No of Pages : 2 **Course Code : 15XW25**

Roll No:
(To be filled in by the candidate)

PSGCOLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, DECEMBER 2016

MSc - SOFTWARE SYSTEMS Semester : 2

15XW25 COMPUTER ORGANISATION

Time : 3 Hours **Maximum Marks : 100**

INSTRUCTIONS:

1. Answer **ALL**questions from GROUP – I.
2. Answer any **5** questions from GROUP – II.
3. Answer any **ONE** question from GROUP – III.
4. Ignore the box titled as **"Answers for Group III"** in the Main Answer Book.

GROUP - I **Marks : 10 x 3 = 30**

1. Express the following numbers in IEEE 754 single precision floating-point format:

   (i) $+46.5 * 10^{-2}$ (ii) -0.5×10^{4}

2. State the condition in which overflow occurs in case of addition & subtraction of two signed 2's complement number. How is it detected?.

3. Initially the register R has 1001 1100, which is –100 in decimal.Indicate the value of R and overflow flag, if the following micro operations are executed continuously?

   R ← shl R

   R ← shr R

4. A system has 48 bits of virtual address and 36 bits of physical address and 128 MB of main memory. If the system uses 4096 byte pages, how many virtual and physical pages can the address support? How many page frames of main memory are there?

5. What are the basic differences between a branch instruction, a call subroutine instruction, and program interrupt?`

6. Differentiate write through and write back methods in cache memory.

7. What is cycle stealing DMA operation?

8. What is the difference between vectored and non-vectored interrupts

9. What is microoperation? Give suitable examples of few four types ofmicrooperations.

10. How does a prefetch buffer help in instruction pipelining process?

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GROUP - II Marks : 5 x 10 = 50

11. Construct a single bit ALU to perform the arithmetic, logical and shift operations. Draw the circuit and the functional table .
12. a) Explain the functioning of a control unit with the help of a block diagram. Write a micro program for the fetch routine of the CPU.
    b) The content of the top of a memory stack is 5320. The content of the stack pointer SP is 3560. A two-word call subroutine instruction is located in memory at address 1120 followed by the address field of 6720 at location 1121. What are the content of PC, SP, and the top of the stack:
        i) Before the call instruction is fetched from memory?
        ii) After the call instruction is executed?
        iii) After the return from subroutine?
13. Explain how the logical address is translated into a physical address in the virtual memory system with a neat diagram. Explain the virtual memory address translation and TLB with necessary diagram.
14. Differentiate between synchronous and asynchronous communication. Illustrate the various ways in asynchronous communication is carried out .
15. State the need for DMA and explain the architecture of DMA interfacing an I/ O device to a processor.
16. a) What are interrupts? Explain different types of interrupts.
    b) How stack is implemented in a general microprocessor system.

GROUP - III Marks : 1 x 20 = 20

17. How does the CPU respond to an interrupt and explain different methods used for establishing the priority of simultaneous interrupts with suitable diagram.
18. Explain in detail the different methods of mapping used in Cache memory organization, with suitable examples. Show how the contents of the cache memory are initialized and the main memory is updated.

/END/

FD/JU