R16

Code No: 138BT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, July - 2023

ELECTRICAL DISTRIBUTION SYSTEMS

(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What are the types of basic distribution system?	[2]
b)	What are the purposes of load forecasting?	[3]
c)	What is a substation?	[2]
d)	What is the importance of voltage drop calculation for distribution systems?	[3]
e)	What are the types of protection coordination?	[2]
f)	What are the objectives of distribution system protection?	[3]
g)	What is the need of power-factor control?	[2]
h)	What are the difference between shunt and series capacitors?	[3]
i)	What are the equipment for voltage control?	[2]
j)	What are the importance of voltage control?	[3]

PART – B

(50 Marks)

2.a) Discuss the factors effecting distribution system planning.

b) A substation supplied the following loads: 175MW, 120MW, 80MW, 60MW and 10 MW. The station has a maximum demand of 220MW. Calculate the following, if annual load factor of the station is 55%, number of units supplied annually, diversity factor and the demand factor. [5+5]

OR

3.a) Discuss the HVDS and LVDS? List out merits and demerits of these distribution systems.

b) Explain the objectives of secondary mains. [6+4]

4.a) What are the rules to be considered for selection of an ideal location of substations?

b) Discuss how do you analyze a substation service area with 'n' primary feeders. [4+6]

OR

5.a) In terms of resistance and reactance of the circuit, derive the equation for load power factor for which voltage drop is maximum.

b) Prove that the power loss due to load currents in the conductors of the single-phase two-wire unigrounded lateral with full capacity neutral is 6 times larger than the one in the equivalent three phase 4-wire lateral. [4+6]

6.a) What are the types of common faults? Discuss the procedure for fault calculations.

b) What are the different protective devices used in the distribution system? Give comparison between them. [5+5]

OR

7.a) Describe the general coordination procedure between protective devices.

b) Explain the coordination between a fuse and a circuit breaker. [5+5]

8.a) Explain how reduction in line current and hence power losses are obtained with p.f improvement.

b) Give the best values of capacitor banks to improve the load p.f. from 0.75 to 0.9 from the following data: Load 700 kVA, operating voltage 3.6 kV (i) Star connection (ii) Delta connection. [5+5]

OR

9.a) Explain the procedure to determine the best capacitor location.

b) A single phase system supplies the following loads:
i) Light load of 40 kW at unity power factor
ii) Induction motor load of 125 kW at p.f. 0.8 lagging
iii) Synchronous motor load of 60 kW at p.f 0.85 leading
iv) Other miscellaneous loads of 40 kW at p.f. 0.75 lagging.
Find the total kW and kVA delivered by the system and p.f at which it works. [5+5]

10.a) Explain the effect of series capacitor over voltage control with necessary diagrams and expressions.

b) Explain about line drop compensation with neat diagram. [5+5]

OR

11. Explain briefly different types of voltage control methods. [10]

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