

22529

12526

3 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
- (2) Answer each next main Question on a new page.
- (3) Illustrate your answer with neat sketches wherever necessary.
- (4) Figures to the right indicate full marks.
- (5) Assume suitable data, if necessary.
- (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
- (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
- (8) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

- 1. Attempt any FIVE of the following: **10****
- a) Define per unit valve.
- b) Draw equivalent ckt of short transmission line.
- c) State the impact of inductance and resistance on transmission line performance.
- d) List out factor affecting proximity effect.
- e) Write any two advantages of generalized circuit representation.
- f) Give the expression for ABCD constant of 'II' model.
- g) Write the advantages of graphical analysis for line performance.

P.T.O.

2. Attempt any THREE of the following: 12

- a) Draw a single line diagram of power system.
- b) Calculate the inductance per km of line consisting of solid conductor of 30 mm diameter placed at the corner of triangle with 3 m., 4 m and 5 m. The conductors are adequately transposed.
- c) Determine the generalised ckts constant for the resultant A and B when two GCC are connected in parallel.
- d) Derive the expression for complex power active and reactive power at sending end.

3. Attempt any THREE of the following: 12

- a) Explain any four advantages of per unit representation of power system parameter.
- b) Explain skin effect and list out four factor affecting skin effect.
- c) Explain the concept of generalized circuit constant.
- d) Prove that in power system complex power equation is $S = VI^*$.

4. Attempt any THREE of the following: 12

- a) Write complete procedure for drawing sending end circle diagram.
- b) A 3 phase line operated at 50 Hz is arranged as shown in Figure No. 1 The conductor diameter is 0.6 cm find inductance per km.

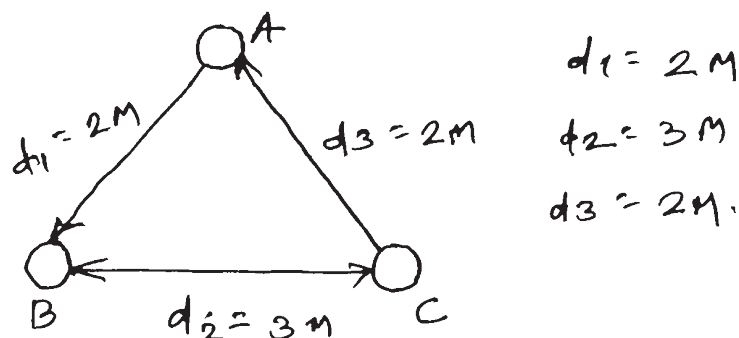


Fig. No. 1

- c) Derive the condition for maximum power at sending end.

- d) Prove that using generalized ckt constant for short transmission line $AD - BC = 1$.
- e) A 3ϕ , 50 Hz line has resistance of 20Ω inductance 0.2 H and capacitance 1 μf . Determine ABCD constant of line considering 'II' model.

5. Attempt any TWO of the following: 12

- a) Give expression for centre X and Y coordinates and radius of receiving end circle dia.
- b) Give the expression for complex power, active and reactive power at receiving end.
- c) Define and explain for self GMD and mutual GMD with suitable example.

6. Attempt any TWO of the following: 12

- a) For a generalised ckt representation of transmission line prove that :-
$$VR = AVS - BIS$$
$$IR = CVS + DIS.$$
 - b) Describe the necessity of reactive power compensation list out reactive power compensation device. Suggest suitable device for following applications :-
 - i) Substation
 - ii) Long transmission line
 - iii) Load center.
 - c) A 3 ph. line has parameter $A = 0.9\angle i$ $B = 100\angle 80^\circ$. Both end voltage maintained at 220 kv. Determine maximum power at sending end.
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