

[This question paper contains 5 printed pages.]

1005

Your Roll No.

B.Sc. (Hons.) / I

C

ELECTRONIC SCIENCE – Paper 1.5 (V)

(Network Analysis and Linear Active Circuits)

Time : 3 Hours

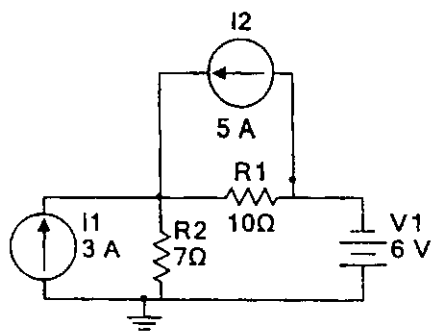
Maximum Marks : 38

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Attempt five questions in all including
Question No. 1 which is compulsory.*

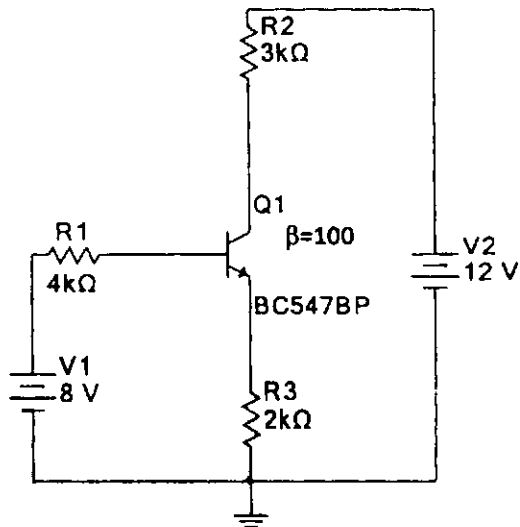
Non Programmable Scientific calculator is allowed.

1. (a) Determine the node voltages in the given circuit. (2)



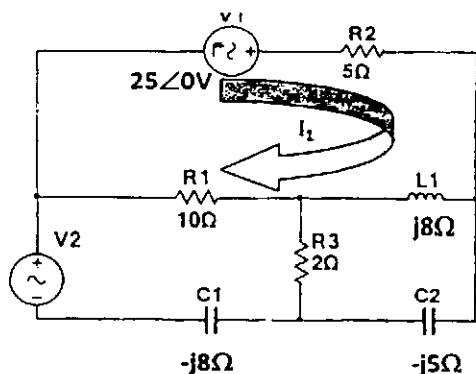
- (b) Find the operating point of the following circuit (2)

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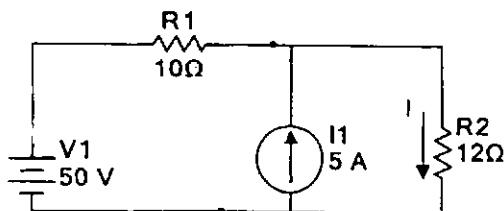


- (c) State and prove maximum power transfer theorem? (2)
- (d) A certain power supply filter produces an output with a ripple of 150 mV peak-to-peak and DC value of 15 V. What is the ripple factor? (2)
- (e) Which RC circuits acts as an (i) Integrator (ii) differentiator? (2)
- (f) Define (i) voltage regulation (ii) peak inverse voltage. (2)
- (g) Design a circuit that will clamp the negative peak of any periodic signal at -5V . (2)
- (h) Explain the term "cross-over distortion". (2)

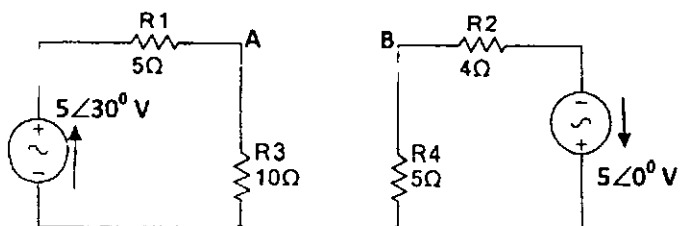
2. (a) For the circuit shown below determine V_2 which causes the mesh current to be zero (4)



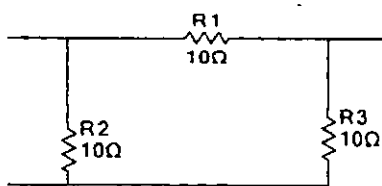
- (b) Find the current I through $12\ \Omega$ resistor using superposition theorem. (3)



3. (a) Obtain thevenin's equivalent circuit for the network shown in the figure given below - (5)



- (b) Derive the H-parameters for circuit and draw its equivalent circuit (2)



4. (a) Derive the expression of ripple factor for a full wave rectifier with inductor filter. (3)
- (b) What effect does the series resistance of a capacitor (used in a capacitor filter) have on the diode current and ripple voltage? (3)
- (c) Under what conditions can the inductor in a pi-section filter be replaced by a resistor? (1)
5. (a) Draw fixed-bias circuit and derive the DC load line equation for the same. (3)
- (b) What is the advantage of complementary push-pull amplifiers? (1)
- (c) What is the advantage of stagger tuning over single tuning? Is it desirable to have a high or low value of quality factor Q ? (3)

6. (a) Classify various power amplifiers on the basis of efficiency. (2)
- (b) Explain the operation of Class B transistor amplifier with necessary circuit diagram and waveforms. (4)
- (c) How does an oscillator differ from an amplifier? (1)
7. (a) The amplifier gain in an oscillator is 50. What should be the percentage feedback for sustained oscillations? (2)
- (b) "A two section (RC) network is sufficient for providing the necessary phase shift in the RC Phase shift Oscillator". Comment. (2)
- (c) Obtain an expression for the frequency of Oscillation for Colpitt Oscillator. (3)