211A3

D   Total Pages   **2**

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SAINTGITS COLLEGE OF ENGINEERING
KOTTAYAM, KERALA
(AN AUTONOMOUS COLLEGE AFFILIATED TO
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER M.TECH. DEGREE EXAMINATION (R), MARCH 2021
VLSI AND EMBEDDED SYSTEMS

Course Code: 20ECVET107

Course Name: DESIGN WITH ARM MICROCONTROLLERS

Max. Marks: 60   **Duration: 3 Hours**

PART A
(Answer all questions. Each question carries 3 marks)

1. Explain embedded system model with neat diagram.
2. Differentiate between power on reset and brown out reset.
3. Distinguish between compilation and cross compilation
4. Differentiate between RISC based and CISC based processor design approach. Also state the disadvantage of RISC over CISC. How did ARM solve it?
5. Explain the concept of data alignment in ARM.
6. Find the content of the destination register after the execution of each of the given instructions, given the content of R5=0x85467220 and R2=4. i) MOV R3,R5,LSL #3 ii)MOV R6,R5,ASR R2
7. What is the necessity for having Memory Accelerator Module? How does it function?
8. What is the value to be entered in the PWPCR register for the following situations i) Single edge control for PWM3 ii) Double edge control for PWM3 iii) Single edge control for PWM1,2 and 3.

PART B
(Answer one full question from each module, each question carries 6 marks)
MODULE I

9. What do you mean by Embedded Systems Design and Development Lifecycle Model? What development models is this model based upon? Name and describe each of its phases.   (6)

OR

10. Differentiate between microprocessors and microcontrollers. Explain in detail the different classification of MCUs based on data word length with suitable examples.   (6)

MODULE II

11. What are the steps to be taken into consideration when there is the need to design systems which are power limited? Explain pull up and pull down resistors.   (6)

OR

12. Distinguish between SRAM and DRAM technology. Why is SRAM the preferred memory technology for cache?   (6)

211A3

MODULE III

13. Describe the steps in converting source file to an executable file with suitable examples. (6)

OR

14. With neat diagrams illustrate how to download the hex file to non-volatile memory. (6)

MODULE IV

15. Explain the features of ARM which have made it a very popular core in the high-end embedded market. Also explain the operating modes in ARM. (6)

OR

16. Write a brief note on the following registers in ARM i) General Purpose Registers (R0-R12), R13(Stack Pointer) , R14(Link Register) & R15 (Program Counter) ii)CPSR (Current Program Status Register) iii) SPSR (Saved Program Status Registers) (6)

MODULE V

17. Write an assembly program in ARM to find the sum of 3x+4y+9z where x=2,y=3 and z=4. Explain each instruction in detail. (6)

OR

18. Write an assembly program in ARM to do division using repeated subtraction. Explain each instruction in detail. (6)

MODULE VI

19. Write a C Program to design a timer for generating a symmetric square wave at pin P1.16 of an LPC214x MCU, using Timer 0. (6)

OR

20. Write a C program to generate an asymmetrical square wave at the lowest four pins of Port 0 in an LPC214x MCU. Calculate the value to be given in PWMMR0 and PWMMR3 to get a pulse train of period 5 ms and duty cycle of 25%. (6)

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