1 SEM BCA (CBCS) DD 1·3

2024

(December)

COMPUTER APPLICATION

Paper : 1·3

(Digital Design)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following : 1×5=5

   (a) Define logic gate.

   (b) Write the characteristics equation of JK Flip-Flop.

   (c) What is binary number ?

   (d) Define Hamming distance.

   (e) Convert $(237)_8$ to decimal.

2. *(a)* Construct a full subtractor circuit and simplify the equation using K-map. 7

Or

Construct an 8-to-1 multiplexer. Explain briefly.

(b) Explain about weighted codes with examples. 5

(c) Convert the following : 1×3=3

(i) $(167)_{10}$ to binary

(ii) $(1723)_8$ to binary

(iii) $(649)_{16}$ to binary

3. Answer ***any four*** questions from the following : 5×4=20

(a) Explain about error detection method.

(b) Explain 1-to-4 demultiplexer with logic diagram and truth table.

(c) Explain 3-to-8 line decoder with logic diagram and truth table.

(d) Explain about Octal to Binary Encoder with logic diagram and truth table.

(e) Write the steps for designing a combinational circuit.

4. *(a)* Define Flip-Flop. Draw and explain about JK Flip-Flop. 1+5=6

Or

Define latch. Explain about S–R latch with logic diagram and truth table. 1+5=6

(b) Explain about asynchronous down counter. 6

(c) Simplify the expression — $Y = \sum m(8,10,11,12,13,14,15)$ using K-map. 4

(d) Explain about Shift Register. 4

Or

Explain about DeMorgan's theorem.