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**Question Paper Code: 41563**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Electronics and Instrumentation Engineering

14UEI603 - REAL TIME EMBEDDED SYSTEMS ARCHITECTURE

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The 8051 has \_\_\_\_\_ 16-bit counter/timers.  
(a) 1                      (b) 2                      (c) 3                      (d) 4
2. Match the following:  
1) TCON              (i) contains status information  
2) SBUF              (ii) timer/counter control register.  
3) TMOD              (iii) idle bit, power down bit  
4) PSW              (iv) serial data buffer for Tx and Rx.  
5) PCON              (v) timer/ counter modes of operation  
(a) 1->ii, 2->iv, 3->v, 4->i, 5->iii              (b) 1->i, 2->v, 3->iv, 4->iii, 5->ii  
(c) 1->v, 2->iii, 3->ii, 4->iv, 5->i              (d) 1->iii, 2->ii, 3->i, 4->v, 5->iv
3. MOV A, @ R1 will be  
(a) copy R1 to the accumulator  
(b) copy the accumulator to R1  
(c) copy the contents of memory whose address is in R1 to the accumulator  
(d) copy the accumulator to the contents of memory whose address is in R1
4. Which of the following commands will move the value at port 3 to register 2?  
(a) MOV P2, R3                      (b) MOV R3, P2  
(c) MOV 3P, R2                      (d) MOV R2, P3

5. The Harvard Architecture has
- (a) Separate program and data memory
  - (b) Unified data and program memory
  - (c) More memory than von Neumann architecture
  - (d) Less memory than von Neumann architecture
6. What are the essential tight constraint/s related to the design metrics of an embedded system?
- (a) Ability to fit on a single chip
  - (b) Low power consumption
  - (c) Fast data processing for real-time operations
  - (d) All the above
7. What is the directional nature of two active wires SDA and SCL usually adopted in I2C Bus for carrying the information between the devices.
- (a) Uni-directional
  - (b) Bi-directional
  - (c) Multi-directional
  - (d) None of these
8. The DMA transfers are performed by a control circuit called as
- (a) Device interface
  - (b) DMA controller
  - (c) Data controller
  - (d) Over looker
9. An interrupt that can be temporarily ignored is
- (a) Vectored interrupt
  - (b) Non-maskable interrupt
  - (c) Maskable interrupt
  - (d) High priority interrupt
10. Which of these is a digital input device?
- (a) pressure sensor
  - (b) servo
  - (c) button
  - (d) potentiometer

PART - B (5 x 2 = 10 Marks)

11. Port 0 be used as input output port? Justify.
12. Write a program to toggle all bits of P1 every 200ms.
13. Mention the typical characteristics of an embedded system.
14. What do you meant by bus arbitration?
15. What is preemptive and non-preemptive scheduling?

PART - C (5 x 16 = 80 Marks)

16. (a) With neat diagram, explain in detail about the block diagram of 8051 microcontroller. (16)

Or

- (b) Write an 8051 Program to send the two messages “Normal Speed” and “High Speed” to the serial port. Assuming that SW is connected to pin P2.0, monitor its status and set the baud rate as follows:

SW = 0, 28,800 baud rate

SW = 1, 56K baud rate

Assume that XTAL = 11.0592 MHz for both cases. (16)

17. (a) Write a program to interface liquid crystal display with 8051 microcontroller and display the message “Success”. (16)

Or

- (b) With the help of block diagram explain the interfacing of stepper motor with the 8051 MCU. (16)

18. (a) Explain in detail about the design process of automatic chocolate vending machine with suitable diagram. (16)

Or

- (b) Discuss in detail about the build process of embedded system. (16)

19. (a) Describe in detail about the serial communication using controller area network bus. (16)

Or

- (b) With suitable diagram, explain in detail about the parallel communication using ISA, PCI and PCI/X buses. (16)

20. (a) Discuss in detail about the different concepts of semaphores with necessary diagram. (16)

Or

- (b) Explain in detail about the interrupt latency and deadline. (16)

