VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)
CHENNAI

Continuous Assessment Test (CAT) – I AUGUST 2025

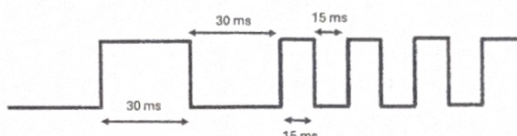| Programme	:	B.Tech.	Semester	:	FALL 2025-2026
Course Code & Course Title	:	BECE204L & Microprocessors and Microcontrollers	Class Number	:	CH2025260102180 CH2025260102220 CH2025260102217 CH2025260102214 CH2025260102190 CH2025260102212 CH2025260102210 CH2025260102208 CH2025260102193
Faculty	:	Dr. S. Revathi, Dr R Dhanush, Dr Kirankumar M, Dr Karthikeyan P R, Dr V R Balaji Dr.R.Saravana Kumar, Dr Balakrishnan Dr. J. Florence Gnana Poovathy , Dr Ravi Tiwari	Slot	:	G1+TG1
Duration	:	90 minutes	Max. Mark		50

General Instructions: < Use this space to provide additional information such as graph sheet, data book etc.>
- Write only your registration number on the question paper in the box provided and do not write other information
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks	CO	BT Level
1.		Enlist the difference between Von Neumann and Harvard architectures with neat diagram	5	1	K1
2.		The initial values stored in the registers of 8051 are given in Table 1.	10	3	K3

Table 1

Reg	Value	Reg	Value	Reg	Value
A	02H	R2	30H	R6	0FH
B	05H	R3	06H	R7	08H
R0	02H	R4	00H		
R1	ECH	R5	35H		

Check the program given in column 1 of Table 2 and answer column 2 and column 3. (Note: The register values will get updated after executing each instruction).

Table 2

	Addressing Mode	Output
MUL AB		
ADD A, R7		
SUBB A, 06H		
XRL 05H, #06H		
ORL A, @R0		

3.	In a school, 10 students have given their willingness to participate in an athletic event. Depending on their age and height, the students are segregated in 3 different Teams A, B & C as given in Table-3. The age of the 10 students are stored in memory location starting from 40H to 49H and their corresponding heights are stored in memory location starting from 50H to 59H. Write an assembly language program in 8051 to find number of students in Team-A, Team-B and Team-C and store the results in memory 60H, 61H and 62H respectively.	10	3	K3

Table-3

Team Name	Age	Height
A	Less than 07H	Less than 50H
B	Less than 07H	Greater than 50H
C	Greater than 07H	All height for this age group

4.	Generate a square pulse as shown below to control the speed of DC servomotor connected in port P1.2 with XTAL= 20 MHz. The square pulse must have one pulse of 60 ms duration followed by 3 pulses of 30 ms duration.	10	4	K3

5.	In a research lab at any time maximum of only 9 students are permitted to use the lab. There are two doors in the lab one for entry and other for exit. When a researcher approaches the entry door, the IR sensor attached to it will trigger external interrupt – 0 (INT0) and the controller will check for vacancy. If there is a vacancy the controller will check for 4-bit secret code to be entered through P1.0-P1.3. (The correct code is 1011). If the researcher enters correct code, the Green LEDs connected to P3.4-P3.7 will blink 3 times indicating the entry door open.

Similarly, the researcher can leave the lab only through exit door, which is attached with IR sensor that triggers external interrupt -1 (INT1) to the controller. The controller will check whether, he/she is the last researcher to leave. If he/she is last researcher to leave, the controller will check for status of all the instrument is OFF by ensuring switch connected to P0.0 is OFF. If this switch is ON, the alarm connected to P0.1 will beep (high to low) once, indicating instrument is ON. Either, if the switch is OFF or the researcher is not the last one to leave the lab a Green LEDs connected to P0.4-P0.7 will blink 3 times indicating the exit door opens.

Also, the controller will continuously send the number of vacancy available to port-2, by updating the number of entry and exit. If there is no vacancy inside the lab, a Red LED connected to P0.2 should glow, indicating lab is full.

Write an assembly language program in 8051 for the above scenario. | 15 | 4 | K3 |

**********All the best *************