

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (EE/Electrical & Electronics Engg./Electronics & Electrical Engg.)
(Sem.-4)

POWER SYSTEM-I

Subject Code : BTEE-405

M.Code : 57107

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- a. What are the conditions that must be satisfied before interconnecting the networks?
- b. State Kelvin's law.
- c. Explain skin effect and proximity effect.
- d. What are the factors that affect the sag in the conductor supported on the supporting structure?
- e. What is the purpose of stringing chart?
- f. What is the need of transmission line parameters?
- g. Compare radial and mesh distribution networks.
- h. What is the purpose of serving provided on the cable?
- i. Derive the expression of insulation resistance of single core cable.
- j. What is the basis behind increasing the distribution and transmission voltage levels? Derive the relevant results.

SECTION-B

2. Derive the expression of characteristic impedance of transmission line. Hence, deduce the expressions of surge impedance and surge impedance loading. Also, explain the significance of SIL.
3. A string of 5 suspension insulators is to be fitted with a grading ring. If the pin-to-earth capacitances are equal to C , find the values of line-to-pin capacitance that would give a uniform voltage distribution over the string.
4. What is the percentage saving in feeder copper if the line voltage in a 3-wire DC system is raised from 220V to 400V for the same power transmitted over the same distance and having the same power loss?
5. Explain, in detail the procedure to draw the receiving end circle diagram for long transmission line based on ABCD constants.
6. Derive the expression for the capacitance of a three phase overhead transmission line. What is the effect of earth on the capacitance of three phase overhead transmission line? Derive the associated results.

SECTION-C

7. A 150km long, 3-phase, 50Hz transmission line has the following constants :

Resistance per phase per km = 0.12 Ohm

Reactance per phase per km = 0.55 Ohm

Susceptance per phase per km = 3×10^{-6} Siemens

If the line supplies load of 60MW at 0.9 p.f. lagging at 110kV at the receiving end, calculate by nominal- π method.

- a) sending end power factor
 - b) voltage regulation and
 - c) transmission efficiency.
8. What are the various methods of laying the underground cables? Discuss these methods. List the advantages and disadvantages of each method.
 9. Compare the AC and DC systems for transmission and distribution systems.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.