28. a.	Show the operations of different branch and data transfer instructions used in PIC microcontroller with suitable examples.	10	2	3	1
	(OR)				
b.	Sketch the ARM NuvoTon Cortex (NUC140) block diagram and discuss the role of its major functional units.	10	2	3	1
29. a.	Explain the data transfer process involved in I2C communication protocol.	10	2	4	1
	(OR)				
b.	Interpret the role of sensors and communication protocol in IOT technology. Also discuss any one protocol used in IOT.	10	2	4	5
30. a.	Analyse the role of following in real time operating system				
	(i) Tasks and task states	5	2	5	1
	(ii) Re-entrancy and re-entrancy rules	5	2	5	1
	(OR)				
b.	Explain the following with respect to RTOS.				
	(i) Message queues	5	2	5	1
	(ii) Interrupt routine	5	2	5	1

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Reg. No.														

B.Tech. DEGREE EXAMINATION, JUNE 2022
Sixth Semester

18EEC308J – EMBEDDED SYSTEM DESIGN
(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:
(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours Max. Marks: 75

	Marks	BL	CO	PO

PART – A (25 × 1 = 25 Marks)
Answer **ALL** Questions

1. When 8051 wakes up then 0×00 is loaded to which register? 1 1 1 1
   (A) DPTR (B) SP
   (C) PC (D) PSW

2. Because of the multiplexed data/address lines of intel 8051 microcontroller the _____ 1 1 1 1
   (A) Chip is small and cheaper (B) Chip is smaller and costlier
   (C) Circuit becomes complex (D) Address and data signals are transferred simultaneously

3. The content of the accumulator after this operation is 1 1 1 1
   MOV A,#3Ah
   ORL A,#09h
   (A) 0011 1001 (B) 0000 1111
   (C) 0011 1011 (D) 0110 0110

4. The range of unsigned int in embedded C programming is _____ 1 1 1 5
   (A) –32768 to +32767 (B) 0 to 65535
   (C) –128 to +127 (D) 0 to 255

5. For multi-way decision, the compact alternative to ELSE-IF statement in embedded C is _____ 1 1 1 5
   (A) For loop (B) While loop
   (C) Do-while loop (D) Switch case

6. What is the correct execution process of an Arduino code? 1 1 2 5
   (A) Editor-preprocessor –compiler (B) Preprocessor –editor-compiler
   (C) Compiler-preprocessor-editor (D) Editor-compiler-preprocessor

7. What is the microcontroller used in Arduino UNO? 1 1 2 5
   (A) ATmega32114 (B) AT915AM3×8E
   (C) ATmega 2560 (D) ATmega 328P

8. _____arduino board contains an onboard joystick. 1 1 2 5
(A) Arduino nano (B) Arduino UNO
(C) Arduino esplora (D) Arduino due

9. Which Arduino board use the ATmega 2560 microcontroller? 1 1 2 5
(A) Arduino micro and due (B) Arduino nano and FiO
(C) Arduino mega and mega ADK (D) Arduino Uno and robot

10. What is the operating voltage of ATmega 328? 1 1 2 5
(A) 1.9 V to 5 V (B) 1.8 V to 5.5 V
(C) 1.1 V to 5 V (D) 12V to 9 V

11. In PIC microcontroller, real time clock design can be used for _____ applications. 1 1 3 1
(A) Data logging (B) Process monitoring
(C) Interrupt handling (D) Rebooting

12. Which of the following is not the bit of STATUS register? 1 1 3 1
(A) DC (B) CY
(C) RPO (D) FSR

13. The PIC 16C6X/7X has _____program counter. 1 1 3 1
(A) 8 bit (B) 11 bit
(C) 12 bit (D) 13 bit

14. ARM processor is a _____device. 1 1 3 1
(A) 8 bit (B) 16 bit
(C) 4 bit (D) 32 bit

15. The program counter is implemented using _____in the ARM processor. 1 1 3 1
(A) Caches (B) Heaps
(C) General purpose register (D) Special purpose register

16. The RS232 protocol is also known as _____ 1 1 4 1
(A) UART (B) SPI
(C) Physical interface (D) Electrical interface

17. Which of the following is the most commonly used buffer in the serial porting? 1 1 4 1
(A) LIFO (B) FIFO
(C) FILO (D) LILO

18. The USB device follows_____structure. 1 1 4 1
(A) List (B) Huffman
(C) Hash (D) Tree

19. Which signal is used to select the slave in the serial peripheral interfacing? 1 1 4 1
(A) Slave select (B) Master select
(C) Interrupt (D) Clock signal

20. The following one is not the characteristics of IOT. 1 1 4 5
(A) Self-configuring (B) Dynamic and self-adapting
(C) Unique identify (D) Standalone infrastructure

21. The problem of priority inversion can be solved by _____ 1 1 5 1
(A) Priority inheritance protocol (B) Priority inversion protocols
(C) Priority selective protocol (D) Priority mask protocol

22. Time required to synchronized switch from the context of one thread to the context of another thread is called 1 1 5 1
(A) Threads fly-back time (B) Jitter
(C) Context switch time (D) Latency

23. In a real time system the computer results_____ 1 1 5 1
(A) Must be produced within a specific deadline (B) May be produced at any time
(C) May be correct (D) Depends on user input

24. Antilock brake system, flight management, pacemakers are examples of _____ 1 1 5 1
(A) Safety critical system (B) Hard real time system
(C) Soft real time system (D) Safety critical system and hard real time system

25. The amount of memory in a real time system is generally _____ 1 1 5 1
(A) Less compared to PCs (B) High compared to PCs
(C) Same as in PCs (D) They do not have any memory

PART – B (5 × 10 = 50 Marks) Marks BL CO PO
Answer **ALL** Questions

26. a.i. Point out the different arithmetic and logical instructions used in 8051 microcontroller. 7 2 1 1

ii. Differentiate microprocessor and microcontroller. 3 2 1 1

(OR)

b. Breakdown the different functional statement used in embedded C programming with suitable example. 10 2 1 5

27. a.i. Survey the various applications of Arduino development board. 5 2 2 5

ii. Prioritize the use of Arduino shielding boards in the development board. 5 2 2 5

(OR)

b. Appraise the features of following functions in Arduino programming.
(i) Advanced I/O functions 6 2 2 5
(ii) Analog and digital I/O 4 2 2 5