This question paper contains 2 printed pages.

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Your Roll No. .....

B.Sc. (Prog.) / II **B**

COMPUTER SCIENCE

Paper— CS 202 – Computer System Architecture

(Admissions of 2005 and onwards)

Time : 3 hours *Maximum Marks* : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

SECTION A (*Botany*)

Question No. 1 is compulsory. Attempt any four questions out of rest. The first question carries 25 marks and the rest of questions carry 12½ marks each.

Q1).

a) Convert the hexadecimal number F3A7C2 to binary and octal. (2)

b) Convert the following numbers with the indicated bases to decimal:

I. (12121)3

II. $(4310)_5$

III. (50)8

(3x1=3)

c) What is the radix of the numbers if the solution to the quadratic equation $x^2-10x+31=0$ is x=5 and x=8. (6)

d) Simplify the following expressions using Boolean algebra.

I. AB+A(CD+CD')

II. (BC'+A'D)(AB'+CD')

(3x2=6)

e) How many 28 x 8 memory chips are needed to provide a memory capacity of 4096 bytes? (5)

f) Perform the logic AND, OR and XOR with the two binary strings 10011100 and 10101010. (3x1=3)

Q.2)

a) Explain Instruction cycle by drawing its flow chart. (6)

b) What is the difference between direct and indirect address instruction? How many references to memory are required for each type of instruction to bring an operand into a processor register? (3½)

c) A computer uses a memory unit with 256K words of 32 bits each. A binary instruction code is stored in one word of memory. The instruction has four parts: an indirect bit, an operation code, a register code part to specify one of 64 registers and an address part. How many bits are there in the operation code, the register code part and the address part? (3)

Turn over

Q.3)

a) Explain why each of the following micro operations cannot be executed during a single clock pulse. Specify a sequence of micro operations that will perform the operation.

I. IR←M[PC]

II. AC← AC+TR

Also illustrate by drawing common bus diagram (4 x 2 8)

b) What do you mean by addressing modes? Explain any two in detail. (4½)

Q.4)

a) What do you mean by associative memory/ Explain. (5)

b) A ROM chip of 1024 x 8 bits has four select inputs and operates from a 5-volt power supply. How many pins are needed for the IC package? Draw a block diagram and label all input and output terminals in the ROM. (4½)

c) Differentiate the following terms.

I. Strobe data transfer

II. Handshaking data transfer

(3)

Q.5)

a) Perform the arithmetic operations (+70)+(80) and (-70)+(-80) with binary numbers in signed 2'complement representation. Use eight bits to accommodate each number together its sign. (6)

b) Write a short note on following:

III. PROM

IV. EPROM

(2 x 2 4)

c) What do you mean by hit ratio? Explain. (2½)

Q.6)

a) Simplify the following Boolean function using three-variable K-Map.

$$F(x, y, z) = \sum(3,5,6,7)$$

(6½)

b) What do you mean by a binary adder? Explain: (3)

c) Show the value of all bits of a 12-bit register when its content represents the decimal equivalent of 295: (a) in binary, (b) in BCD. (3)