

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [2016-19]

B.A./B.Sc. FIRST SEMESTER (July – December) 2016

Mid-Semester Examination, September 2016

Date : 10/09/2016

COMPUTER SCIENCE (Honours)

Time : 11 am – 1 pm

Paper : I

Full Marks : 50

[Answer any two questions]

[2×7·5]

1. a) What is canonical POS form? Convert $A(\bar{A} + B)(\bar{A} + B + \bar{C})$ to canonical POS form. [1+3]
b) Subtract $4AB \cdot 6B_{16}$ from $5074 \cdot 56_{16}$. [2]
c) Why Roman number system is non-positional? [1·5]
2. a) Prove transposition theorem of Boolean algebra using algebraic method. [2·5]
b) Encode the following dataword 1001110 using even-parity Hamming code. [3]
c) $(A2 \cdot B9)_{16} = (?)_8$ [2]
3. a) Reduce the following expression using K-map $\sum m(9,10,12) + d(3,5,6,7,11,13,15)$. [2·5]
b) Why Gray code is called 'reflective'? [2]
c) Subtract $5402 \cdot 56$ from $206 \cdot 45$ using 8's complement method. [3]

[Answer any five questions]

[5×7]

4. a) What is the advantage of using associative memory? Describe its match logic. [1+3·5]
b) Design a 1-bit magnitude comparator circuit. [2·5]
5. a) Explain indirect addressing mode. [2·5]
b) What is the function of IR. [1]
c) Differentiate between dataflow and control flow architecture. [1·5]
d) Illustrate De Morgan's Theorem. [2]
6. a) Differentiate between Three C's misses of cache memory. [1·5]
b) Describe a suitable remedy for cache coherence problem. [2·5]
c) What is K-map? Which coding is used in K-map and why? [1+0·5+1·5]
7. a) What is the advantage of non-restoring division over restoring division? [1]
b) Divide 8_{10} by 3_{10} using restoring division. [3·5]
c) Design a combinational circuit for 1-bit half adder. [2·5]
8. a) Represent $26 \cdot 625_{10}$ using IEEE-754 single precision format. [2·5]
b) What is denormal number? [1]
c) Explain significand underflow. [1·5]
d) What is the advantage of using Booth's algorithm? [2]
9. a) Multiply 9_{10} and -4_{10} using Booth's algorithm. Do it algorithm wise. [3·5]
b) Design a 5 to 32 decoder using one 2 to 4 decoder IC and four 3 to 8 decoder ICs. [3·5]
10. a) What is rotational delay? [1]
b) Why DRAM is called an analog device? [1·5]
c) Differentiate between EPROM and EEPROM. [1]
d) 'RISC architecture is hardwired controlled' —Justify. [1·5]
e) What is miss penalty? [2]