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BAM/A-20 **564**

ELECTRONICS

Paper–II (Theory)

Time : Three Hours] [Maximum Marks : 45

Note : Attempt *five* questions in all, selecting *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) What is Combinational circuit ? Explain the full adder circuit with the help of truth table. 5

(b) Implement the full adder circuit using

(i) Half adders.

(ii) NAND gates. 4

2. (a) What is Multiplexer circuit ? Explain a 8 : 1 multiplexer with the help of its truth table and its circuit using NAND gates. 6

(b) Implement the following boolean function using a 8 : 1 multiplexer :

$$f(A, B, C) = \Sigma(0, 2, 5, 7).$$ 3

UNIT–II

3. (a) What is Flip-flop ? Explain the working of JK flip-flop with the help of its circuit diagram and truth table. 6

(b) What are the salient features of 1-bit memory cell ? 3

4. (a) Design a 4-bit Asynchronous counter using T flip-flops. Give its truth trade and output waveforms. 6

(b) Make the state diagram of above counter [Part-(a)] showing all the necessary signals. 3

UNIT–III

5. What do you understand by Shift register ? How many different types of shift registers are there ? Explain a 4-bit SISO shift register with the help of its circuit diagram and output waveforms. 9

6. What is Ring Counter ? Explain the working of 4-bit Ring counter with the help of its output waveforms. 9

UNIT–IV

7. Why a D/A converter is required ? Explain the working of 4-bit weighted resistor D/A converter with the help of its neat and clean diagram. What are its limitations ? 9

8. Why a A/D converter is required ? Explain the working of 4-bit simultaneous A/D converter with the help of its circuit diagram. What are its merits and demerits ? 9

UNIT–V

9. (a) Define Frequency modulation, and derive an expression for the frequency modulated carrier wave and also define the modulation index. 6

(b) What are the advantages of FM over AM ? 3

10. (a) What do you understand by Differential PCM (DPCM) ? Explain with the help of circuit diagram that how DPCM is different from PCM. 5

(b) What do you understand by a Sample and Hold circuit (S/H) ? Explain with the help of its circuit diagram, input and output waveforms. 4