

10/06/2025 SE ELECTRICAL SEM-III C-SCHEME EPS-I QP CODE: 10085660

Duration – 3 Hours

Total Marks - 80

N.B.: - (1) Question No.1 is compulsory.

(2) **Attempt** any **Three** questions out of the remaining **five** questions.

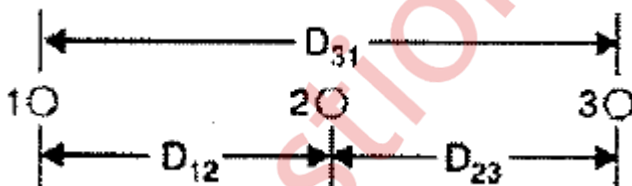
(3) Assume suitable data if necessary and justify the same.

Q 1. **Answer any four questions.**

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|----|--|----|
| A) | Discuss in details skin effect with a neat diagram | 05 |
| B) | State the advantages and disadvantages of Solar cell power generation | 05 |
| C) | Derive the expression for the insulation resistance of a single core cable. | 05 |
| D) | Define string efficiency? Illustrate the any one method of improving string efficiency | 05 |
| E) | State the steps to calculate the self GMD of three phase double circuit line. | 05 |

Q 2 a) A 20km single phase line has two parallel conductors separated by 1.5m. The diameter of each conductor is 0.823cm. If the conductor has resistance of 0.311ohm/km. Find the loop impedance of this at 50 Hz. **10**

Q 2 b) Calculate the inductive reactance of each conductor in a 3 phase, 3 wire line of 80km, when the conductors are arranged in horizontal plane with spacing such that $D_{31}=4m$, $D_{12}=D_{23}=2m$. The conductors are transposed and have a diameter of 2.5cm. **10**



Q 3 a) A 3phase, 132 kV, 100km, 50Hz, single circuit line has equilateral spacing with 3.5m between conductors. The conductor diameter is 1.2 cm. Calculate **10**

- line to neutral capacitance per phase per km
- Charging current per phase
- Charging MVA

Q 3 b) Derive the expression for capacitance of three phase transmission line with unsymmetrical spacing **10**

Q 4 a) Define medium transmission line nominal pi model. Draw the equivalent circuit representation. Derive the expression for regulation and efficiency of medium transmission line Nominal pi method. State the expressions for its A, B, C, D constants also, analyse its validity for two port network. **10**

- Q 4 b) An overhead 3-phase transmission line delivers 5000kW at 22kV at 0.8pf lagging. 10
The resistance and reactance of each conductor is 4 ohm and 6 ohm respectively.
Determine sending end voltage , percentage regulation and transmission efficiency.
- Q 5 a) Develop the expression of string efficiency for 2 disc insulators string. 10
- Q 5 b) The three bus-bar conductors in an outdoor substation are supported by units of post 10
type insulators. Each unit consists of a stack of 3 pin type insulators fixed one on the
top of the other. The voltage across the lowest insulator is 13.1 kV and that across
the next unit is 11 kV. Find the bus-bar voltage of the station. Also calculate the
string efficiency
- Q 6 a) Write short note on following (i) step and touch potential (ii) neutral grounding and its 10
method.
- Q 6 b) Draw p.u. impedance diagram for the system as shown. Choose base voltage of 11kV 10
and Base MVA as 20 MVA for Generator G.

