

**R15**

Code No: 124DH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, February - 2024

PRINCIPLES OF ELECTRICAL ENGINEERING

(Electronics and Communication 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) Explain the time constant of series R-L circuit. [2]
- b) Write the current equation of RC circuit for step response in transient state condition. [3]
- c) What is meant by input driving point admittance and output driving point admittance? [2]
- d) Express h-parameters in terms of Y-parameters. [3]
- e) Differentiate stop band and pass band filters? [2]
- f) Write about m-derived T-Section filter. [3]
- g) What are the different types of DC Motors? [2]
- h) What are different losses of a d.c machine? [3]
- i) State applications of stepper motor. [2]
- j) Differentiate between core type and shell type transformer. [3]

**PART - B**

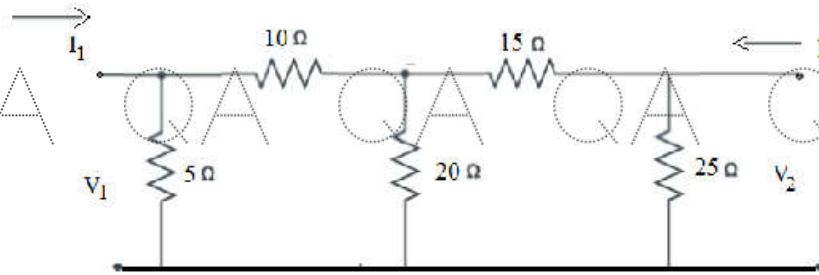
**(50 Marks)**

- 2.a) Derive the transient response current of RLC circuit for DC excitation.
- b) Calculate the time taken by a capacitor of  $1.5\mu\text{F}$  and in series with a  $1.2\text{M}\Omega$  resistance to be charged up to 85% of the final value. [6+4]

**OR**

- 3.a) Derive the transient response current of RL circuit for DC excitation.
- b) An L-R-C series circuit contains a coil of inductance 1 H and resistance  $8\Omega$  and a capacitor of capacitance  $50\mu\text{F}$ . Assuming current 'i=0' at time  $t=0$ , determine i) the state of damping in the circuit, and ii) an expression for the current when a step voltage of 10 V is applied to the circuit. [4+6]

4. Find the A B C D parameters of the network shown below. [10]



OR

- 5.a) What is a transformed network? Explain clearly with an example.  
b) What are the conditions for Reciprocity and symmetry of open circuit impedance parameter? And h- parameters respectively. [5+5]

6. What are attenuators? Discuss various types of attenuators briefly. [10]

OR

7. A filter is required to pass all frequencies above 25 kHz and to have a nominal impedance of 600  $\Omega$ . Design a) a high-pass T section filter and b) a high-pass  $\pi$  section filter to meet these requirements. [10]

- 8.a) Draw and explain the magnetization characteristics of a DC shunt generator..  
b) A 6 pole lap wound DC generator has 600 conductors on its armature. The flux per pole is 0.02 Wb. Calculate i) the speed at which the generator must be run to generate 300 V  
ii) What would be the speed if the generator were wave wound? [5+5]

OR

- 9.a) Describe different methods of speed control of d.c motors.  
b) A 400V, dc series motor has an armature resistance of 0.12 $\Omega$ . When motor takes a current of 85A, its speed is 600 rpm. Determine its speed if current drawn by the motor changes to 40A. [5+5]

- 10.a) Explain the principle of operation of a transformer. Derive its emf equation.  
b) A single-phase transformer has 500 turns in the primary and 1200 turns in the secondary. The cross-sectional area of the core is 80sq.cm. If the primary winding is connected to a 50 Hz supply at 500V, calculate (i) peak flux-density, and (ii) Voltage induced in the secondary. [6+4]

OR

- 11.a) Explain the effect of variations of frequency and supply voltage on Iron losses of a transformer.  
b) How do you conduct OC test on a 1- $\phi$  transformer? [5+5]

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