GANPAT UNIVERSITY
B.TECH SEM-V (ELECTRICAL)
REGULAR EXAMINATION NOV-DEC-2014
2EE504:-ELECTRICAL POWER SYSTEM - II

Time: 3 Hours   Total Marks:-70

Instructions: - 1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

SECTION-I

Que.-1 (A) With a neat diagram, discuss redial and interconnecting distribution systems. [06]

(B) A 2-wire d.c. distributor AB is fed from both ends. At feeding point A, the voltage is [06] maintained as at 230 V and at B 235 V. The total length of the distributor is 200 meters and loads are tapped off as under : 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.

OR

Que.-1 (A) With necessary diagram and equation, explain uniformly loaded DC distributor fed at [06] both ends with unequal voltages.

(B) A d.c. distributor AB is fed at both ends. At feeding point A, the voltage is maintained [06] at 235 V and at B at 236 V. The total length of the distributor is 200 metres and loads are tapped off as: 20 A at 50 m from A, 40 A at 75 m from A, 25 A at 100 m from A, 30 A at 150 m from A. The resistance per kilometer of one conductor is 0.4 Ω. Calculate the minimum voltage and the point at which it occurs.

Que.-2 (A) A d.c. ring main ABCDA is fed from point A from a 250 V supply and the resistances [06] (including both lead and return) of various sections are as follows: AB = 0.02 Ω; BC = 0.018 Ω; CD = 0.025 Ω and DA = 0.02 Ω. The main supplies loads of 150 A at B; 300 A at C and 250 A at D. Determine the voltage at each load point. If the points A and C are linked through an interconnector of resistance 0.02 Ω, determine the new voltage at each load point.

(B) How does AC distribution differ from DC distribution? Also discuss importance of [05] load power factors in AC distribution.

OR

Que.-2 (A) Define: Feeder, Distributor, Service mains. [04]

(B) A 3-phase, 400V distributor AB is 1000 meters long. The 3-phase load at point C at a [07] distance of 600 meters from sending end takes 5A per phase at a p.f. of 0.8 lagging. At far end point B, a 3-phase, 400 V induction motor is connected which has an output of 10 H.P. with an efficiency of 90% , p.f. 0.85 lagging and current is 14.08A. If voltage at point B is to be maintained at 400 V, what should be the voltage at point A? The resistance and reactance of the line are 1Ω and 0.5Ω per phase per kilometre respectively.

Que.-3   **Attempt any three:**   [12]
  (A) Classify the different types of underground cable and Draw the sketch of S.L. cable and label the various parts.
  (B) A single-core cable has a conductor diameter of 1 cm and insulation thickness of 0.4 cm. If the specific resistance of insulation is 5.0×10^{14} Ω-cm, calculate the insulation resistance for a 4 km length of the cable.
  (C) Describe Varley loop test for the location of earth fault in an underground cable.
  (D) Write the properties of insulating material which using in underground cable? List out the insulating material and explain Impregnated paper.

SECTION-II

Que.-4 **(A)** Explain the phenomenon of Corona and list out the factors affecting corona and also explain it.   [06]
  (B) Draw the key-diagram of 66/11 kV substation.   [06]

OR

Que.-4 **(A)** A 3-phase overhead line consists spacing between conductor is 6 m. The conductor diameter is 22.66mm and surface irregularity factor is 0.82. The air temperature and pressure are 25 ^{0}C and 73 cm of mercury. Find visual critical voltage.   [06]
  (B) Write a short not on equipment in a transformer substation.   [06]

Que.-5 **(A)** Explain Auto-transformer tap changing method with necessary figure.   [05]
  (B) Design an earthing grid for a 220kV substation. Soil resistivity 55 Ω-m. Fault current 5000A, substation area 47.50 X 31.5m and resistivity of soil at surface is 3000 Ω-m. Assume suitable data.   [06]

OR

Que.-5 **(A)** List out the types of bus bar arrangement? Explain duplicate bus bar system.   [05]
  (B) A 3-phase line having an impedance of (5 + j 20) ohms per phase delivers a load of 25 MW at a p.f. of 0.8 lagging and voltage 33 kV. Determine the capacity of the synchronous condenser required to be installed at the receiving end if voltage at the sending end is to be maintained at 33 kV.   [06]

Que.-6   **Attempt any two:**   [12]
  (A) Explain terminal and through substation.
  (B) Draw and explain Tirril regulator.
  (C) Explain the method of measurement of earth resistivity.

END OF PAPER