

(OLD COURSE)

QP Code : 4011

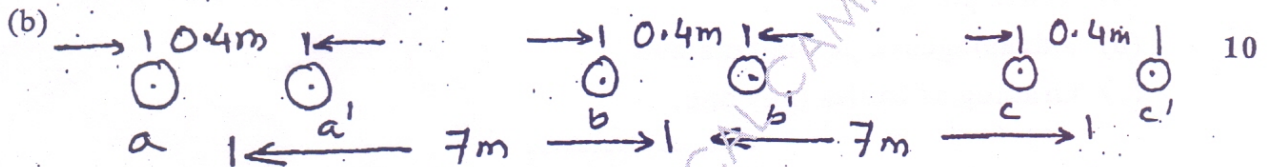
(3 Hours)

[Total Marks : 100

- N.B. (1) Question No. 1 is compulsory.  
 (2) Attempt any four out of remaining.

1. (a) Explain skin effect. 5  
 (b) Explain Ferranti effect with phasor. 5  
 (c) Write short note on suspension type insulator. 5  
 (d) Explain touch potential. 5

2. (a) Derive an expression for inductance of three phase transmission line with unsymmetrical spacing. 10



Find inductive reactance in  $\Omega/\text{km}$  at 50Hz of three phase bundled conductor line with two sub conductors per phase each having radius 1.725 cm.

3. (a) Derive an expression for capacitance of a single phase line considering effect of earth. 10

- (b) Find inductance per phase per km of a three phase line having conductors of diameter 2cm placed at the corners of a triangle with sides 4m, 5m, 6m. Assume line is fully transposed. 10

4. (a) Obtain ABCD parameters of a medium length transmission line represented by T model. Draw phasor diagram also. 10

- (b) A 200km long three phase transmission line has a resistance of  $48.7 \Omega$  per phase, inductive reactance  $80.2 \Omega$  per phase and capacitance (line to neutral)  $8.42 \text{ nF}$  per km. It supplies a load of 13.5MW at 88 kV and power factor 0.9 lag. Using nominal T model find sending end voltage and current. 10

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5. (a) Explain conductor configuration, spacing, span and clearance. 10  
(b) Derive an expression for capacitance of single core cable. 10
6. (a) Explain methods to improve string efficiency. 10  
(b) A suspension string insulator has 3 units each unit can withstand a maximum voltage of 11kV. The capacitance of each joint and metal work is 12.5% of the capacitance of each disc. 10  
Find (i) Maximum line voltage for which the string can be used?  
(ii) String efficiency.
7. Explain following – 20  
(a) Tuned power lines  
(b) Advantages of per unit method  
(c) Grading of cables (any one).
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