A

(20623)

BCA – II Sem.

Printed Pages : 3

Roll No. .....

18007

B.C.A. Examination, June–2023

DIGITAL ELECTRONICS AND COMPUTER ORGANISATION

(BCA-204)

Time : 3 Hours] *[Maximum Marks : 75*

Note: Attempt questions from **all** Sections as per instructions.

Section–A

(Very Short Answer Type Questions)

Note : Attempt all the ***five*** questions. Each question carries 3 marks. Very short answer is required not exceeding 75 words. 5×3=15

1. Give the logic diagram and truth table of RS flip-flop. 3

2. Why RAM is used in computer? How static RAM is different from Dynamic RAM and where these RAMs are used in computer system? 3

3. Construct half adder circuit using basic gates. 3

4. State and prove De-Morgan theorem. 3

5. With logic diagram, characteristic table and the characteristic equation, explain the operation of a D Flip-Flop. 3

Section–B

(Short Answer Type Questions)

Note: Attempt any ***two*** questions out of the following three questions. Each question carries 7.5 marks. Short answer is required not exceeding 200 words. 2×7.5=15

6. What are multiplexer and Demultiplexer? Also give the logical expression. 7½

7. Draw and explain SISO, SIPO, PISO and PIPO shift registers with suitable example. 7½

8. Implement following boolean function using multiplexers. 7½

   $F(ABCD) = \Sigma (0, 1, 3, 4, 9, 15)$

Section–C

(Descriptive Answer Type Questions)

Note: Attempt any ***three*** questions out of the following five questions. Each question carries 15 marks. Answer is required in detail. 3×15=45

9. Explain cache memory and cache initialization. Give the significance of cache memory.

A two way set associative cache memory uses block of four words. The cache can accommodate a total of 2048 words from the main memory. The main memory size is 128K × 32

(a) Formulate all pertinent information required to construct the cache memory.

(b) What is the size of cache memory? 15

10. Design a synchronous sequential circuit with 2 inputs T and C. The output attains a value of 1 when T = 1 and C moves from 1 to 0. Otherwise output is 0. 15

11. What is decoder? Draw the circuit of a 2 to 4 decoder and explain its functions. 15

12. Explain the difference between all of the following- 15

(a) Volatile and Non-Volatile memory

(b) Static and Dynamic memory

(c) Sequential and Random Access memory

(d) Magnetic and Semi-Conductor memory

(e) Sum of Product (SOP) and Product of Sum (POS)

13. Design an 32 × 8 memory RAM chip using 16 × 4 memory chips. 15