Question Paper

Exam Date & Time: 07-Jan-2019 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SCHOOL OF INFORMATION SCIENCES

FIRST SEMESTER MASTER OF ENGINEERING - ME (EMBEDDED SYSTEMS) DEGREE EXAMINATION (MAKE-UP) - JANUARY 2019

Advanced Computer Architecture [ESD 611]

Marks: 100 **Duration: 180 mins.**

MAKEUP JAN 2019

Answer all the questions.

1) Give the register level organization of the following machines and state the salient features of each group. (10)

i) General registers machines

ii) Accumulator based machines

iii) Stack machines (3+3+4)

2) Write technical notes on (2x5=10) (10)

i) Expanded Code Technique

ii) Characteristics of a good instruction format.

3) Design a 4-bit 8-function arithmetic unit that will function as follows: (10)

S2	S1	S0	Function F
0	0	0	2A
0	0	1	A plus B'
0	1	0	A plus B
0	1	1	A minus 1
1	0	0	2A plus 1
1	0	1	A plus B' plus 1
1	1	0	A plus B plus 1
1	1	1	A

4) Consider the following register transfer description. (10)

```
Declare registers     A [8], B [8], C [8], N [4];
Declare bus           Outbus [8];
START:    A ← 1, B ← 1, C ← 0; N ← 10;
          Outbus ← A;
LOOP:     Outbus ← B;
          If N = 0 then go to HALT;
          C ← A + B;
          A ← B;
          B ← C;
          N ← N – 1;
          Go to LOOP;
HALT:     HALT
```

Identify the components required in the processing unit, give their characteristics and design the processing unit incorporating the control points to perform the above task.

5) Write a detailed note on Nano Programming with an example (10)

6) Explain the following: (2x5=10) (10)
a. Differentiate between standard I/O and memory mapped I/O
b. Write a note on programmed I/O and Interrupt I/O

7) Explain the following: (2x5) (10)
a. Mention the roll and advantages of Barrel shifter
b. Explain the following instruction in ARM7: SBC, SUBGT, TST, LDR, STMEA

8) Explain the exception entry and return in ARM (10)

9) Explain synchronous and asynchronous bus with necessary diagram (10)

10) List and explain the 4 schemes which helps to reduce branch hazards (10)

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