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B.E/B.TECH DEGREE EXAMINATIONS: JUNE 2010

Second Semester

EEE231: ELECTRICAL AND ELECTRONIC CIRCUITS

(Common to B.E-Computer Science and Engineering, B.Tech-Information Technology)

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. When n number of equal resistances of R ohms connected in parallel, the equivalent resistance is

A) $R^2/2n$ B) R/n C) nR D) 1/nR

2. What is the voltage across the heater of resistance 5 Ω through which passes a current of 46 A?

A) 41 V B) 230 V C) 9.2 V D) 51 V

3. What will be the power consumption in a circuit having impedance of (3+j4) Ω when a voltage (100+j50) V is applied?

A) 660 W B) 500 W C) 2500 W D) 100 W

4. In a pure capacitive circuit the current

A) Lags the voltage by 90^o B) Leads the voltage by 90^o

C) Lags the voltage by less than 90^o D) Leads voltage by less than 90^o

5. A device that can be used as voltage regulator

A) zener diode B) PN diode C) SCR D) UJT

6. Ripple frequency of a full-wave rectifier is

A) twice the supply frequency B) same as the supply frequency

C) four times the supply frequency D) eight times the supply frequency

7. In an NPN transistor, the collector junction is reverse biased and emitter junction is forward biased. The transistor will operate in

A) active region B) cut off region C) saturation region D) inverted region

8. The ON voltage and forward break over voltage of an SCR depends on the

A) Gate current alone

B) Band gap of the semiconductor alone

C) Gate current and the semiconductor band gap respectively

D) Semiconductor band gap and the gate current respectively

9. Colpitts oscillator is an electrical dual of

A) Hartley Oscillator B) Clapp Oscillator C) Pierce Oscillator D) Armstrong Oscillator

10. An ideal Op- Amp is an ideal

A) Voltage controlled current source B) Voltage controlled voltage source

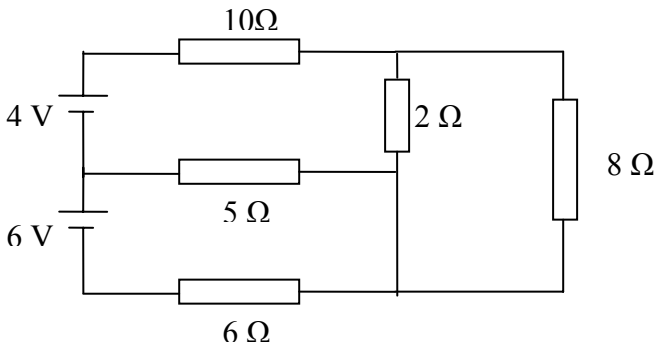
C) Current controlled current source D) Current controlled voltage source

PART B (10 x 2 = 20 Marks)

11. A 6 V battery has an internal resistance of 0.25 Ω, connected to a load resistance of 2 Ω. Determine the power supplied to the load.
12. Two resistances R_1 and R_2 give combined resistance of 4 Ω when in series and 1 ohm when in parallel. What are the values of resistances R_1 and R_2?
13. What do you mean by RMS value of an ac quantity?
14. A pure inductance 0.01 H takes a current 10 cos1500t. Find the inductive reactance and equation for voltage across it.
15. A full wave rectifier uses two diodes, the internal resistance of each diode is assumed to be 20Ω. The transformer RMS secondary voltage from center tap to each end is 50 V and load resistance is 980 Ω. Find the average load current
16. What is the principle of optical diode?
17. Compare the CE, CB, CC configurations in terms of voltage gain.
18. What is the necessity of the coupling capacitor in transistor amplifiers?
19. State Barkhausen criterion.
20. Draw the circuit for Differentiator using Operational amplifier.

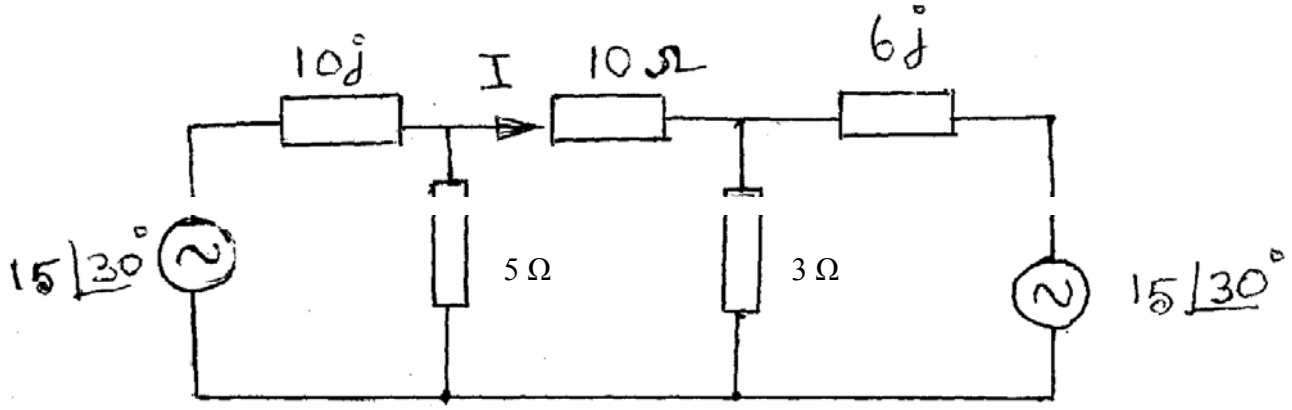
PART C (5 x 14 = 70 Marks)

21. (a) Determine the magnitude and direction of current in each resistor in the following circuit.



(OR)

(b) Find the current I flowing through 10 Ω resistor shown in the Figure below.

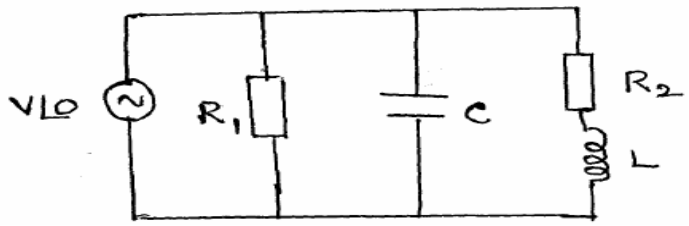


22. (a) A Balanced star connected load of (4+j3) Ω per phase is connected to a 3 phase, 415 V, 50 Hz supply. Find i) the line current ii) the power factor iii) the Active power iv) the reactive power and v) the apparent power.

(OR)

(b) (i) Derive the relationship among quality factor, resonant frequency and bandwidth for a series RLC circuit. (6)

(ii) Derive an expression to find the resonant frequency of the circuit shown in the following Figure. (8)



23. (a) (i) Draw the circuit diagram and explain the working of full wave rectifier using semiconductor diodes. (7)

(ii) Describe the action of the capacitor filter, L-section and pi-section filter on full wave rectifier output. (7)

(OR)

(b) (i) Explain the action of a zener diode as voltage regulator. (7)

(ii) Explain the characteristics of PN Junction diode (7)

24. (a) Describe how to obtain the input and output Characteristics of a transistor in CE configuration with neat circuit diagram.

(OR)

(b) Explain the construction and working of Enhancement MOSFET with their characteristics.

25. (a) Explain the functioning of RC Phase shift Oscillator with a neat circuit diagram. Also derive the equation for frequency of oscillation.

(OR)

(b) (i) Describe the operation of Operational amplifier with feedback circuit diagram. (7)

(ii) Explain the working of Operational amplifier comparator. (7)

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