17510

21718

3 Hours / 100 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. A) Attempt **any three** of the following : **(12)**

a) Explain the role of power system engineer in operation of power system.

b) What is proximity effect ? State the factors on which it depends.

c) List the advantages of generalised circuit representation. (any 4 points)

d) State the need of reactive power compensation and name the devices used for reactive power compensation.

B) Attempt **any one** of the following. **(6)**

a) State the effect of capacitance and inductance on the performance of transmission line.

b) For a generalised circuit prove AD – BC = 1.

2. Attempt **any two** of the following. **(16)**

a) State the factors to be considered to draw reactance diagram from impedance diagram of modern power system.

b) Three conductors of 3 ϕ , 3 wire system are arranged at the corners of equilateral triangle of side 2 M each, diameter of each conductor is 2 cm. Calculate inductance and capacitance of each conductor.

c) Derive Overall ABCD constants of network where two transmission line are seriesly connected.

3. Attempt **any four**. **(16)**

a) Compare short and long transmission line. (Any four points)

b) Define self GMD and mutual GMD.

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c) Obtain the expression for flux linkages of an isolated current carrying conductor due to internal flux only.

d) Prove that complex power in power system is VI* and not V*I.

e) Describe the stepwise procedure for drawing receiving end circle diagram.

4. A) Attempt **any three** of the following. **(12)**

a) "AC resistance of a conductor is more than DC resistance". Justify.

b) Explain how ABCD constants are measured for the erected transmission line.

c) State the expression for complex power at receiving end of transmission line. Derive the condition for maximum power at the receiving end.

d) State the advantages of circle diagram (any 4 points).

B) Attempt **any one** of the following. **(6)**

a) Draw nominal π and T networks. And write the expression for ABCD parameters for nominal π and T network.

b) Calculate self GMD for following configuration :

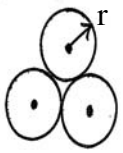


Fig.1

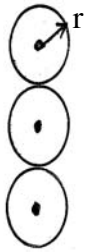
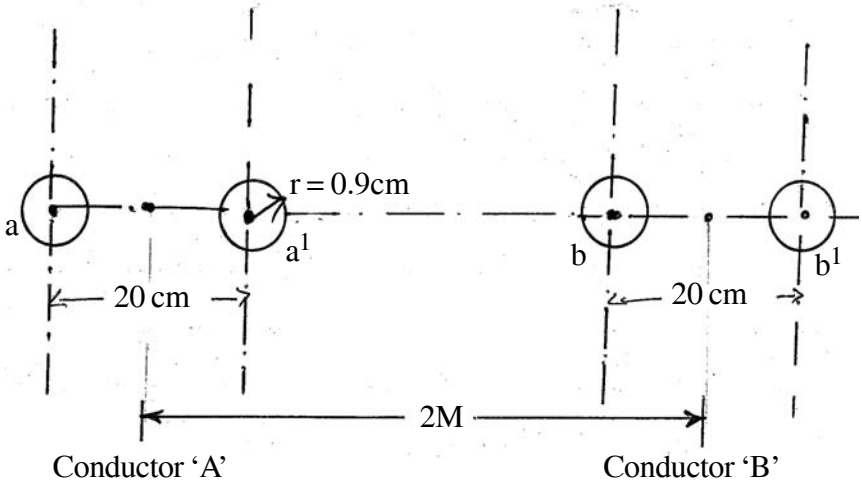


Fig.2

5. Attempt **any two** of the following. **(16)**

a) Determine inductive reactance of 1 ϕ line arrangement shown in fig.



Marks

b) A 3ϕ, 50Hz, 100 km transmission line has resistance $10\,\Omega$, inductance 0.1H and capacitance $0.9\,\mu F$ delivers a power of 35 MW, 132 KV, 0.8 pf lagging. Use nominal π method. Derive ABCD parameters, efficiency and regulation.

c) A 33KV, single circuit, 3 phase transmission line has the ABCD parameters $A = D = 01\ \angle 0^{o}$, $B = 11.18\ \angle 63.43^{o}\ \Omega$ and the receiving end voltage is 32 KV (line to line). How much active and reactive power is to be dispatch from sending end ?

6. Attempt **any four** of the following. **(16)**

a) State any four advantage of P.U.Calculations.

b) What is transposition of conductors in 3ϕ system ? State its advantages.

c) Derive the expression for inductance of 3ϕ line (single circuit) composed of solid conductor symmetrical spacing.

d) State the comparison between sychronous condenser and capacitor bank (any four points) used in power system.

e) A 3 phase 132 KV over head transmission line delivers 40 MVA at 0.8 p.f. log at receiving end. The line constants are $A = 0.98\ \angle 3^{o}$, $B = 110\ \angle 75^{o}\ \Omega$ with the help of circle diagram determine sending end voltage.
