22529

24225
3 Hours / 70 Marks

Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers 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.

Marks

1. Attempt any FIVE of the following : 10

(a) Draw equivalent circuit of π network.

(b) List out the role of Power System Engineer.

(c) List out factors affecting proximity effect.

(d) State significance of inductance & capacitance.

(e) Give the formula for generalised circuit constant for T network.

(f) $Z = 50\angle 70^\circ$ & $Y = 412 \times 10^{-4} \angle 90$

Calculate generalised circuit constant "A".

(g) Give the formula for co-ordinates of centre and radius of receiving end circle diagram.

2. Attempt any THREE of the following : 12

(a) Summarise advantages of Per Unit system.

(b) Calculate inductance of each conductor of 1ϕ line having dist. 3m apart and radius of conductor is 20 mm.

(c) Determine GCC for resultant network when two networks are connected in series.

(d) A 220 kV transmission line has following constant. $A = 0.8\angle 3^{o}$, $B = 100\angle 75\ \Omega$/ph. Determine max power that can be received if voltage is maintained at 220 kV at both ends.

3. Attempt any THREE of the following : 12

(a) Develop reactance diagram for given power system as shown in Fig. 1 consider generator rating as base.

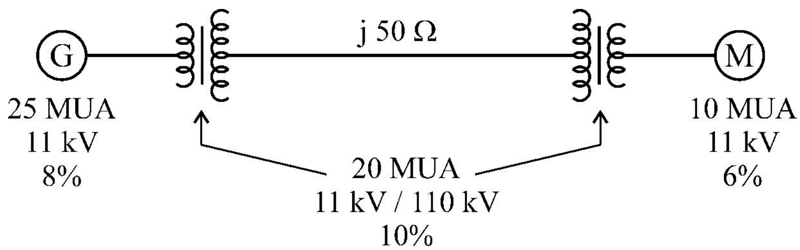


Fig.-1

(b) Describe skin effect & state factors affecting skin effect.

(c) Explain the concept of generalised circuit constant.

(d) A 400 kV transmission line has constant $A = 0.8\angle 2^{o}$, $B = 80\angle 70\ \Omega$/ph. Determine power at unity pf that can be delivered if voltage at both ends is maintained at 400 kV.

4. Attempt any THREE of the following : 12

(a) Derive the condition for max. power at receiving end.

(b) 3 ph transmission line has conductors mounted at corners of triangle with sides 3M, 5M & 6M. Diameter of conductor is 20 mm. Calculate inductance of each conductor.

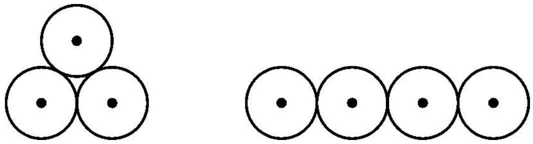
(c) 3ϕ transmission line with impedance $32.9\angle 72.35$ Ω/ph & admittance is 2.827×10^{-4} mha/Ph delivers load of 35 MW, 132 kV, 0.8 pf lag. Use π method & determine ABCD constants.

(d) 3ϕ line has following parameters $A = D = 0.9\angle 0.4$, $B = 99\angle 76.86$ sending end and receiving end, voltage is maintained at 220 kV & load angle is 9°. Calculate sending end active & reactive power.

(e) Prove that $AD - BC = 1$.

5. Attempt any TWO of the following : 12

(a) Define self GMD & calculate self GMD for conductor each having radius "r" arrangement as given in fig.-2.



(i) (ii)

Fig.-2

(b) Describe step by step procedure for drawing receiving end circle dia.

(c) A 275 kV line has constant $A = 0.92\angle 1.8$, $B = 110\angle 77$ & $V_R = 275$ kV.

Calculate sending end voltage if load is 200 kW, 0.8 pf lag.

6. Attempt any TWO of the following : 12

(a) Derive the condition for man power at sending end.

(b) Describe need of reactive power compensation equipments. List out types of reactive power compensation equipments with its application.

(c) Describe benefits of generalised circuit constant representation.
