

Total No. of Questions: 6

Total No. of Printed Pages:3

Enrollment No.....



Faculty of Engineering
End Sem (Even) Examination May-2019
OE00039 Power Substation Theory and Practices

Programme: B.Tech.

Branch/Specialisation: All

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. What is the range of MHV substations? 1
 (a) All voltages above 1000 V AC
 (b) Voltages between 1kV and 33 kV
 (c) Between 33 kV and 110 kV
 (d) 220 kV and 400 kV
- ii. Which among these types of bus bars can be used outdoor? 1
 (a) Tubular (b) ACSR (c) AAC (d) All of these
- iii. Current rating is not necessary in case of- 1
 (a) Isolators
 (b) Circuit breakers
 (c) Load break switches
 (d) Circuit breakers and load break switches.
- iv. Which among these is a type of surge arrester? 1
 (a) Conventional gapped arrestors
 (b) Metal oxide arrestors
 (c) Both (a) and (b)
 (d) None of these
- v. Gas Insulated Substation is employed where: 1
 (a) Where there is less space available
 (b) For high Altitude substation
 (c) In terrain region
 (d) All of these

P.T.O.

[2]

- vi. Which of the gas is used in gas insulated substation? **1**
 (a) Nitrogen + SF6 (b) Hydrogen + SF6
 (c) SF6 (d) None of these
- vii. What is an earth electrode? **1**
 (a) Electrode that is connected to earth
 (b) Material used for earthing
 (c) Electrode connected to the circuit
 (d) Electrode which is connected to the mains
- viii. Moisture content in the soil ___ the earth soil resistance:
 (a) Increase (b) Decrease
 (c) Does not affect (d) None of these
- ix. A_____ consists of number of minicomputers or microcomputers inter connected in a tree structure. **1**
 (a) Shared bus systems (b) Ring system
 (c) Hierarchical system (d) None of these
- x. PLC stands for- **1**
 (a) Programmable Logo Controller.
 (b) Programmed Latching Circuit.
 (c) Programmable Logic Controller.
 (d) Pneumatic Latching Circuit.
- Q.2 i. Enlist the classification of sub-stations. **2**
 ii. Define these terms- **3**
 (a) Single Bus (b) Double Bus
 iii. To design a substation, highlight the important points needed. **5**
- OR iv. Draw schematic diagram and explain the ring bus system. Also give its two disadvantages. **5**
- Q.3 i. Give the significance of current and potential transformer in power system. **4**
 ii. Write a detailed note on power fuses. **6**
- OR iii. Explain the basic features of Load break switches used in a substation. Also write its operating mechanism. **6**
- Q.4 i. Give the details of temperature rise test. **4**

[3]

- ii. Write advantages and disadvantages of Gas Insulated Substations. **6**
- OR iii. What are the suitable properties of SF6 for gas insulated substations? **6**
- Q.5 i. Explain Step potential & Touch potential, both Tolerable and actual. **4**
 ii. How would you earth the substation equipment and auxiliaries as per I.E. rules? **6**
- OR iii. Explain these terms briefly- Integrated Earthing and Earthing Grid. **6**
- Q.6 Write a short note on any two:
 i. Analog Data Acquisition **5**
 ii. Communications Networks inside the Substation **5**
 iii. Testing and Commissioning of transformer **5**

Marking Scheme

OE00039 Power Substation Theory and Practices

| | | | | |
|-----|------|--|--------------|----------|
| | | Significance of potential transformer | 2 marks | |
| | ii. | Power fuses. | | 6 |
| | | Definition | 1 mark | |
| | | Mechanism | 2 marks | |
| | | Features | 3 marks | |
| OR | iii. | Features of Load break switches | 3 marks | 6 |
| | | Operating mechanism. | 3 marks | |
| Q.4 | i. | Temperature rise test. | | 4 |
| | | Circuit | 1 mark | |
| | | Explanation | 3 marks | |
| | ii. | Advantages of Gas Insulated Substations | 3 marks | 6 |
| | | Disadvantages of Gas Insulated Substations | 3 marks | |
| OR | iii. | Properties of SF6 for gas insulated substations | | 6 |
| | | 1 mark for each property | (1 mark * 6) | |
| Q.5 | i. | Step potential | 2 marks | 4 |
| | | Touch potential | 2 marks | |
| | ii. | Earth the substation equipment and auxiliaries as per I.E. rules | | 6 |
| | | Six marks for complete steps | | |
| OR | iii. | Integrated Earthing | 3 marks | 6 |
| | | Earthing Grid. | 3 marks | |
| Q.6 | | Write a short note on any two: | | |
| | i. | Analog Data Acquisition | | 5 |
| | ii. | Communications Networks inside the Substation | | 5 |
| | iii. | Testing and Commissioning of transformer | | 5 |
