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Question Paper Code : 27295

5 Year M.Sc. DEGREE EXAMINATION, MAY/JUNE 2016

Second Semester

Software Engineering

ESE 022 – COMPUTER ARCHITECTURE

(Common to 5 Year M.Sc. Software Systems)

(Regulations 2010)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. List the different types of assembler directives.
2. What is the purpose of stack ?
3. Give an example to show that three guard bits are needed to produce the correct answer when two positive numbers are subtracted.
4. Consider a 16 bit floating point number with a 6-bit exponent and a 9-bit normalized fractional mantissa. The base of the scale factor is 2 and the exponent is represented in excess-31 format. Add the numbers A and B formatted as follows and write the answer in normalized form.

A = 0 10001 11111110

B = 0 10001 11111110

5. How does one execute a computer instruction in a step by step process ?
6. What is mean by Hazards ?
7. State the functions of a bootstrap loader.
8. A two way set associative cache memory uses blocks of four words. The cache can accommodate a total of 2048 words from main memory. The main memory size is $128k \times 32$. What is the size of the cache memory ?
9. What is busy waiting ?
10. Define cycle stealing.

PART – B (5 × 16 = 80 Marks)

11. (a) (i) Describe in detail about the evolution of Computers. (8)
- (ii) What is the purpose of using stack in the CPU ? Explain how it is implemented. (8)

OR

- (b) (i) A digital computer has 16 registers, each is of 32 bits. They are connected by a common bus which is constructed with multiplexers.
 - (1) How many selection inputs are there in each multiplexer ? (3)
 - (2) How many multiplexer are there in the bus ? (3)
 - (3) What sizes of multiplexers are needed ? (2)
 - (ii) What is opcode ? Explain the instruction code format in detail. (8)
12. (a) Explain the floating point add/sub rule ? Write a detailed flowchart and explain how Floating Point addition/subtraction is performed.

OR

- (b) (i) Compare Hardwired control from Microprogrammed control. (8)
- (ii) Explain the standard form of floating point numbers. (8)

13. (a) Explain the different types of hazard encountered in a pipelined operation.

OR

(b) Describe how control signals are generated by a program that controls the operations in a computer. Write a combined micro routine that can implement the BGT (Branch if > 0), BPL (Branch if Plus) and BR (Branch Unconditionally) instructions. What is the total number of microinstructions required? How many microinstructions are needed if a separate micro routine is used for each machine instruction?

14. (a) Discuss the cache memories and performance considerations in memory system.

OR

(b) Write notes on :

(i) Secondary storage devices in detail.

(ii) Associate memories.

15. (a) (i) Differentiate between Memory mapped I/O, Interrupt-Initiated I/O and Isolated I/O. (6)

(ii) Explain the modes of Transfer with an example of programmed I/O. (10)

OR

(b) (i) Compare the characteristics of RISC and CISC. (6)

(ii) State the use of interrupt and explain in detail enabling and disabling interrupts. Also state how multiple devices are handled. (10)