C 3367

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

(Regulation 2004)

Computer Science and Engineering

PH 1157 — PHYSICS — II

(Common to Information Technology)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. State Kirchoff's voltage law.

2. Three equal resistors are connected in parallel and yield an effective resistance of $3\,\Omega$. What is the value of each resistor?

3. Define Thevenin's impedance of a circuit.

4. State the Maximum Power Transfer theorem.

5. How are extrinsic semiconductors formed?

6. JFET is known as 'Unipolar transistor'. Why?

7. Calculate the ripple factor for a half-wave rectifier.

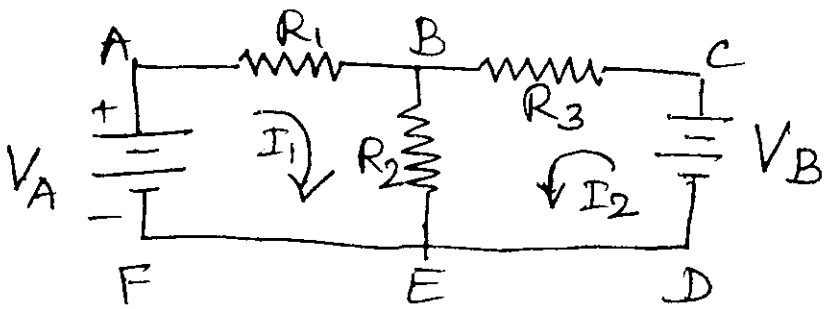
8. State the Barkhausan criterion for oscillators.

9. What is known as the common mode rejection ratio (CMRR) of a differential amplifier?

10. List any two linear, and any two non-linear applications of operational amplifiers.

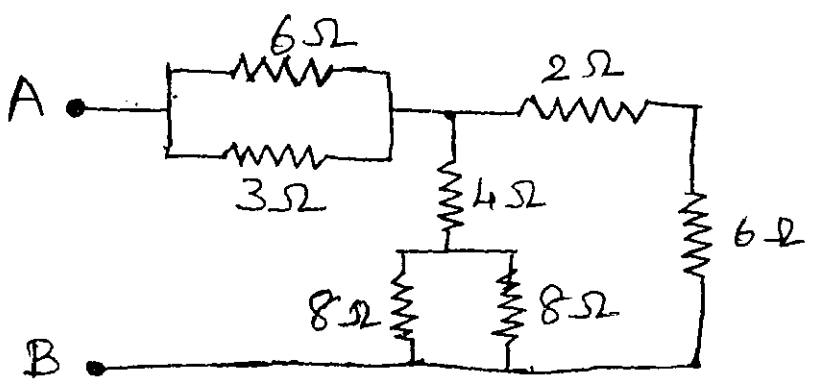
PART B — (5 × 16 = 80 marks)

11. (a) Using the loop current analysis, obtain the equations for the branch currents I_1 and I_2 of the following circuit.

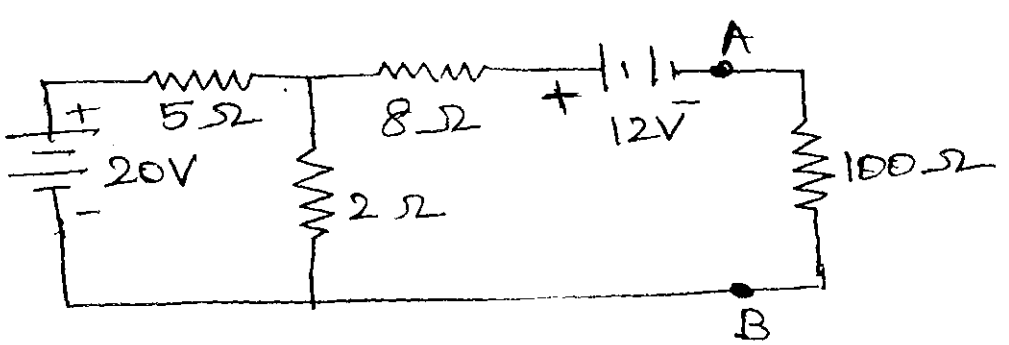


Or

(b) Find the equivalent resistance of the network shown below between the terminals A and B.



12. (a) Find the current in the 100 Ω resistor connected across AB for the circuit shown below using Thevenin's theorem. (16)



Or

(b) Explain the procedure for Delta to Star circuit conversions and obtain the relations between their resistances. (16)

13. (a) Discuss the working of a zener diode, its equivalent circuits, and its V-I characteristics. Also outline its application as a voltage regulator. (12 + 4)

Or

(b) Explain the working of an N-channel MOSFET in its depletion and enhancement modes with necessary circuit diagrams for biasing.

14. (a) With necessary circuit diagram, discuss the working of a full wave rectifier with capacitor filter and obtain an expression for the ripple factor. (10 + 6)

Or

(b) Explain the construction and working of a Colpitts oscillator. Also obtain expressions for the frequency and conditions of sustained oscillations. (8 + 4 + 4)

15. (a) Explain the working of an operational amplifier as an inverting summing amplifier and as a subtractor. (8 + 8)

Or

(b) Discuss the following applications of an operational amplifier :

(i) Differentiator. (8)

(ii) Integrator. (8)