Embedded System

Question BANK

Section A

2 Marks Questions

1. Write down the main differences between Von Neumann and Harvard architecture.
2. What is "Thumb" in ARM processor?
3. Differentiate between assembler and compiler. What is IDE?
4. What is l2C bus? Write down its main features.
5. What is "Inline Assembly"? Explain with example . Mention its advantages and disadvantages.
6. Draw the Program Status Register and mention FLAG bits.
7. Differentiate between conditional jump and unconditional jump instructions
8. What is instruction pipelining and its use in programming?
9. What is "Pointer Aliasing", explain with an example.
10. What is key de-bouncing? How it is implemented in hardware?

Write briefly :

11. Interrupts
12. Instruction
13. PSR
14. BUS
15. Register
16. GSM
17. Function
18. Assembler
19. Sensors
20. LDA and STA Instructions

21. Which features does ARM have in common with many other RISC architectures?
22. Differentiate between CPSR and SPSR.
23. Explain the concept of thumb instructions in ARM processor.
24. Implement the statement x = (a+b)–c, using ARM instructions.
25. What is the WFI instruction used for?
26. Why exceptions are used in ARM processors?

27. Discuss the role of write-back cache in ARM processors.
28. What is Jazelle extension in ARM processors?
29. Draw the interfacing of 64KB *4 RAM and 32KB*4 ROM with ARM-7 processor? Show all relevant signals.
30. What is emulator?
31. What is a linker?
32. Differentiate between RISC and CISC.
33. What is AMBA?
34. Differentiate between ARM7TDMI and ARM8.
35. Explain the function of coprocessor.
36. What is the need of cache memory?
37. What do you mean by exception?
38. Explain the advantage of pipelining.
39. What do you mean by THUMB architecture?
40. What is CPSR?
41. What is a little Endian memory organization?
42. Differentiate between RISC and CISC
43. What is ARMsd.
44. Differentiate between ARM7TDMI and ARM8.
45. Explain the function of coprocessor.
46. Explain Privileged mode.

Section B

5 Marks Questions

1. Draw the architectural block diagram of ARM and explain data flow referring each unit.
2. Explain the working of "Barrel shifter" with an example instruction and diagram.
3. Explain the function of following instructions one by one:
   i) SUB r0, r1, #5
   ii) ADD r2, r3, r3, LSL, #2
   iii) LOR r0, [r1]
   iv) SWP r3, r2, [r1]
   v) ADDEQ r5, r5, r6
4. Mention useful techniques for optimizing ARM assembly, and briefly explain them.
5. Write down the process of 'DC Motor interfacing' with ARM Processor /microcontroller. Draw the circuit diagram and explain with help of flow chart/pseudo code. How will you change the direction of DC Motor?
6. Explain with help of diagram functions of various registers.
7. What do you mean by addressing mode? Describe any four.
8. Differentiate between call by value and call by reference in functions.
9. Write a program to generate pyramid of stars (*) using loop.
10. Differentiate between ADC and DAC.
11. Discuss the role of LI and L2 cache memories in ARM processor.
12. Assume that there is a byte-string of ASCII-encoded characters stored in memory starting at location STRING. It is terminated by the Carriage-Return character (CR). Write an ARM program to determine the length of the string and store the length in location LENGTH.
13. How C/C++ is useful in embedded system programming? Also mention the advantages of high level programming for embedded system.
14. How ZIGBEE can be interfaced with an ARM processor? Draw and explain an interfacing diagram.
15. Explain the need for a fast interrupt service and a normal interrupt service in ARM programmer model with proper diagram.
16. Explain the instruction MUL, SMLAL, CL, BX, BKPT.
17. Why does r15 give PC+8 in first cycle of an instruction and PC+12 in subsequent cycles on an ARM7?

18. Explain various co-processor instructions.
19. Explain the JTAG boundary scan organization with proper diagram.
20. Explain the ARM programmer model with proper diagram.
21. Explain various control flow instructions.
22. WAP to display “HELLO WORLD “on the display.
23. Explain the 3 stage pipeline ARM organization.
24. Write a note on ARM architecture variants.

Section-C

10 Marks Questions

1. Explain various operating models of ARM, what is coprocessor and how it works. Explain the working of MPU and MMU related memory.
2. What is an Interrupt? How many interrupts are there in ARM processor? Name them in order of their priority. Write down their vector addresses and their significance.
3. Consider a case study in which the analog data is acquired from a temperature sensor. Then the date in converted into digital using ADC and the value is displayed on an LCD through the microcontroller. Draw circuit diagram from this application and explain its working with help of flow-chart.
4. Describe the working of Stepper Motor and DC Motor.
5. Write a note on both: Instruction Scheduling and Register Allocation.
6. Discuss GSM Interfaces in detail.
7. Explain the importance of declaration static, extern, void, interrupt in embedded C.
8. Write an ARM program to find the larger of two 32-bit variables VALUE1 and VALUE2. Place the result in the variable RESULT. Assume the values are unsigned.
9. Using I/O lines, and a driver circuit, explain the operation to run a DC Motor. Also explain the interfacing of DC motor with an ARM processor by showing relevant interfacing diagram.
10. Write note on the following:
    a. Debugging tool
    b. GSM interface
11. Explain ARM7TDMI organization with all important features and extensions.

12. WAP to interface 2*16 LCD module with ARM 7.
13. Write note on Instruction Scheduling, IDE.
14. Explain ARM7TDMI organizational with all important features and extensions?
15. WAP TO INTERFACE stepper motor module with ARM7.