CSE

ECE

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 11320

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Second Semester

Electronics and Communication Engineering

EC 2151/147201/EC 25/10144 EC 205/080290007/EE 1152 — ELECTRIC CIRCUITS AND ELECTRON DEVICES

(Common to Computer Science and Engineering, Biomedical Engineering, Medical Electronics Engineering and Information Technology)

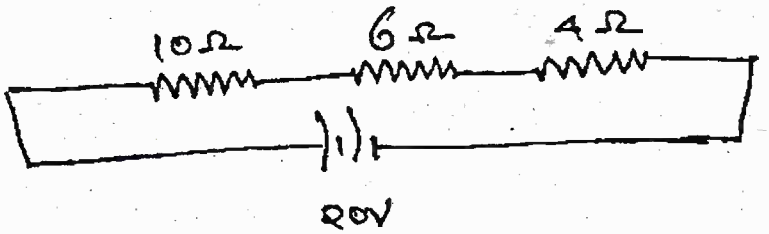
(Regulation 2008)

Time : Three hours | Maximum : 100 marks

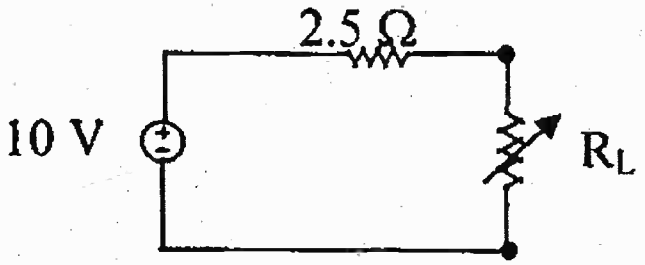
Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. For the circuit shown below, find the voltage across and current through 6Ω resistor. The battery voltage is 20 V.



2. In the circuit shown below, what is the maximum power transferred to the load?



3. Draw the phasor diagram for a series RL circuit.

4. Draw the frequency response of a single tuned circuit.

5. State the effect of temperature of PN junction diode.

6. What is diffusion capacitance?

7. Compare BJT and FET.

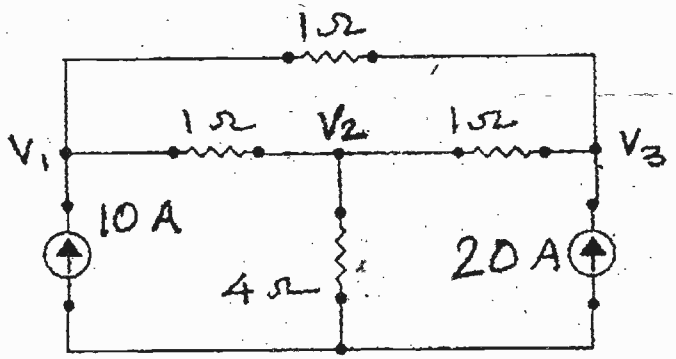
8. When a FET acts as a voltage variable resistor?

9. What is tunnelling phenomenon?

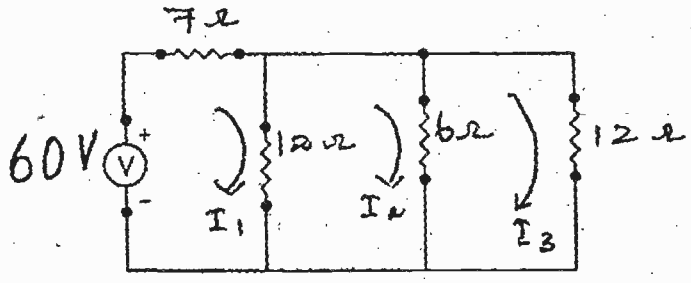
10. Name any two applications of photoconductive cells.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Find the power in 4 ohms resistor of the circuit, shown below, by nodal analysis. (8)

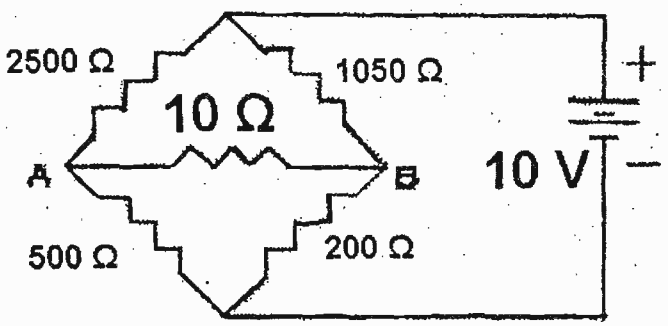


(ii) Solve for I_1, I_2 and I_3, in the circuit shown below, by mesh current method. (8)

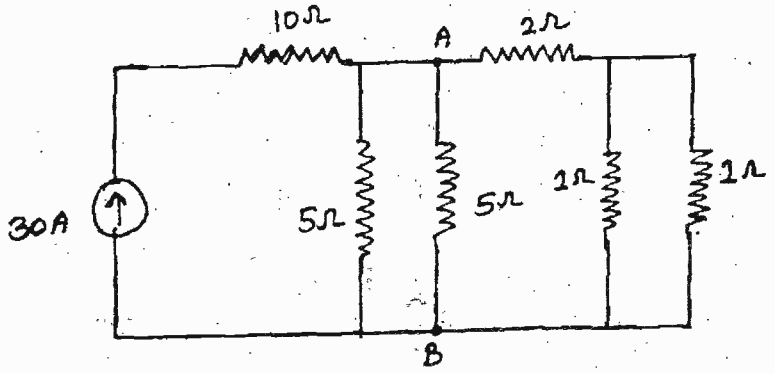


Or

(b) (i) Using Thevenin's theorem find the current passing through 10Ω resistor in the circuit shown below. (8)



(ii) Obtain the Norton's equivalent circuit for the network shown below and find the current through AB. (8)



12. (a) Derive an expression for the current response of RLC series circuit with sinusoidal excitation. From the results, discuss the nature of transient and steady state responses. Comment on the phase angle involved. (16)

Or

(b) (i) Explain the concept of half power frequencies of a series RLC circuit. (4)

(ii) A series RLC resonance circuit has R = 100 Ω, L = 0.5 H, C = 0.4 μF. Find the resonant frequency, the half power frequencies and the bandwidth. (4)

(iii) Derive the quality factor of a parallel RLC circuit at resonance. (8)

13. (a) Derive the PN diode current equation from the quantitative theory of diode currents. (16)

Or

(b) (i) Sketch and explain the V-I characteristics of zener diodes. (8)

(ii) Explain briefly the following :

(1) Avalanche breakdown (4)

(2) Zener breakdown. (4)

14. (a) (i) Draw the circuit for the CE configuration of a NPN transistor and explain in brief its input and output characteristics. (10)

(ii) Compare the performance of a transistor in the CE, CB and CC configurations. (6)

Or

(b) (i) Sketch and explain the construction of N-channel JFET. Give also its symbol. (4)

(ii) Explain the operation of N-channel JFET. Sketch and explain the drain characteristics. (8)

(iii) Define the following parameters of JFET: (4)

(1) Transconductance

(2) Drain resistance

(3) Amplification factor

(4) Power dissipation.

15. (a) (i) Explain the construction, operation and characteristics of UJT. (8)

(ii) Sketch the symbol of DIAC and explain its operation and characteristics. (8)

Or

(b) (i) What is the basic principle behind an LED? Describe the operation and construction of LEDs. (8)

(ii) What is the basic property of a Photoconductive cell? With the help of sketches, explain its construction, symbol and operation. (8)