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2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS

ELECTRICAL DISTRIBUTION SYSTEM

(ELECTRICAL&ELECTRONICS ENGINEERING)

NOVEMBER 2005

TIME: 3 HOURS

MAX MARKS: 80

Answer any FIVE Questions
All Questions carry equal marks
?????

1. Examine the present trend for the future distribution system planning. [16]

2. (a) Explain the characteristics of different types of Load models. [6]

(b) Assume that the annual peak load of a primary feeder is 2,000 kW, at which the power is 80kW per three phase. Assuming an annual loss factor of 0.15, determine

- i. the average annual power loss [5]
- ii. the total annual energy loss due to the copper losses of the feeder. [5]

3. Draw the one line diagram of radial type primary feeder and mention the factors that influences the selection of primary feeder. [6+10]

4. How do you analyse a substation service area with 'n' primary feeders. [16]

5. (a) In terms of resistance and reactance of the circuit, derive the equation for load power factor for which voltage drop is minimum. [6]

(b) An unbalanced 3-phase star connected load is connected to a balanced 3-phase, 4-wire source. The load impedances Z_R , Z_Y and Z_B are given as , 706 300, 856 - 400 and 506 350 ohms per phase respectively and the phase 'R' line voltage has an effective value of 13.8 KV. Use the line to neutral voltage of phase 'R' as the reference and determine the line and neutral currents and total real and reactive powers. [6+4=10]

6. (a) Explain the principle of operation of fuse. [6]

(b) Explain the coordination procedure between Reclosure and fuse. [10]

7. (a) Write notes on how an over excited synchronous machine improves power factor? [8]

(b) A feeder supplies an industrial consumer with a cumulative load of

i. Induction Motors totaling 300HP which runs at an average efficiency of 89% and lagging average p.f. of 0.85

ii. Synchronous Motors totaling 100HP with an average efficiency of 86% and

iii. a heating load of 100KW. The industrial consumer plans to use the synchronous motors to correct its overall p.f. Determine the required p.f. of the synchronous motors to correct the overall p.f. at peak load to

A. unity

B. 0.96 lagging.

8. (a) How do the shunt capacitor and reactors control the voltage? List the disadvantages of using a shunt capacitor for voltage control. [3+3+4]

(b) With the help of a phasor diagram, show how a series capacitor boosts the voltage? What are the drawbacks of this method?