

End Semester Examinations - 2015-16 Even Semester - May 2016

14EE2013 Transmission and Distribution

Set A

Time : 3 hrs
Total Marks: 100

1. (a) A diesel station supplies the following loads to various consumers:

Industrial consumer = 1500 kW ; Commercial establishment = 750 kW ; Domestic power = 100 kW ; Domestic light = 450 kW. If the maximum demand on the station is 2500 kW and the number of kWh generated per year is 45×10^5 , determine (i) the diversity factor and (ii) annual load factor. (8M)

- (b) A generating station has the following daily load cycle :

Time (Hours) :	0—6	6—10	10—12	12—16	16—20	20—24
Load (MW) :	40	50	60	50	70	40

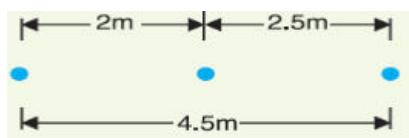
Draw the load curve and find (i) maximum demand (ii) units generated per day (iii) average load and (iv) load factor. (12M)

OR

2. (a) Derive an expression for inductance per phase for a 3-phase overhead transmission line.

When i) Conductors are symmetrically placed. ii) Conductors are unsymmetrically placed but the line is completely transposed. (16M)

- (b) A 3-phase, 50 Hz, 66 kV overhead line conductors are placed in a horizontal plane as shown in following figure. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate the capacitance per phase. assuming complete transposition of the line. (4M)



3. (a) Explain briefly the Classification of overhead transmission line based on its length and voltage. (4M)

- (b) A 3-phase, 50 Hz transmission line 100 km long delivers 20 MW at 0.9 p.f. lagging and at 110 kV. The resistance and reactance of the line per phase per km are 0.2Ω and 0.4Ω respectively, while capacitance admittance is 2.5×10^{-6} siemen/km/phase. Calculate : (i) the current and voltage at the sending end (ii) efficiency of transmission. Use nominal T method. (16M)

OR

4. (a) Explain the different methods used in improving the string efficiency. (8M)

- (b) In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency. (12M)

5. (a) Explain briefly the factors affecting the Corona. (5M)

- (b) An overhead transmission line conductor having a parabolic configuration weights 1.925 kg per metre of length. The area of X-section of the conductor is 2.2 cm^2 and the ultimate strength is 8000 kg/cm^2 . The supports are 600 m apart having 15 m difference of levels. Calculate the sag from the taller of the two supports which must be allowed so that the factor of safety shall be 5. Assume that ice load is 1 kg per metre run and there is no wind pressure. (15M)

OR

6. (a) Prove that g_{\max} / g_{\min} in a single core cable is equal to D/d , where d and D are the conductor and sheath diameter. (8M)

(b) Describe about the Various grading methods of cables. (12M)

7. (a) The maximum and minimum stresses in the dielectric of a single core cable are 40 kV/cm (r.m.s) and 10 kV/cm (r.m.s) respectively. If the conductor diameter is 2 cm, find: (i) thickness of insulation (ii) operating voltage. (6M)
- (b) Find the most economical value of diameter of a single-core cable to be used on 50 kV, single-phase system. The maximum permissible stress in the dielectric is not to exceed 40 kV/cm (r.m.s). (4M)
- (c) The capacitances of a 3-phase belted cable are 12.6 μ F between the three cores bunched together and the lead sheath and 7.4 μ F between one core and the other two connected to sheath. Find the charging current drawn by the cable when connected to 66 kV, 50 Hz supply. (10M)

OR

8. (a) Classify the Distribution system based on scheme of connection. (10M)
- (b) A 2-wire d.c. distributor cable AB is 2 km long and supplies loads of 100A, 150A, 200A and 50A situated 500 m, 1000 m, 1600 m and 2000 m from feeding point A. Each conductor has a resistance of 0.01 Ohm per 1000 m. Calculate the potential difference at each load point if a potential difference of 300 V is maintained at point A. (10M)
9. (a) Explain briefly about types of D.C Distributors. (8M)
- (b) A 2-wire d.c. distributor AB is fed from both ends. At feeding point A, the voltage is maintained as at 230 V and at B 235 V. The total length of the distributor is 200 metres and loads are tapped off as under : 25 Amps at 50 metres from A ; 50 Amps at 75 metres from A ; 30 Amps at 100 metres from A ; 40 Amps 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. (12M)

Wishing you All the Best
