R18

Code No: 155CV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, March - 2021

POWER SYSTEM – II

(Electrical and Electronics Engineering)

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

Answer any five questions.

All questions carry equal marks.

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1.a) Explain clearly the 'Ferranti effect' with a phasor diagram.

b) A 3-phase 50 Hz transmission line has resistance, inductance and capacitance per phase of 10 ohm, 0.1 H and 0.9 μF respectively and delivers a load of 35 MW at 132 kV and 0.8 p.f. lag. Determine the efficiency and regulation of the line using (i) nominal-T, (ii) nominal-π. [6+9]

2.a) Derive the ABCD parameters of a nominal π represented medium length transmission line with neat phasor diagram.

b) Classify the transmission lines. [9+6]

3.a) How do you determine the capacity of the phase modifier if the net reactive power required to maintain certain voltages at the two ends is known? Explain.

b) What is the need of compensation in power system? Explain about Load ability characteristics of overhead lines. [7+8]

4.a) Explain the surge impedance loading with necessary expressions.

b) How voltage control can be achieved by using Off-load tap changing transformers? [8+7]

5.a) Discuss the advantages of p.u. system method over the absolute method of analysis.

b) Show that a travelling wave moves with a velocity of light on the overhead line and its speed is proportional to $1/\sqrt{\varepsilon_r}$ on a cable with dielectric material of permittivity ε_r. [7+8]

6.a) Describe about Attenuation of travelling waves.

b) State the advantages of p. u system. [8+7]

7.a) What is volt-time curves? What is their significance in power system studies?

b) What are ground rods and counterpoises? Explain clearly how these can be used to improve the grounding conditions. Give various arrangements of counterpoise. [6+9]

8.a) Obtain the symmetrical components of the following set of unbalanced currents $I_a = 1.6\angle 250^0$, $I_b = 1.0\angle 180^0$ and $I_c = 0.9\angle 132^0$. Also find out the neutral current.

b) Derive an expression for the fault current for a double line to ground fault as an unloaded generator and draw its equivalent circuit. [7+8]

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