

Roll No.:

National Institute of Technology, Delhi

B. Tech. Examination

End-Semester Examination May, 2019

Branch	: Electrical & Electronics Engineering	Semester	: Fourth
Title of the Course	: Power Systems	Course	: EEL 253
Time: 3 Hours		Code	
		Maximum Marks: 50	

Note : Symbols used in the questions are having their usual meaning. Assume if any data is missing.

Section- A- Attempt all questions. Write the short answer.

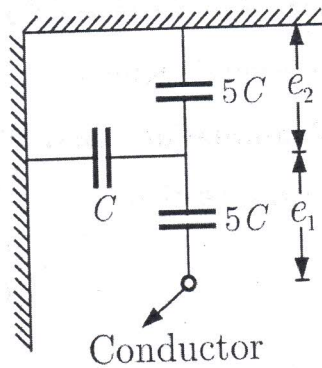
(1x10)

1. Why the current carrying capacity of cables in D. C. is more than that in A. C. ?
2. What is the relative permittivity of rubber?
3. What is sags and dips?
4. What is the highest voltage level limit where Pin type insulators are not used.
5. Why solid type cables are considered unreliable beyond 66kV ?
6. For an existing ac transmission line, the string efficiency is 80%, if dc voltage is supplied for the same set up, what will be the string efficiency.
7. What is the usual spans with R. C. C. poles ?
8. Define Ferranti effect.
9. Write the different names of the methods which can improve the string efficiency.
10. How the effect of Corona can be detected?

Section- B- (Attempt any four questions)

(5x4)

11. Describe the nominal π model for transmission line.
12. Explain the various working voltages for transmission and distribution and draw the relevant circuit.
13. Discuss the various ways to reduce the corona loss in transmission lines.
14. With the help of block diagram describe the various equipments in substations.
15. Consider a three-phase, 50 Hz, 11 kV distribution system. Each of the conductors is suspended by an insulator string having two identical porcelain insulators. The self-capacitance of the insulator is 5 times the shunt capacitance between the link and the ground, as shown in the below figure.
Calculate the voltages across the two insulators.



(10x2)

Section- C- (Attempt any two questions)

16. A generation station of 1MW supplied a region which has the following demands:

From	To	Demand (kW)
midnight	5 am	100
5 am	6 pm	No-load
6 pm	7 pm	800
7 pm	9 pm	900
9 pm	midnight	400

Neglect transmission line losses and find the following:

- Plot the daily load curve and the load duration curve.
 - Find the load factor, the reserve capacity, plant capacity factor, plant use factor, the hours that the plant has been off and utilization factor.
17. A single core cable covered by the lead and design for 66 kv. If the radius of the conductor is 0.5 cm and the insulator consists of three layers have a relative permittivity of 5,4,3 respectively and the electric stresses on these layers are 40,30,20 kv/cm respectively. Find inside of the sheath of the cable.
18. Two transmission line A & B connected through a cable C. The surge impedances are 500 Ω , 60 Ω , and 300 Ω for A, C, B respectively. If the surge of 100kV is travelling from transmission line A towards cable C then find
- Transmitted voltage into the cable.
 - Transmitted voltage in the line B.
 - Transmitted voltage in the cable C due to first reflected voltage from junction BC reaching the junction A & C.
