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By K B Hemanth Raj

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CBCS Scheme

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15CS44

Fourth Semester B.E. Degree Examination, June/July 2017

Microprocessors and Microcontrollers

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Explain execution unit (EU) and Bus interface unit (BIU) of 8086 μ p with a neat diagram. (08 Marks)
b. Explain the different addressing modes used in 8086 μ p with suitable example. (08 Marks)

OR

- 2 a. Explain all bits of flag register of 8086 μ p with a neat diagram. Show the setting and resetting of flag bits with a suitable example. (06 Marks)
b. Write an assembly level program (ALP) to add two bytes of data stored at data 1 and data 2 and save the result in sum with comments. Identify all the directives found in the program. (06 Marks)
c. Show the memory dump for the following data section or data segment. (04 Marks)

```
· DATA
  ORG 0010H
DATA 1 DB 25
DATA 2 DB 10001001B
DATA 3 DB 12H
        ORG 0020H
DATA 4 DB '2591'
        ORG 0030H
DATA 5 DW 9, 2, 7, 0CH, 00100000B, 5
        ORG 0040H
DATA 6 DW 4 DUP (00H)
```

Module-2

- 3 a. Explain Rotate instructions with suitable example. (06 Marks)
b. With a suitable program show how a packed BCD value is converted to ASCII value. (04 Marks)
c. Assume that there is a class of five people. With following grades: 69, 87, 96, 45, 75. Write an ALP to find the highest grade. (06 Marks)

OR

- 4 a. Write an ALP that adds the following two multiword numbers and saves the result:
Data 1 = 548FB9963CE7H and
Data 2 = 3FCD4FA23B8DH (08 Marks)
b. Write an ALP to perform the following :
i) Clear the screen
ii) Set the cursor at row 8 and column 5 of the screen.
iii) Prompt "There is a message for you from VTU : to read it enter Y. If the user enters 'Y' or 'y' then the message "Hello! All the best for your exams" will appear on the screen. If the user enters any other key, then the prompt "No more messages for you" should appear on the next line. (08 Marks)

Module-3

- 5 a. Explain handling of overflow problem arisen in addition of signed numbers with a suitable example. (06 Marks)
- b. Explain XLAT instruction with example. (04 Marks)
- c. Explain 74138 decoder configuration to enable the memory address F0000H to F7FFFH to connect four 8k RAMS. (06 Marks)

OR

- 6 a. Briefly explain the control word format of 8255 in I/O mode and BSR mode. Find the control word if PA = out, PB = in, PC0 – PC3 = in and PC4 – PC7 = out. Use port addresses of 300H – 303H for the 8255 chip. Then get data from port B and send it to port A. (08 Marks)
- b. Assume that we have 4 bytes of hexadecimal data: 25H, 62H, 3FH and 52H.
- Find the checksum byte
 - Perform the checksum operation to ensure data integrity.
 - If the second byte 62H had been changed to 22H. Show how checksum detects the error. (08 Marks)

Module-4

- 7 a. Differentiate between RISC and CISC processors. (06 Marks)
- b. Explain ARM core data flow model with a neat diagram. (06 Marks)
- c. Discuss briefly how coprocessors can be attached to ARM processor. (04 Marks)

OR

- 8 a. Explain the architecture of a typical embedded device based on ARM core with a neat diagram. (08 Marks)
- b. Explain the concept of pipeline and interrupts used in ARM processor. (08 Marks)

Module-5

- 9 a. Explain the following instructions of ARM processor with suitable example.
i) MLA ii) QADD iii) SMULL iv) LSL. (08 Marks)
- b. Write an ALP to copy a block of data (Block 1) to another block (Block 2) using ARM instructions. (08 Marks)

OR

- 10 a. Write an ALP using ARM instructions that calls subroutine fact to find factorial of a given number. (08 Marks)
- b. Write short notes on memory access and branch instructions of ARM controller. (08 Marks)

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