Duration 3hrs   **Total Marks -80**


N.B.:- (1) Question No.**1** is compulsory.
          (2) **Attempt** any **three** questions out of remaining **five** questions.
          (3) Draw neat diagrams wherever it is necessary.

Q 1.		Answer the following questions.	
	A)	Compare AC and DC Supply system	**05**
	B)	What are the factors affecting sag?	**05**
	C)	Derive the expression for capacitance of single phase two wire transmission line	**05**
	D)	What is Ferranti effect?	**05**

Q 2   a)   Draw & Explain single line diagram of structure of typical AC supply   **10**
           system

Q 2   b)   Drive the expression of string efficiency for 4 disc insulators string   **10**

Q 3   a)   In a string of three units, the capacitance between each link pin to earth is   **10**
           11% of the capacitance of one unit. Calculate the voltage across each
           unit and the string efficiency when the voltage across the string is 33 kV.

Q 3   b)   Derive expression for inductance of single phase line having Composite   **10**
           conductors

Q 4   a)   Draw nominal π method of medium transmission line and derive the   **10**
           equation for sending end voltage and sending end current with phasor
           diagram

Q 4   b)   A single circuit transmission line is delivering a load of 100 MVA at 220kV   **10**
           and p.f. of 0.85 lagging. The line as A=D= $0.96 \angle 3^0$, B=$110 \angle 72^0$ ohm,
           C= $0.0005 \angle 90^0$ siemens. Calculate sending end voltage, sending end
           current and sending end power

Q 5   a)   State advantages and disadvantages of P.U. System & how the base   **10**
           quantities are selected?

Q 5   b)   Consider the 50 Hz power system the single-line diagram of which is   **10**
           shown in Fig. 1. The system contains three generators, three
           transformers and three transmission lines. The system ratings are

           Generator G_1:   200 MVA, 20 kV, X_d = 15%
           Generator G_2:   300 MVA, 18 kV, X_d = 20%
           Generator G_3:   300 MVA, 20 kV, X_d = 20%

Transformer T_1:   300 MVA, 220Y/22 kV, $X = 10\%$

Transformer T_2:   Three single-phase units each rated 100 MVA, 130Y/25 kV, $X = 10\%$

Transformer T_3:   300 MVA, 220/22 kV, $X = 10\%$

The transmission line reactances are as indicated in the figure. Draw the reactance diagram choosing the Generator 3 circuit as the base.
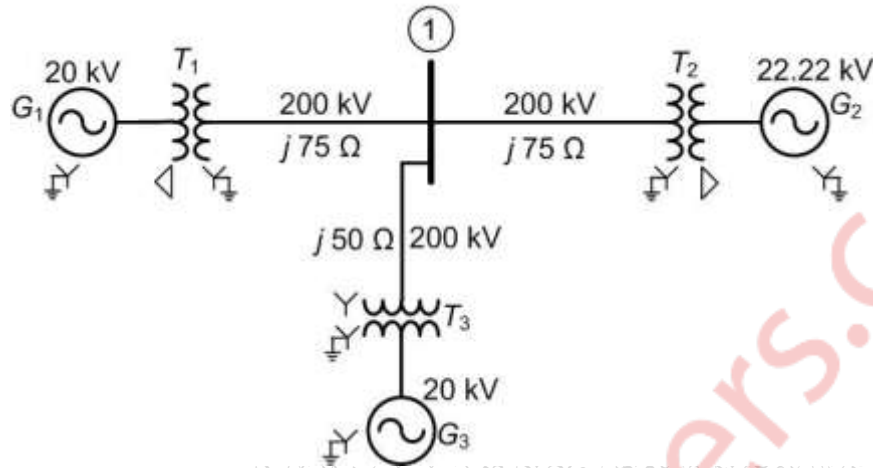
Q 6	a)	Explain grading of cable and describe any one in detail.	**10**
Q6	b)	Write a note on	**10**

i) Measurement earth resistance & soil resistivity

ii) Tower footing resistance

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