**Con. 5805-13.** **LJ-10633**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any **four** from **six** remaining.

1. (a) Discuss step potential and touch potential. **20**
   (b) Explain skin effect.
   (c) Advantages of P. U. system.
   (d) Compare overhead verses under ground system.

2. (a) Derive an expression for ABCD Parameters for π model of medium transmission line. **10**
   (b) A double circuit three phase line is shown in fig. The conductors a, a^1, b, b^1 and c, c^1 belong to the same phase resp. The radius of each conductor is 1.5 cm. Find the inductance of the double - ckt line in mH / Km / phase. **10**
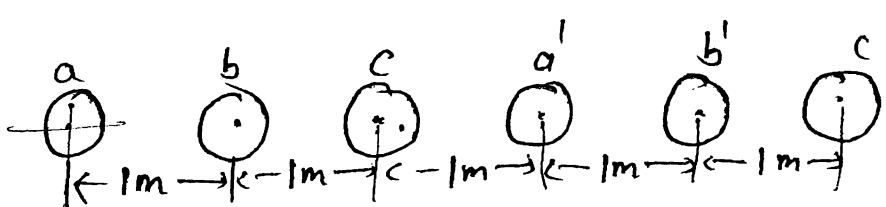

3. (a) Derive an expression for capacitance of 1ϕ two wire transmission line. **6**
   (b) Explain transposition cycle to find inductance of three phase line. **4**
   (c) A 100 mVA, 33kV, 3ϕ generator has a sub transient reactance of 15%. The generator is connected to the motors through transmission line and transformers as shown. **10**
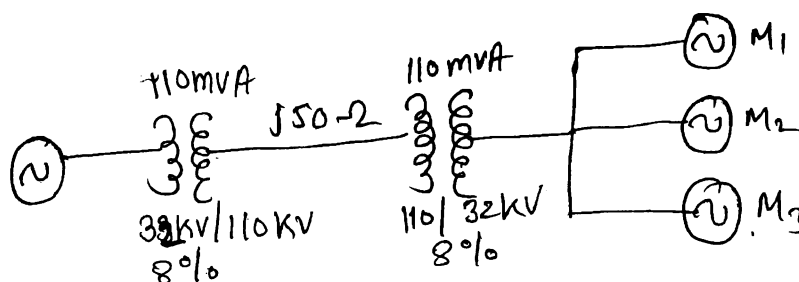
   The motors have rated inputs of 30 mVA, 20 mVA and 50 mVA at 30 kV with 20% subtransient reactance. The generator ratings are as shown in diagram. Selecting generator rating as the base quantity in generator ckt. Draw P. U. reactance diagram.

4. (a) With reference to overhead transmission line. Explain conductor configuration, span spacing and sag. **10**
   (b) Each conductor of a three phase high voltage transmission line is suspended by a string of 4 suspension type disc insulators. If the potential diff. across the second unit from top is 13.2 kV and across the third from top is 18 kV. Determine voltage bet^n conductors. **10**

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5. (a) The conductor arrangement is as shown in fig. Determine the capacitance and   **10**
         charging current / km when the transmission line operating at 132 kV.
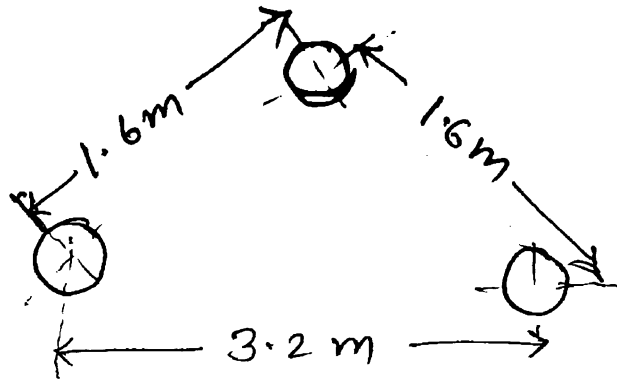
         The conductor diameter is 0.8 cm.

    (b) Discuss the different methods of neutral grounding.   **10**

6. (a) Explain the term grading of a cable.   **10**
    (b) What is bundle conductors ? What is the effect of using bundled conductors on **6**
         line inductance.
    (c) Derive an expression for insulation resistance of a single core cable.   **4**

7. (a) Discuss different methods for improving string efficiency.   **8**
    (b) Write a short note on (any **two**) :-   **12**
         (i) Ferranti effect.
         (ii) Explain GMD and GMR.
         (iii) Typical AC Supply System.