

This question paper contains 4 printed pages]

Your Roll No

5198

B.Sc. Prog. / II
EL-201 – ANALOG AND DIGITAL
CIRCUITS
(N.C. – Admissions of 2005 & onwards)

J

Time : 3 Hours

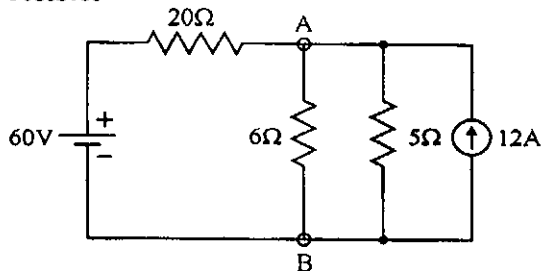
Maximum Marks : 75

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

Attempt **five** questions in all At least **two** questions from each Section 'A' and Section 'B' All questions carry equal marks.

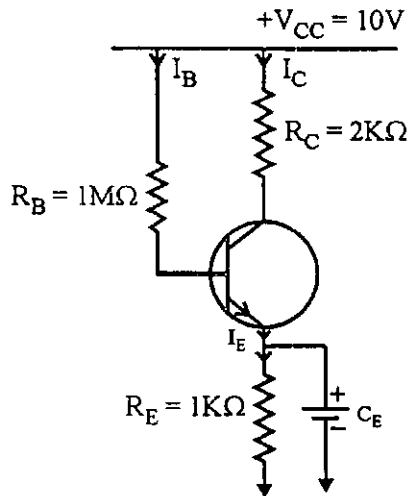
SECTION 'A'

- 1 (a) State and explain Norton's Network Theorem 5
- (b) The circuit of fig below is excited by a voltage and current source Using Norton's theorem, calculate current through the 6Ω resistor 5



- (c) What are h-parameters ? Find
- (i) h_{11} and h_{21} from Short-circuit Test
- (ii) h_{12} and h_{22} from Open-circuit Test 5

- 2 (a) Describe the potential or voltage divider method for transistor biasing How stabilisation of operating point is achieved by this method ? 8
- (b) Calculate the values of three currents in the circuit shown below 7



- 3 (a) Draw the circuit diagram of centre-tap full wave rectifier and explain its working 8
- (b) Derive an expression for the efficiency and ripple factor of a full wave rectifier 7

SECTION 'B'

- 4 (a) Perform the following operation
 $(DB7)_{16} - (437)_8 - (10101)_2 = (\quad)_{16}$ 7
- (b) Show that the dual of the exclusive - OR is equal to its complement 3
- (c) Reduce the given Boolean expression 5

$$\overline{ABC} + \overline{AB} + BC$$

- 5 (a) Minimize the following expression using K-map and implement the minimized expression using only NOR gates 8

$$F(A, B, C, D) = A\overline{C} + \overline{B}D + \overline{A}CD + ABCD$$

- (b) Define Fan out parameter for a logic family Draw and explain the circuit for a TTL logic family NOR gate 7

- 6 (a) Draw the logic circuit diagram of 4-bit subtractor using full adders (Block diagram) 5
- (b) Implement a full-adder circuit with a decoder and two OR gates 5
- (c) Implement the following Boolean function with an 8XI MUX 5

$$F(A, B, C, D) = \Sigma m (0, 3, 5, 6, 8, 9, 14, 15)$$

- 7 (a) Draw the logic circuit diagram of a edge-trigger J-K Flip Flop and explain its operation 7
- (b) Draw the logic circuit diagram of 4-bit asynchronous ripple counter and explain its working with the help of timing diagram 8
- 8 (a) Draw the logic circuit diagram of 4-bit parallel-in-parallel out controlled buffer register 5
- (b) Draw the basic memory cell of SRAM using SR flip-flop and logic gates 3
- (c) Draw a block diagram for Bipolar 256×4 RAM and explain its working 7
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