

Code No: 09A40401

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, June-2014

PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to ECE, ETM)

Time: 3 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks

- 1.a) A capacitor with initial voltage v_0 is connected to resistor of $R\Omega$ at $t = 0$, derive the expression for the voltage across the capacitor and current through the capacitor at any time $t > 0$ and plot the waveforms.
- b) Find $i(0^+)$ in the circuit shown in Figure 1.

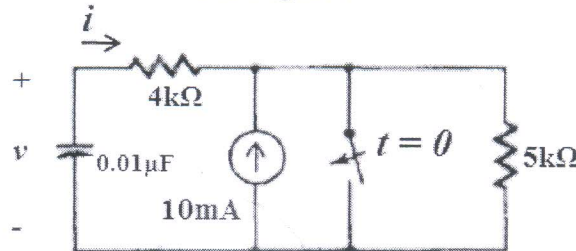


Figure: 1

2. Find ABCD parameters of the circuit in Figure 2.

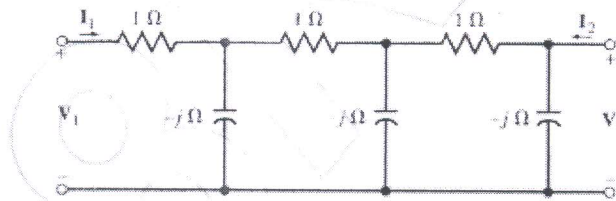


Figure: 2

3. A low pass π -section filter consists of an inductance of 25 mH in series arm and two capacitors of $0.2\mu\text{F}$ in shunt arms. Calculate the cut-off frequency, design impedance, attenuation at 5 KHz and phase shift at 2 KHz. Also find the characteristic impedance at 2 KHz.
- 4.a) Explain T-type attenuator.
b) Design a T-type attenuator to give an attenuation of 60dB and to work in a line of 500Ω impedance.
- 5.a) Derive an expression for the induced emf in the armature of a DC Machine.
b) A 4-pole, lap-wound, dc shunt generator has a useful flux per pole of 0.07 Wb. The armature winding consists of 220 turns each of 0.004 ohms resistance. Calculate the terminal voltage when running at 900 rpm, if the armature current is 50A.
- 6.a) Discuss various methods of speed control of dc shunt motor?
b) A 250V DC shunt motor takes 4A when running unloaded. Its armature and field resistances are 0.3Ω and 250Ω respectively. Calculate the efficiency when the dc shunt motor taking a current of 60A.

- 7.a) Draw the phasor diagram of a single phase transformer under load conditions for lagging power factor.
- b) 6600/400V, 50 Hz, single phase Transformer has a net cross-sectional area of the core of 428 cm^2 . The maximum flux density in the core is 1.5 Tesla. Calculate the number of turns in the primary and secondary windings.
8. Write short notes on the following:
- a) Capacitor motors.
 - b) Shaded pole motor.
 - c) Stepper motor.

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