Code No: RT31023 **R13** SET - 1

**III B. Tech I Semester Supplementary Examinations, May-2017**

# POWER SYSTEMS-II

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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## PART –A

| | | | |
|---|---|---|---|
| 1 | a) | Why do we find line to neutral capacitance in a 3-phase system? | [3M] |
| | b) | Write an expression for voltage regulation of a short transmission line and draw the vector diagram. | [4M] |
| | c) | Why is the rigorous solution method required for long lines? | [4M] |
| | d) | What is the effect of shunt capacitance at the terminal of a transmission line? | [4M] |
| | e) | Why Ferranti effect occurs in a transmission line? | [4M] |
| | f) | What are the advantages of suspension insulators? | [3M] |

## PART -B

| | | | |
|---|---|---|---|
| 2 | a) | A 3-phase, 50Hz, 132kV overhead line has conductors placed in a horizontal plane 4m apart. Conductor diameter is 2cm if the line length is 100 km, calculate the charging current per phase assuming complete transposition. | [9M] |
| | b) | What is the effect of unsymmetrical spacing of conductors in a 3-phase transmission line? | [7M] |
| 3 | a) | Show how regulation and transmission efficiency can be determined for medium lines using (**i**) nominal T method and (**ii**) nominal Π method. | [8M] |
| | b) | A $3\phi$ line delivers 3500 kW at 0.8 p.f lag to a load. The impedance of the line is (2+j5) Ω. If the sending end voltage is 33 kV, determine the receiving end voltage, line current and efficiency of the line. | [8M] |
| 4 | a) | Explain the concept surge impendence loading of long lines. | [8M] |
| | b) | A 132kV, 50Hz, 3-ph transmission line delivers a load of 50MW at 0.8pf lagging at the receiving end. The generalized constants of the transmission line are: $A = D = 0.95\angle 1.4^0$; $B = 96\angle 98^0$; $C = 0.0015\angle 90^0$. Find the regulation of the line and charging current. Use nominal-T method. | [8M] |
| 5 | a) | Develop an equivalent circuit at the transition points of transmission lines for analyzing the behavior of travelling waves. | [8M] |
| | b) | What are different types of transients? | [4M] |
| | c) | Why surge impedance in overhead lines is more than that of underground cables. | [4M] |

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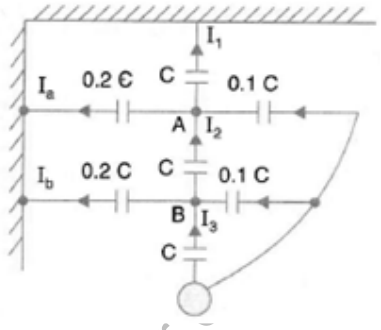
6 a) Discuss the factors effecting corona effect in power system. [7M]

b) A 3-phase, 220 kV, 50 Hz transmission line consists of 1·5 cm radius conductor spaced 2 metre apart in equilateral triangular formation. If the temperature is 40ºC and atmospheric pressure is 76 cm, calculate the corona loss per km of the line. Take $m_0 = 0{\cdot}85$. [9M]

7 Determine the voltage across each disc of suspension insulators and percentage of the line voltage to earth. The self and capacitance to ground of each disc is C and 0.2C respectively. The capacitance between the link pin and the guard ring is 0.1C. Also If the capacitance to the line of the lower link pin were increased to 0.3C by means of a guard ring determine the redistribution of voltage. Also determine the string efficiency in each case [16M]

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