PART – B (5 × 10 = 50 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
26. a.	Draw the design of a snack vending machine and justify it as an embedded system appropriately.	10	3	1	4
	(OR)				
b.	With necessary coding examples explain the various conditional statements in C language.	10	3	1	3
27. a.	With a neat sketch explain the successive approximation ADC.	10	1	2	1
	(OR)				
b.	How can you generate a PWM wave of different duty cycle? Explain in detail about the logic.	10	3	2	3
28. a.	Distinguish between ticker and timeout mode in mbed timer controller. With C code explain the implementation of these codes.	10	2	3	1
	(OR)				
b.	Draw a 16×16 bitmap image and divide pixels into 4×4 blocks and write a hex code to display check board pattern of the same. Explain the concept behind the graphic formation.	10	2	3	3
29. a.	How can you access data files in mbed controller? Explain the concepts and code related to it?	10	4	4	
	(OR)				
b.	Explain data communication using Zigbee in mbed microcontroller.	10	4	4	
30. a.	How is MIDI used to interface audio to mbed controller? Explain the interfacing concepts in detail.	10	5	5	
	(OR)				
b.	What is wav audio file? How do you interface wave audio files using mbed controller? Explain in detail.	10	5	5	

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Reg. No. | | | | | | | | | | | | | | |

B.Tech. DEGREE EXAMINATION, DECEMBER 2022

Sixth and Seventh Semester

18ECE204J – ARM-BASED 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

PART – A (25 × 1 = 25 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
1.	The type of instruction that has a feature to improve the performance and code density with execution done by using a branch instruction is (A) Conditional execution (B) Variable execution (C) Pipelining (D) Register transfer execution	1	1	1	1
2.	Which register is used as a stack pointer (SP) which stores the head of the stack in the processor mode of ARM architecture? (A) R1 (B) R13 (C) R14 (D) R15	1	1	1	1
3.	The type of architecture with a combined data and instruction memory is _____ (A) ARM (B) Thumb (C) Von Neuman (D) Harvard	1	2	1	1
4.	What will be output of instruction MOV r7, r5, LSL #2 when the input is r5=5 and r7 =8? (A) R7=20 (B) R7=24 (C) R7=25 (D) R7=23	1	2	1	3
5.	If-else structure in a program is a type of _____ (A) Data transfer instruction (B) Memory instruction (C) Branch instruction (D) Control instruction	1	2	1	1
6.	Wait_ms is a command used for _____ (A) Waits for number of milliseconds specified as int (B) Waits for number of milliseconds specified as float (C) Waits for number of microseconds specified as int (D) Waits for number of microseconds specified as float	1	1	2	1
7.	Pin numbers _____are configured as digital input and /or outputs in mbed microcontroller. (A) 1 to 26 (B) 5 to 30 (C) 21 to 40 (D) 15 to 23	1	1	2	1

8. In ADC the signals SC and EOC stands for _____ 1 1 2 1
   (A) Start conversion, end of conversion (B) Start conversion, end of code
   (C) Select conversion, end of conversion (D) Stop conversion, enable of conversion

9. Duty cycle of PWM is given as_____ 1 1 2 1
   (A) Pulse on time/(pulse off time + pulse period) (B) Pulse on time * 100/pulse off time
   (C) Pulse period * 100/pulse off time (D) Pulse on time * 100/pulse period

10. Fill in the missing line to display a sawtooth waveform 1 2 2 3

```
#include "mbed.h"
Analog out Aout(P18)
float i;
int main ( ) {
while (1) {
for (i=0; i<1;i=i+0.1){
wait (0.001);}}}
```

   (A) $A_{out} = 1$ (B) $A_{out} = 0$
   (C) $A_{out} = i$ (D) $A_{out} = 2$

11. In locate (x, y) function, x, y _____ 1 1 3 1
   (A) Gets display cursor position (B) Finds display cursor position
   (C) Resets display cursor position (D) Sets display cursor position

12. C time ( ) function in timer interface is used to _____ 1 1 3 1
   (A) Convert a tm structure to custom format human readable string (B) Converts a time stamp to tm structure
   (C) Converts a timestamp to a human readable string (D) Get the current time

13. Two commonly used techniques to identify external events by microcontroller are _____ 1 2 3 1
   (A) Time triggers and event triggers (B) Interrupts and polling
   (C) Context switching and nesting (D) Read and write

14. To display the digit 9 using seven segment LED which of the following hexacoode has to be entered 1 2 3 4
   (A) 5f (B) 64
   (C) Og (D) 6f

15. Assuming the speed of data transfer of *I2C* to be 100 Kbits/sec, how much time will it take you transferring one byte of data? 1 2 3 4
   (A) 1 µs (B) 0.7µs
   (C) 0.7µs (D) 2 ms

16. The memory which retains is data even when power is removed is called as _____ 1 1 4 1
   (A) Non volatile memory (B) Volatile memory
   (C) Resistive memory (D) Storage cell

17. What is the location of the internal registers of CPU? 1 1 4 1
   (A) Internal (B) On chip
   (C) External (D) Motherboard

18. DRAM has to be refreshed every few milliseconds, otherwise the information is _____ 1 1 4 1
   (A) Duplicated (B) Forwarded to next block
   (C) Archieved (D) Lost

19. _____is specifically intended to allow the mbed to utilize an external flash mass storage device on the USB bus. 1 2 4 1
   (A) USB host (B) Host API
   (C) USB host MSD (D) USB API

20. The approximate communication range for class 1 Bluetooth device is _____ 1 2 4 1
   (A) 100 m (B) 10 m
   (C) 1000 m (D) 50 m

21. MIDI note value 60 represents C4, which has a fundamental frequency of _____ 1 1 5 1
   (A) 21.63 Hz (B) 266.63 Hz
   (C) 251.63 Hz (D) 241.63 Hz

22. A S20 kHz-tick, attach-us (& S 20 kHz-task, 50) means _____ 1 1 5 1
   (A) To attach 50 us timer count (B) To attach subroutine to 50 us clock
   (C) T attach task to 50 us timer code (D) To attach task to 50 us tick

23. With many audio DSP systems, the analog output from the DAC is converted to a reconstructed signal by implementing an _____ this removes all steps from the signal leaving a smooth transition 1 1 5 1
   (A) Analog reconstruction filter (B) Rectifier
   (C) Regulator (D) PWM output

24. Filters can be designed to have different steepness of cut off attenuation to adjust the _____ 1 2 5 1
   (A) Bandwidth (B) Cut off frequency
   (C) Filters roll off rate (D) Band rejection

25. # defined buffer size 0×FF. What is the size of buffer in bytes? 1 2 5 3
   (A) 128 (B) 64
   (C) 256 (D) 512