GANPAT UNIVERSITY
B.TECH SEM III (Electrical Engineering)
Regular Examination Nov-DEC.-2012
2EE303 - Electrical Power System-I

Time: 3 Hours   Marks: 70
Instruction:
   (1) All Questions are compulsory.
   (2) Figures to the right indicate full marks.
   (3) Answer to two sections must be written in separate answer books.

SECTION: 1

Q-1. (a) The three conductors of a 3 phase overhead line are arranged at the corners of a (04)
         triangle of sides 4, 5 and 6 meters. Calculate inductance per km of the each
         conductor when conductors are regularly transposed. The diameter of each line
         conductor is 2 cm.

     (b) Explain the rigorous method for analysis of long transmission line. (04)

     (c) What do you mean by Generalized parameters of Transmission line? Write the (04)
         A,B, C, D parameter for Long transmission line. Prove that AD-BC=1 for any
         Transmission line.

OR

Q-1. (a) Discuss the end condenser method for analysis of medium transmission line. (04)

     (b) Calculate the capacitance of three phase transmission line having conductors (04)
         spaced at unsymmetrical distance.

     (c) A 150 km, 3-φ, 110 kV, 50 Hz transmission line transmits a load of 40,000 kW at (04)
         0·8 p.f. lagging at the receiving end. Resistance/km/phase = 0·15Ω ;
         reactance/km/phase = 0·6 Ω; susceptance/km/phase = 10−j5 S.
         Determine (i) the A, B, C and D constants of the line (ii) regulation of the line.

Q-2. (a) Why is the neutral of system earthed? Discuss the Voltage transformer Neutral (03)
         earthing

     (b) Discuss the load curve and explain how it help to define the size and Numbers of (04)
         Generating Units.

     (c) Derive the equation of Most economical Power Factor. (04)

OR

Q-2. (a) Explain the Sinking fund method of Depreciation calculation for power system (04)
         economy.

     (b) The load connected to a station is 100 MW and the demand factor of the (04)
         consumers is 1.25. Estimate the capacity of the generating station when load factor
         is 50%, Diversity factor of distribution is 1.33 and that of transmission is 1.5 Take
         the efficiency of transmission and distribution as 90%.

     (c) Explain the earthing transformer. (03)

Q-3. **Attempt any three.** (12)
     (a) Discuss the Base load and the Peak load on station and discuss the methods for
         meeting the Peak load.
     (b) Discuss basic characteristic of Tariff and Discuss Maximum demand Tarriff.
     (c) Explain the Proximity and Ferranti effect.
     (d) Write a short note on Bundle conductor.

Q-4. (a) Draw the schematic diagram of a steam power station with required notations. (06)

(b) In a 66kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 9% of self capacitance of each insulator find (i) the distribution of voltage over 3 insulators and (ii) string efficiency. (06)

OR

Q-4. (a) Compare: Hydro power plant and Nuclear power plant. (06)

(b) A transmission line has a span 200 meters between level supports. The conductor has a cross sectional area of $1.29cm^2$, weights 1170kg/km and has a breaking stress of $4218kg/cm^2$. Calculate the sag for a safety factor of 5, allowing a wind pressure of 122 kg per square meter of projected area. What is the vertical sag? (06)

Q-5. (a) Advantages of transmit power at high voltage with necessary equations? (04)

(b) Classification of Distribution Systems. (02)

(c) Comparison between D.C. and A.C. transmission. (03)

(d) Define following terms. (1.) Feeder (2.) Distributor. (02)

OR

Q-5. (a) With neat sketch diagram explain the ring main system? Write down the advantages of interconnected system over ring main system. (06)

(b) List out the various types for power transmission? Derive the equation for required volume of the conductor material for overhead 3-phase 4 wire A.C. system. (05)

Q-6. **Attempt any three.** (12)

(a) Define string efficiency? List out the methods for improving string efficiency? Explain how string efficiency is improve by using guard ring.

(b) List out the types of insulators which are using in power system? Explain the Pin type insulator with necessary diagram.

(c) Draw and explain the nuclear reactor with necessary diagram.

(d) Find out corona loss for 3-Φ,220kV,50Hz,200km transmission which carried by steel cored conductor whose diameter is 1.624cm and spacing between two conductor is 6m.Assume value of air density factor is 1 and value of surface irregularity factor is 0.85.

END OF PAPER