

B.Tech. DEGREE EXAMINATION, JUNE 2023
Sixth Semester

18ECE204J – ARM - BASED EMBEDDED SYSTEM DESIGN
(For the candidates admitted from the academic year 2018-2019 to 2021-2022)

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 & Part - C** should be answered in answer booklet.

Time: 3 hours

Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Marks BL CO PO

Answer **ALL** Questions

- | | |
|---|------------------|
| 1. The type of instruction that has a feature to improve the performance and code density with executions done by using a branch instruction is _____. | 1 1 1 1 |
| (A) Conditional execution (B) Variable execution
(C) Pipelining (D) Register transfer execution | |
| 2. Any instruction that is applied on the register r_0 can be equally well applied to any of the registers from $r_0 - r_{13}$. This property of ARM is called as _____. | 1 2 1 1 |
| (A) Equality (B) Orthogonality
(C) Pipeline (D) Condensed | |
| 3. The 16 bit instruction of ARM processor is called as _____. | 1 1 1 1 |
| (A) Thumb instruction (B) ARM instruction
(C) Jazele instruction (D) Java byte code | |
| 4. The type of architecture with a combined data and instruction memory is _____. | 1 2 1 1 |
| (A) ARM (B) Thumb
(C) Von Neumann (D) Harvard | |
| 5. The worst case quantization error in an ADC is half of _____. | 1 2 2 3 |
| (A) Reference voltage (B) Resolution
(C) Number of binary digits-n (D) Accuracy | |
| 6. The hexa code to display 0 using 7 segment LED is _____. | 1 3 2 3 |
| (A) 0x78 H (B) 0x07 H
(C) 0x 3F H (D) 0x80 H | |
| 7. Value of resistors used for pull up in I2C interface is _____. | 1 3 2 3 |
| (A) 1.4 – 3.7 k Ω (B) 2–4 k Ω
(C) 1–3 Ω (D) 2.2–4.7 k Ω | |

8. SCL stands for _____.
 (A) Start clock (B) Serial clock
 (C) Stop clock (D) Service clock
9. In LCD interfacing RS-register select =0 stands for _____.
 (A) Data register (B) Command register
 (C) Instruction register (D) Control register
10. _____ flag is used to check the controller status in LCD interfacing.
 (A) Available (B) Status
 (C) Busy (D) Check
11. In locate (X,Y) function X,Y _____.
 (A) Gets display cursor position (B) Finds display cursor position
 (C) Resets display cursor position (D) Sets display cursor position
12. An ultrasound signal of 40 kHz is to be digitized. Recommend the minimum sampling frequency.
 (A) 20 kHz (B) 40 kHz
 (C) 80 kHz (D) 10 kHz
13. The memory which does not retain its data when power is removed is called _____.
 (A) Non volatile (B) Volatile
 (C) Flash (D) Dynamic memory
14. Which of the following is the fastest means of memory access for CPU?
 (A) Registers (B) Cache
 (C) Main memory (D) Virtual memory
15. The approximate communication range for class 1 Bluetooth devices is _____.
 (A) 100 m (B) 10 m
 (C) 1000 m (D) 50 m
16. FAT stands for _____.
 (A) File append table (B) File access table
 (C) File allocation table (D) File assignment table
17. In the instruction PWM out sound (P21):P21 represents _____.
 (A) GND (B) VCC2
 (C) Input pin (D) Output pin
18. 200 Hz wave is a _____.
 (A) Regular 200 Hz sinewave (B) Regular 200 Hz cosine wave
 (C) Audio 200 Hz sine wave (D) Video 200 Hz sine wave
19. The order of the filter is given by the number of _____.
 (A) Passive components (B) Capacitor used
 (C) Frequencies used (D) Delays used

20. The value "note" represents notes on a piano keyboard which is a 1 1 5 1

- (A) 16 bit value
(C) 7 bit value

- (B) 10 bit value
(D) 8 bit value

PART – B (5 × 4 = 20 Marks)

Answer **ANY FIVE** Questions

	Marks	BL	CO	PO
21. Explain 5 shapes of pipelining in ARM cortex processor.	4	2	1	3
22. With suitable examples explain data processing instructions of LPC1768.	4	2	1	1
23. Write a program in MBED to glow red and green LED using switch input.	4	2	2	3
24. Briefly explain the functions associated with PWM on MBED.	4	1	2	1
25. Depict the Master – Slave configuration of I2C serial communication interface.	4	2	3	3
26. Write two functions and its format and summary of stdio library for accessing Data files with MBED.	4	2	4	1
27. Write a program on MBED to read MIDI messages and display key and velocity data to a host terminal application.	4	3	5	4

PART – C (5 × 12 = 60 Marks)

Answer **ALL** Questions

	Marks	BL	CO	PO
28. a. Explain ARM core data flow model with the deployment of ARM registers in user mode.	12	1	1	1
(OR)				
b. Explain the instruction set classification of ARM LPC1768 with suitable examples.	12	2	1	1
29. a. Explain the concept of seven segment displays and their working with proper hexadecimal codes and program in detail.	12	3	2	3
(OR)				
b. What is the significance of ADC in embedded systems? With necessary coding and functions explain how to interface ADC to LPC1768 MBED in detail.	12	2	2	3
30. a. How to communicate data synchronously using MBED controller? Explain the concepts and coding related to it in detail.	12	2	3	3
(OR)				
b. Explain the register formats associated with LCDs and also explain a code to display alphabets and characters in LCD.	12	3	3	4

31. a. How do you access data using external USB flash memory with MBED? 12 3 4 4
Explain in detail with necessary code.

(OR)

b. Elucidate on the concepts of Bluetooth in wireless data communication in detail. 12 3 4 3

32. a. Explain the concepts of Digital audio and the role of MIDI in MBED controller in detail. 12 4 5 3

(OR)

b. Implement a digital low pass filter in MBED and explain how it is used in digital audio filtering in detail. 12 4 5 3

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