

17417

21314

3 Hours / 100 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 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 TEN of the following: 20**
- a) State the standard voltages for following in India.
 - i) Secondary Distribution Voltage.
 - ii) Primary Distribution Voltage.
 - b) State any two reasons, why Three-phase A.C. system is preferred for power transmission.
 - c) State any eight components of transmission line.
 - d) State any four insulating material used for cable.
 - e) State any two points, how proximity effect can be reduced?
 - f) What is the meaning of transposition of conductor draw figure.

P.T.O.

- g) State the effect of low P.F. on
 - i) Efficiency of Transmission line.
 - ii) Regulation of Transmission line.
- h) State two assumptions made while drawing equivalent circuit of Nominal 'T' network of medium transmission line.
- i) State any two applications of HVDC transmission system.
- j) State four components of distribution system.
- k) State four points to be considered while designing the distributor.
- l) Write sequence of operation of isolator and circuit breaker while opening and closing.

2. Attempt any **FOUR** of the following:

16

- a) Study the Figure No. 1 and answer following questions.

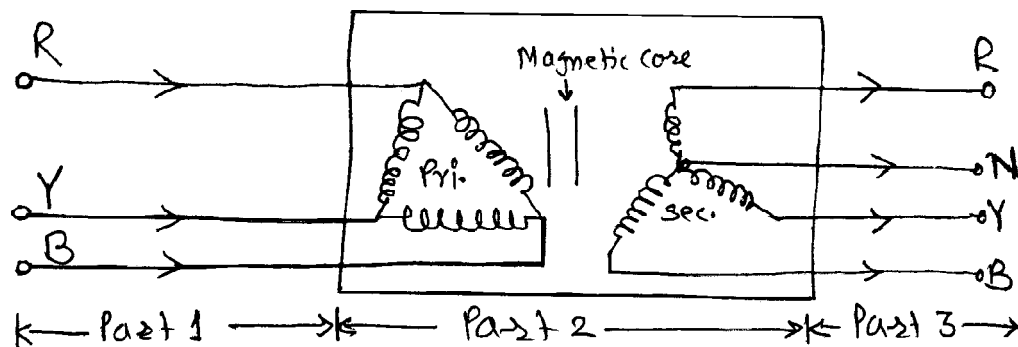


Fig. No. 1

- i) What is the meaning of part 1? State its voltage level.
- ii) What is the meaning of part 2?
- iii) What is the meaning of part 3? State its voltage level.
- b) Discuss any four disadvantages of bundle conductors.
- c) State eight points, why underground cable is preferred for transmission and distribution in Metro Politan Cities?

- d) Compare single circuit and double circuit on following points.
- i) Number of conductors
 - ii) Reliability to maintain supply
 - iii) Height of supporting structure
 - iv) Design of supporting structure
 - v) Inductance
 - vi) Voltage drop
 - vii) Power factor
 - viii) Economics.
- e) Draw a neat labelled diagram of stay insulator used in T and D network. State its two functions.
- f) A string of three unit suspension insulator observed to have voltage distribution on top disc 9 KV, middle disc 12 KV.
Find –
- i) Line voltage
 - ii) String Efficiency

3. Attempt any FOUR of the following:

16

- a) State any eight important reasons for adoption of EHVAC transmission.
- b) State any four electrical properties of insulating material. State the four name of insulating material used for manufacturing T and D line insulator.
- c) Derive the mathematical expression of string efficiency of three phase transmission line having three disc insulators.
- d) State three parameters of transmission line. What is the effect of line parameters on performance of transmission line.
- e) Explain the phenomenon of corona. How corona effect can be reduced (state any two points).
- f) Draw vector diagram for unity, lagging and leading P.F. in transmission line? State its effect on voltage regulation.

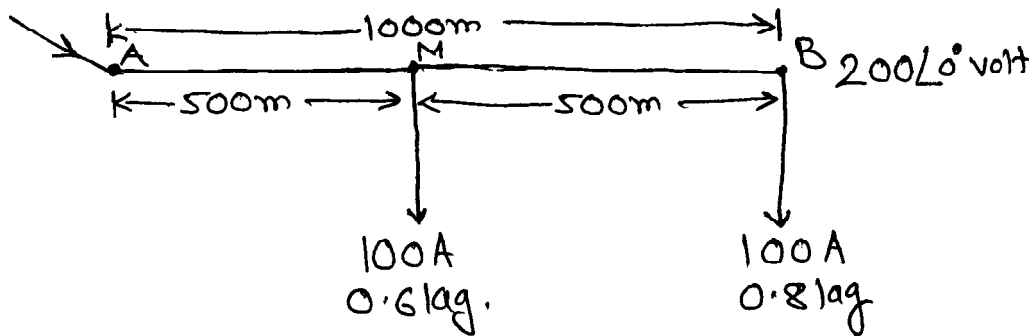
4. Attempt any FOUR of the following:**16**

- a) Explain any four factors affecting corona.
- b) State the values of generalized circuit constant of A, B, C and D in case of
 - i) 'T' equivalent circuit.
 - ii) 'π' equivalent circuit of medium transmission line.
- c) A single phase overhead transmission line delivers 5000KW at 11KV, 0.8P.F. lagging. If resistance and reactance per conductor is 0.45 ohm and 0.08 ohm respectively calculate
 - i) Sending end voltage
 - ii) Transmission efficiency
- d) Give the classification of HVDC transmission system. Draw layout of monopolar HVDC transmission system.
- e) Compare HVDC and EHVAC transmission system on the basis of
 - i) No. of conductors required for double circuit.
 - ii) Capital cost of sub-station
 - iii) Ground return
 - iv) Skin effect
 - v) Proximity effect
 - vi) Ferranti effect
 - vii) Corona loss
 - viii) String efficiency
- f) Compare Primary and Secondary distribution system on any eight points.

5. Attempt any **FOUR** of the following:

16

- a) Draw layout of grid or interconnected distribution system. State its two advantages and two applications.
- b) A single phase distributor one kilometer long and is loaded as shown in Figure No. 2 has a resistance and reactance per conductor is 0.1 ohm and 0.15 ohm for one kilometer. At far end voltage is 200 Volt the P.F. of load is referred to voltage of receiving end. Draw vector diagram and calculate voltage at sending end.

**Fig. No. 2**

- c) State any eight advantages of outdoor sub-station over indoor sub-station.
- d) State the eight requirements of an ideal distribution system.
- e) Draw single line diagram of pole mounted distribution sub-station. State the points (Parts) to be earthed of distribution transformer D.P. structure.
- f) State any eight criteria for selection of site for sub-station.

6. Attempt any FOUR of the following:**16**

- a) A short three phase overhead transmission line with impedance per phase $5 + j20$ ohm. When sending end and receiving end voltages are 46.85kV and 33kV respectively at 0.8 p.f. lagging calculate
 - i) Current
 - ii) Transmission Efficiency.
 - b) Classify distribution system –
 - i) According to nature of current
 - ii) According to method of construction
 - iii) According to scheme of connection.
 - c) State one situation (application) for following types sub-station.
 - i) Indoor sub-station
 - ii) Outdoor sub-station
 - iii) Under ground sub-station
 - iv) Plinth mounted sub-station.
 - v) Gas insulated sub-station
 - vi) Pole mounted sub-station
 - vii) Compact or Prefabricated Sub-station.
 - viii) Mobile sub-station
 - d) Derive an expression for voltage regulation of short transmission line by drawing vector diagram.
 - e) Draw equivalent circuit and vector diagram for medium transmission line. State Assumption made.
 - f) State the four methods of cable laying. State any six precaution to be taken while laying of underground cable.
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