

(4)

(d) Define overflow and underflow with examples.

2+2=4

4. (a) Define minterm and maxterm for a Boolean expression. A combinational network has four inputs (A, B, C, D) and three outputs (X, Y, Z). XYZ represents a binary number whose value equals the number of 1's at the input. For example if ABCD=1011 then XYZ=011. Find the minterm expansions for X, Y and Z. (1+1)+(3×2)=8

(b) Prove that $A+BC=(A+B)(A+C)$ from left to right. Use this to convert $WX'Y + WXZ' + Y'Z$ to product-of-sums form. 2+4=6

(c) Give $F=AB'D'+A'B'D'+A'BC'D+AB$

(i) Draw the logic circuit using basic gates.

(ii) Reduce it to the minimum form using Karnaugh map.

(iii) Draw the logic circuit of the reduced expression. 2+2+2=6

5. (a) Draw and explain the circuit of an 8×1 multiplexer with the help of truth table. What is the function of a demultiplexer? 4+1=5

(b) Write notes on ASCII and EBCDIC codes.

3+3=6

(c) What is the disadvantage of a ripple counter? Design a 4-bit synchronous counter and show how it overcomes the ripple problem. 2+5=7

(d) Why is edge-triggering necessary? 2

2006-2007

BI (G-1+1+1 System)

2006

COMPUTER SCIENCE (General)

First Paper

(Revised New Syllabus)

Time : Two Hours

Full Marks : 50

The figures in the margin indicate full marks.

Answer question no.1 and any two from the rest.

1. (a) Select the correct answer (any five) : 5×1=5

(i) Which of the following languages follow structured programming concepts?

(a) BASIC

(b) C

(c) ADA

(d) PL / I

(ii) Which of the following does not belong to octal number system?

(a) 1101

(b) 2000

(c) 783

(d) 222

(iii) Mantissa is a part of — number.

(a) floating point

(b) 2's complement

P.T.O.

(2)

- (c) fixed point
(d) BCD
- (iv) Which of the following gates is universal ?
(a) AND
(b) XOR
(c) NOT
(d) NOR
- (v) One out of many inputs is selected by —
(a) Encoder
(b) Decoder
(c) Multiplexer
(d) Flip-flop.
- (vi) The number of outputs in a cycle of a 4-bit ring counter is —
(a) 4
(b) 2^4
(c) 4^2
(d) 1024
- (vii) Race condition occurs in — flip-flop.
(a) D
(b) J-K
(c) R-S
(d) T

(3)

- (b) State true or false (T/F) : 1×5=5
- (i) $A + A'B = A + B$
(ii) Pseudo codes can be directly executed in a computer.
(iii) Karnaugh maps are used to simplify Boolean expressions.
(iv) Parity generator is a sequential circuit.
(v) JK flip-flop can be used to build registers.
2. (a) Draw the basic block diagram of a computer system and describe the functions of its major components. 8
(b) How are the super, main-frame, mini and micro computers different from each other? Give a comparative description. 6
(c) Describe the hierarchy of the hardware, various types of softwares, user etc. in a computing environment with the help of a suitable diagram: 4
(d) What do you mean by second generation computers? 2
3. (a) Discuss the fixed and floating point representations of numbers with their significances in computing. 6
(b) Brief the essential features of an algorithm. What do you mean by time and space complexity of an algorithm? 6+2 = 8
(c) What is the significance of 2's complement representation? 2

P.T.O.

BI (G-1+1+1 System)

2006

COMPUTER SCIENCE (General)

Second Paper

(Revised New Syllabus)

Time : Two Hours

Full Marks : 50

The figures in the margin indicate full marks.

Answer question no.5 and any two from the rest.

1. (a) Write algorithms to implement Stack and its PUSH and POP operations using pointer.

(b) Give the postfix form of the following :

$A+[(B+C)+(D+E) F]/G$

(c) Why Stack is called LIFO data structure.

12+5+3=20

2. (a) Write an algorithm to evaluate a postfix expression. Explain with example.

(b) What are the limitations of simple queue? Can we overcome these problems using circular queue? Explain.

(c) Define deque?

12+6+2=20

3. (a) Differentiate between the linear and binary search.

(b) What is the prerequisite for the binary search.

(c) Write a note on Hashing.

4+2+14=20

P.T.O.

(2)

4. (a) Explain Insertion sort algorithm alongwith a suitable example.

(b) What are the factors to be considered during the selection of a sorting technique.

(c) What do you mean by complexity of an algorithm.

14+4+2=20

5. Discuss briefly the various commonly used file organisations.

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