

ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : JUNE - JULY 2009

REGULATIONS - 2008

SECOND SEMESTER

080290007 - ELECTRIC CIRCUITS AND ELECTRON DEVICES

(COMMON TO ECE / CSE / IT / MEDICAL ELECTRONICS / BIOMEDICAL ENGG.)

TIME : 3 Hours

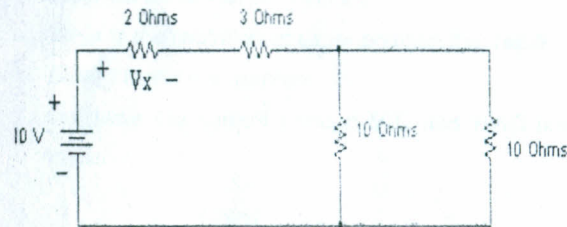
Max.Marks : 100

PART - A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

- Two capacitors C1 & C2 are connected in series if  $C_1 = 10\mu\text{F}$  and equivalent capacitance is  $1.67\mu\text{F}$ . Find C2.
- State Norton's Theorem.
- A voltage divider circuit of two resistors is designed with a total resistance of the two resistors equal to  $50\Omega$ . If the output voltage is 10% of the input voltage, obtain the values of the two resistors in the circuit.
- Determine  $V_x$  using voltage division method.



- In an L-C-R circuit, give the Q-factor of the inductor and the capacitor.
- Obtain the resonance frequency and BW of a series RLC circuit with  $R = 5\Omega$ ,  $L = 40\text{mH}$ ,  $C = 1\mu\text{F}$
- Draw the frequency response of a single tuned circuit.

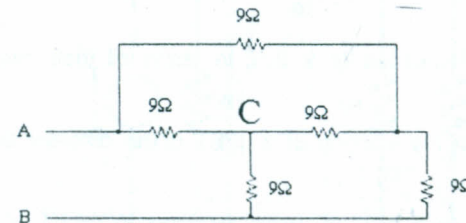
- Give the applications of resonance circuits.
- Comment on the voltage and current during resonance in series and parallel R-L-C circuits.
- What is meant by extrinsic semiconductor?
- Why a series resistor is necessary when a diode is forward biased?
- Distinguish between Zener breakdown and avalanche breakdown.
- Define transition capacitance of a diode.
- List any two differences of FET and BJT.
- Define drift current.
- What is meant by punch through effect?
- With  $V_{GS} = 0$ , the drain current in saturation region of JFET is  $8\text{mA}$ . If the pinch off voltage is  $-4\text{V}$ , estimate the drain current at  $V_{GS} = -2\text{V}$ .
- Mention two advantages of LCD over LED display.
- Draw the symbol and equivalent circuit of UJT.
- What is meant by dark current and dark resistance in photodiodes?

PART - B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

- a) Find the voltage drop across the C and B if a DC supply of  $12\text{V}$  is connected between A and B.



21. b) State and prove the Maximum Power Transfer theorem for an AC circuit. 6
22. a) For the Circuit shown in Problem 21. a), Estimate the equivalent resistance across A and C using star-delta transformation method. 6
22. b) For the Circuit shown in Problem 21. a), the resistance  $9\ \Omega$  across C and B is replaced by an impedance of  $5+j8\ \Omega$ , and a voltage source of 15v is connected across A and B. Estimate the current through A and C using any method. 6
23. a) A resistor R and a  $2\ \mu\text{F}$  capacitor are in series across a 100v DC supply. Across the capacitor is a cold-cathode lamp which strikes at 60v. Calculate R so that the lamp strikes 5 sec after the switch is closed. If  $R=5\text{M}\Omega$ , after how much time would the lamp glow? 6
23. b) Derive the Resonance frequency and Bandwidth for a R-L-C parallel circuit. 6
24. a) Draw the basic structure of the PN junction and name the regions 6
24. b) Derive the built-in potential across a PN junction 6
25. a) Discuss on the following AC parameters of a PN-junction diode 8  
 a) Junction Capacitance  
 b) Diffusion Capacitance
25. b) For an N-type semiconductor, calculate the Fermi level. 4
26. a) Compare all the three configurations of a BJT in terms of their circuit parameters. 6
26. b) With a neat diagram, explain the working of a JFET under different bias conditions. 6
27. a) Describe the structure and operation of Depletion type MOSFET. Also explain its drain and transfer characteristics with neat sketch. 8
27. b) Derive the drain current equation of a JFET. 4

28. a) Draw the transistor equivalent of an SCR and comment. 4
28. b) Write short note on, a) LCD b) UJT 8

\*\*\*\*\*THE END\*\*\*\*\*