

Total No. of Questions : 8]

SEAT No. :

**P3074**

**[5154]-640**

[Total No. of Pages : 2

**B.E. (Electrical)**

**EHV AC TRANSMISSION**

**(2012 Course) (Semester - I) (403144) (End Semester) (Elective - II)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Answer all questions.*
- 2) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Assume suitable data, if necessary.*
- 6) *Use of calculator is allowed.*

- Q1)** a) Prove that a one 750 KV line power handling capacity of a.c. transmission line carry as much power as four 400 KV circuits for equal distance of transmission. **[8]**
- b) Derive expression for inductance of multi conductor lines & state Maxwells coefficients. **[8]**
- c) The field strength on the surface of a sphere of 1 cm radius is equal to the corona inception gradient in air of 30 KV/cm. Find the charge on the sphere. **[4]**

OR

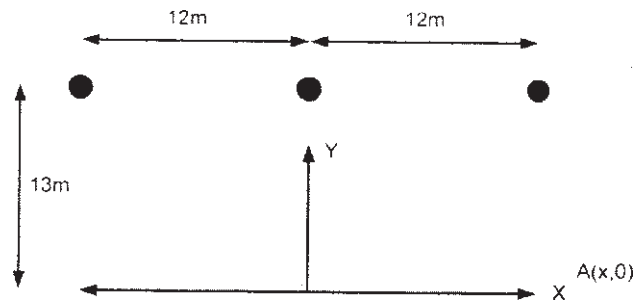
- Q2)** a) Write note on dampers and spacers Draw the neat sketches. **[8]**
- b) Explain the field of a sphere gap. **[8]**
- c) Calculate Geometric Mean Radius (GMR) of a bundled conductor for 400kV AC line having two sub conductors, each of 1.59 cm radius and sub conductor spacing 45 cm. **[4]**

- Q3)** a) Discuss effect of power frequency magnetic fields on human health and specify permissible limits. **[9]**
- b) Evaluate the horizontal, vertical and total value of electrostatic field components near the single circuit transmission line, which are energized by three phase voltages. **[9]**

OR

*P.T.O.*

- Q4) a)** Compute the r.m.s. value of ground level electrostatics field of a 400 kV Line at its maximum operating voltage of 420 kV given: single circuit configuration  $H = 13\text{m}$ ,  $S = 12\text{m}$ , conductor  $2 \times 3.18\text{cm}$  diameter,  $B = 45.72\text{cm}$ ,  $N = 2$ , Assume  $D_i = D_o$ . [9]



- b) Derive the expression for voltages induced in the conductors of an energized circuit of double circuit three phase line. [9]

- Q5) a)** With a simple block diagram, explain the Audible noise measuring circuit in Extra high voltage ac lines. [8]

- b) Explain the corona formation and methods to reduce the corona effects. [8]

OR

- Q6) a)** From charge voltage diagram derive an expression for corona loss for ac voltage of conductor and compare it with Ryan Hen line formula. [8]

- b) Explain the quantities on which the Audible noise level depends for the Extra high voltage ac lines. [8]

- Q7) a)** State and explain at least four factors to be considered in the design of ehv lines based upon the steady state limits. Also state their limiting value. [8]

- b) Biref, line insulation design based upon transient over voltages. [8]

OR

- Q8) a)** Explain in detail properties of cable insulation materials. [8]

- b) Define  $\tan \delta$  loss factor & derive an expression for insulation resistance of a cable. [8]

