Total No. of Questions—**8**] [Total No. of Printed Pages—**4**

Seat No.	

[4957]-1036

S.E. (Electrical) (Second Semester) EXAMINATION, 2016

POWER SYSTEM—I

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2,** Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6**, Q. No. **7** *or* Q. No. **8,**

(*ii*) Neat diagrams must be drawn wherever necessary.

(*iii*) Figures to the right indicate full marks.

(*iv*) Assume suitable data, if necessary.

1. (*a*) Define the following terms : [6]

(*i*) Load Factor

(*ii*) Demand Factor

(*iii*) Diversity Factor

(*iv*) Plant Capacity Factor

(*v*) Plant Use Factor

(*vi*) Reserve Capacity.

(*b*) Give the difference between isolators and circuit breakers. Hence state sequence of operation of these devices while opening and closing of the circuits. [6]

P.T.O.

Or

2. (*a*) An industry has total connected load of 220 MW. The maximum demand is 150 MW. On averge each machine works for 70% of time. Find yearly expenditure on electricity if the tariff is Rs. 3000 + Rs. 700 kW of maximum demand/year + Rs. 0.60/kWh. [6]

(*b*) Explain in brief, various methods of improving string efficiency. [6]

3. (*a*) What is importance of sag; hence define sag and vertical sag. Also explain how wind and ice loading affects the presence of sag. [6]

(*b*) Derive the expression for loop inductance of single phase two wire line. [7]

Or

4. (*a*) A single core cable for use on 1 phase, 11 kV, 50 Hz system has conductor area of 0.0645 cm^2 and internal diameter of sheath is 2.18 cm. The permittivity of the dielectric used in cable is 3.5. Find capacitance of cable per km length hence find the charging current. [7]

(*b*) Derive the expression for inductance of three phase single circuit transmission line when conductors are arranged in horizontal plane but transposed. [6]

5. (*a*) Derive an expression for capacitance to neutral of a three phase overhead transmission line with equilateral spacing. [6]

(*b*) A 3-phase, 50 Hz, 66 kV overhead line conductors are placed in a horizontal plane. The distances are as A – B = 2 m, B – C = 2.5 m and A – C = 4.5 m. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate :

(*i*) Total capacitance per phase.

(*ii*) Charging current per phase, assuming complete transposition of the line. [6]

Or

6. (*a*) What is the method of images ? [4]

(*b*) Derive an expression for capacitance of a three phase double circuit overhead transmission line with symmetrical spacing. [8]

7. (*a*) Express the relationship for the sending end voltage and current in terms of receiving end voltage and current for a medium length transmission line with Nominal 'π' method of representation. Draw the phasor diagram. [7]

(*b*) A balanced 3 phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is (20 + j52) Ω and total phase neutral admittance is 315×10^{-6} S. Use T method to find : [6]

(*i*) A, B, C, D constants of the line

(*ii*) Sending end voltage.

Or

8. (*a*) Evaluate the generalized circuit constants for medium transmission line with Nominal 'T' method. [6]

(*b*) A 3-phase, 50 Hz, 150 km line has a resistance, inductive reactance and capacitive shunt admittance of 0.1 Ω, 0.5 Ω and 3×10^{-6} S per km per phase. If the line delivers 50 MW at 110 kV and 0.8 p.f. lagging, determine the sending end voltage and current. Assume a nominal π circuit for the line. [7]