

Please check that this question paper contains 9 questions and 2 printed pages within first ten minutes.

[Total No. of Questions: 09]

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Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)

Semester: 5

Name of Subject: Power Systems – I (Apparatus and Modelling)

Subject Code: PCEE-109

Paper ID: 16461

Time Allowed: 03 Hours

MORNING

Max. Marks: 60

09 MAY 2023

NOTE:

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

Part – A

[Marks: 02 each]

Q1.

- a) What is the use of bundled conductors in power transmission?
- b) Identify the key factors that contribute to cable failure in a power system.
- c) Name the different types of protection schemes?
- d) Outline the structure of a power system.
- e) Analyze the advantages of using per-unit system of measurements in power system.
- f) Compare the environmental impacts of conventional and renewable energy sources.

Part – B

[Marks: 04 each]

- Q2. What is back-up protection and how does it function in a power system?
- Q3. Explain the concept of surge impedance loading.
- Q4. Illustrate the impact of capacitance on the performance of a single core cable.
- Q5. Examine the key advantages and disadvantages of Bulk Power Grids and Micro-grids.
- Q6. Discuss the significance of the economic size of line conductors in the design of an efficient power transmission system.
- Q7. Compare and contrast Line-Commutated Converters and Voltage Source Converters in terms of their design, operating principles, and performance characteristics.

Part – C

[Marks: 12 each]

Q8. Explain the method of Symmetrical Components and how it is used to analyse three-phase power systems.

OR

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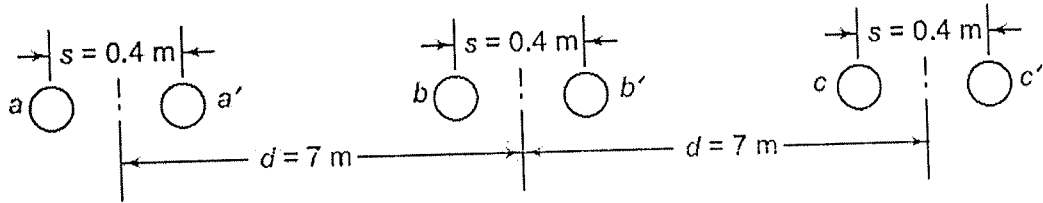
Summarize the following:

- a. Distributed Energy Resources
- b. Concept of dielectric stress in cables.

Q9. Contrast the characteristics of DC and AC systems for transmission and distribution, highlighting their respective advantages and disadvantages. In what situations would one type of system be more suitable than the other?

OR

Evaluate the inductive reactance in ohms per kilometer at 50 Hz of a three-phase bundled conductor line with two conductors per phase as shown in Figure. All the conductors are ACSR with radii of 1.725 cm.



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