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

Seat No.	

[4857]-1036

S.E. (Electrical) (II Sem.) EXAMINATION, 2015

POWER SYSTEMS-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*) Your answers will be valued as a whole.

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

1. (*a*) Explain how the load duration curve can be plotted from load curve. What information can be obtained from it ? [6]

(*b*) Discuss advantages and disadvantages of : [6]

(*i*) Pin type insulators

(*ii*) Suspension type insulators

Or

2. (*a*) A consumer has a maximum demand of 250 kW at 50% load factor. If the tariff is Rs. 100 per kW of maximum demand plus 20 paisa per kWh, find the overall cost per kWh. [6]

P.T.O.

(*b*) Explain in brief the necessity and working of the following equipments in power plant and hence specify their ratings. [6]

(*i*) Bus bars

(*ii*) Isolators

3. (*a*) Explain in brief various types of line supports. [6]

(*b*) A single-phase double circuit transmission line is shown in figure (1). Conductors 1 and 2 in parallel form one path while conductors 1' and 2' in parallel form the return path. Determine the total inductance per km of the line. The diameter of each conductor is 2 cm. [7]

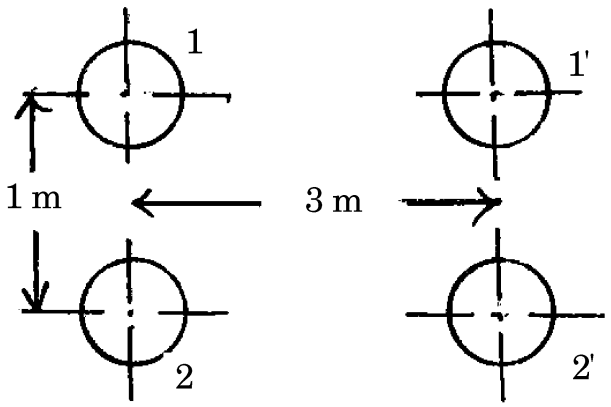

Fig. (1)

Or

4. (*a*) A 33 kV single core cable has a conductor diameter of 1 cm and a sheath of inside diameter 4 cm. Find the maximum and minimum stress in the insulation. [7]

(*b*) Derive an expression for inductance per phase per km of three phase single circuit transmission line when conductors are arranged in horizontal plain. Assume complete transposition. [6]

5. (*a*) Derive an expression for capacitance of single-phase overhead transmission line considering the effect of earth. [6]

(*b*) Calculate the capacitance of 100 km long 3-phase 50 Hz overhead transmission line consisting of 3 conductors, each of diameter 2 cm and spaced 2.5 m at corners of an equilateral triangle. [6]

Or

6. (*a*) Explain the concept of GMR and GMD for capacitance calculations of overhead transmission line. [6]

(*b*) A 3-phase, 50 Hz, 132 kV overhead line has conductors placed in horizontal plane 4 m apart. Conductor diameter is 2 cm. If the line length is 100 km, calculate the charging current per phase assuming complete transposition. [6]

7. (*a*) Express the relationship for sending and voltage and current in terms of receiving end voltage and current for medium transmission line with nominal 'P*i*' method of representation. Draw neat circuit diagram and phasor diagram. [7]

(*b*) Find the A, B, C, D parameters of a 3-phase 80 km 50 Hz transmission line with series impedance of 0.15 + j0.78 ohm per km and a shunt admittance of j5 * 10^{-6} mho per km. [6]

Or

8. (*a*) Explain how transmission lines are classified hence explain their characteristics. [6]

(*b*) A 3-phase 50 Hz overhead transmission line has the following distributed parameters;

Resistance = 28 ohms;

Inductive reactance = 63 ohms;

Capacitive susceptance = 4 * 10^{-4} mho.

If the load at the receiving end is 75 MVA at 0.8 p.f. lagging with 132 kV between the lines, calculate voltage, current and power factor at sending end using nominal 'T' method. [7]