7. With neat diagram compare AC and DC transmission systems. Discuss their merits and demerits. **(10)**

Q8. **Write short answer on any TWO :** **(5 x 2)**

a) Compare static and dynamic compensators

b) Grading of Cables

c) Corona loss

d) Kelvin's law for conductor size