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16117

3 Hours / 100 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) Use of Non-programmable Electronic Pocket Calculator is permissible.
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
(7) Preferably write the answers in sequential order.

Marks

1. **Answer any TEN of the following:** **20**
- a) State the standard voltages in India for the following:
 - (i) Generation voltage
 - (ii) Primary transmission voltage
 - b) State the necessity of transmission of electricity any two reasons.
 - c) State any four trade names of ACSR conductor.
 - d) State the function of following layer in construction of a cable:
 - (i) Armouring
 - (ii) Metallic sheathing

P.T.O.

- e) State the skin effect in transmission line conductor.
- f) What is meant by transposition of conductors and why it is necessary?
- g) Define voltage regulation of transmission line.
- h) Draw equivalent circuit diagram of medium transmission line with nominal ' π ' method.
- i) State any two routes of HVDC transmission line network in India.
- j) State the out put voltage of distribution transformer.
- k) Why radial distribution system is used for short distances?
- l) State the function of following components in distribution sub - station:
 - (i) Lightning Arrester
 - (ii) Drop out fuse Drop down fuse

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

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

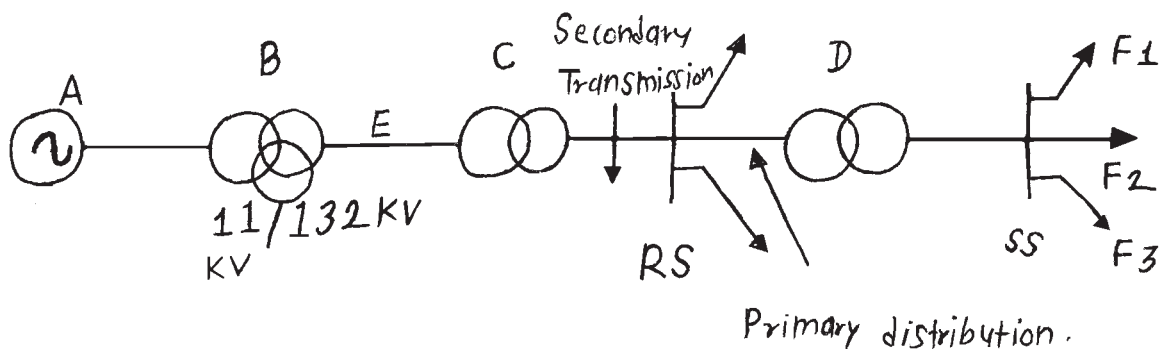


Fig. No. 1

- (i) Which part is shown by 'A'?
- (ii) State the meaning of symbol shown at 'B' point.
- (iii) State the voltage rating of equipment at point 'D'.
- (iv) Which part is shown by 'E'?

- b) Write any four desirable properties of transmission line conductor.
- c) Compare overhead transmission line with under ground cable on the basis of public safety, flexibility, fault location and cost of installation.
- d) What is meant by double circuit line? State the types of line support.
- e) Draw a neat labeled diagram for the following:
 - (i) Pin type
 - (ii) Insulator
- f) A string of three unit suspension insulator observed to have voltage distribution on top disk 9 kV, middle disc 12 kV.
Find:
 - (i) Line voltage
 - (ii) String efficiency

3. Attempt any FOUR of the following:

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- a) State the effect of use of high voltage in transmission of Electrical Power on following parameter.
 - (i) Line loss
 - (ii) Supporting structure weight
- b) State any four desirable properties of insulating material for transmission line, insulator.
- c) State and explain any one method for improving string efficiency.
- d) State the effect of inductance and capacitance on performance of transmission line.
- e) State two advantages and two disadvantages of corona effect.
- f) State the effect of lag, lead and unity power factor on regulation of transmission line with phasor diagram.

4. Attempt any FOUR of the following:

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- Define the disruptive critical voltage and visual critical voltage.
- State the values of generalized circuit constants A, B, C and D for short transmission line.
- A single phase 11 kV line with a length of 20 kM is to transmit 750 KVA load. The total inductive reactance of line is 0.5 ohm per kM and total resistance is 0.2 ohm per kM. Calculate the sending end voltage and efficiency of the line at 0.8 p.f. lagging.
- Define E H V line. State its necessity any four points.
- Which are the factors to be considered while designing feeder?
- State any four disadvantages of extra high voltage A.C. transmission system.

5. Attempt any FOUR of the following:

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- Give classification of substation on basis of:
 - Service requirement
 - Construction
- List two advantages and two disadvantages of indoor substation.
- Draw a single line diagram for 11 kV/400 volt distribution substation.
- Draw the connection diagram of grid distribution system and give any two advantages of the system.
- Draw the layout of ring distribution scheme and write any two advantages of the same.
- A single phase AC distributor of 900 m length has total impedance of $(0.02 + j 0.04)$ ohm and is fed from one end at 250 V. If it is loaded as in Figure No. 2. Calculate the voltage drop and voltage at far end.

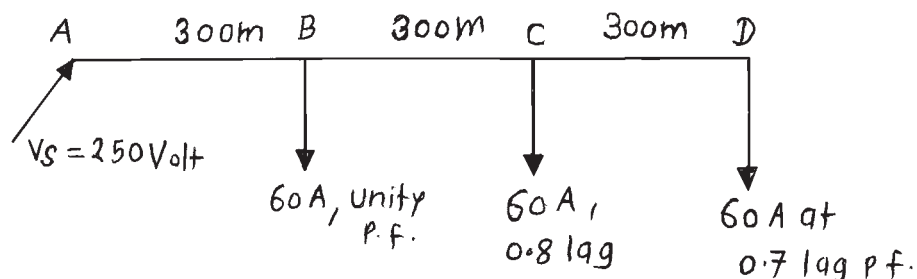


Fig. No. 2

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

- a) Suggest suitable sub-station for following applications with suitable reasons:
 - (i) Urban area
 - (ii) Rural area
 - b) State advantages and disadvantages of radial distribution system.
 - c) A three phase line of 5 kM length delivers 5000 kW at a power factor of 0.8 lagging to a load. The resistance and reactance per kM of each conductor are 0.2 ohm and 0.5 ohm respectively. If the voltage at the supply end is maintained at 11 kV, Calculate the sending voltage and efficiency of line.
 - d) Draw equivalent circuit of medium transmission line with nominal T method with phasor diagram.
 - e) Classify transmission line as per length and voltage level.
 - f) With neat sketch explain briefly any one method of cable laying in distribution system.
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