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

III B. Tech I Semester Supplementary Examinations, May - 2016
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) What is the use of double circuit transmission line? [3M]

b) What is the effect of load power factor on regulation and efficiency of a transmission line? [4M]

c) What do you understand by long transmission lines? [4M]

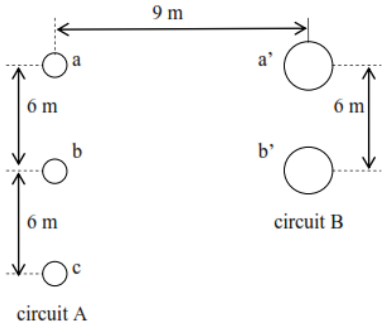
d) What are the factors that cause a travelling wave? [4M]

e) Define corona. [3M]

f) Can string efficiency in an A.C. system be 100%? Explain. [4M]

PART -B

2 a) Find GMD, GMR for each circuit, inductance for each circuit and total inductance per meter for two circuits that run parallel to each other. One circuit consists of three 0.25 cm radius conductors. The second circuit consists of two 0.5 cm radius conductors as shown in the figure below: [10M]



b) Find an expression for the flux linkages in parallel current carrying conductors. [6M]

3 a) Derive the expressions for regulation and efficiency of a short transmission line. Draw required circuit and phasor diagram. [7M]

b) Find the following for a single circuit transmission line delivering a load of 50MVA at 110 kV and p.f. 0·8 lagging : [9M]
(i) sending end voltage, (ii) sending end current, (iii) sending end power and (iv) efficiency of transmission. Given A = D = 0·98□ 3º; B = 110 □ 75º ohm ; C = 0·0005 □ 80º siemen.

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4 A 3-ph overhead line has a total series impedance/ph of $200\angle 80^0$ ohms and a total shunt admittance of $0.0013\angle 90^0$ siemen/ph. The line delivers a load of 80MW at 0.8pf lagging and 220kV between the lines. Determine the sending end line voltage and current by rigorous method. [16M]

5 a) Derive reflection and refraction coefficient of transmission line when receiving end is open circuited. [8M]

b) A cable has a conductor of radius 0.75cm and a sheath inner radius 2.5cm. Find (i) the inductance per meter length, (ii) capacitance per meter length, (iii) surge impedance and (iv) velocity of propagation, if the permittivity of insulation is 4. [8M]

6 a) A transmission tower on a level ground gives a minimum clearance of 8 meter for its lowest conductor with a sag of 10 m for a span of 300 m. If the same tower is to be used over a slope of 1 in 15, find the minimum ground clearance obtained for the same span, same conductor and same weather conditions. [9M]

b) Describe the various methods for reducing corona effect in an overhead transmission line. [7M]

7 An overhead line has a conductor of cross-section $2.5cm^2$ hard drawn copper and a span length of 150mts. Determine the sag which must be allowed if the tension is not exceeded one-fifth of the ultimate strength of $4175kg/cm^2$ a) in still air and b) with a wind pressure of 1.3 kg meter and an ice costing of 1.25 cm. Determine also the vertical sag in the latter case. [16M]

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