

Total No. of printed pages = 3

**ECE 1816 OE 11**

216/23

Roll No. of candidate

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2023

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Azara, Hatkhowapara  
Guwahati - 781017

**B.Tech. 6<sup>th</sup> Semester End-Term Examination**  
**Electronics and Telecommunication Engineering**  
**ADVANCED MICRO CONTROLLERS**

(New Regulation (w.e.f. 2017-18) & New Syllabus (w.e.f. 2018 - 19))

Full Marks - 70

Time - Three hours

The figures in the margin indicate full marks for the questions.

Answer Question No. 1 and any *four* from the rest.

1. Answer the following (MCQ/ Fill in the blanks) (10 × 1 = 10)
- (i) Which of the following is an example of complex embedded system?  
(a) Printer (b) Washing machine  
(c) ATM Machine (d) All of the above
- (ii) Intel 8051 microcontrollers are based on-  
(a) CISC architecture (b) RISC architecture  
(c) Von Neuman architecture (d) Both option (a) and (c) are correct
- (iii) The base variant of Intel 8051 microcontrollers having-  
(a) 128 bytes of RAM and 40K bytes of ROM  
(b) 128 bytes of RAM and 4K bytes of ROM  
(c) 128 bytes of RAM and 256K bytes of ROM  
(d) None of the above
- (iv) The action of the instruction "CJNE A, Data, loop" is  
(a) Jump to loop if A ≠ Data (b) Jump to loop if A = Data  
(c) Jump to loop if A > Data (d) Jump to loop if A < Data

[Turn over

- (v) \_\_\_\_\_register is used to control the operation of TIMER0 and TIMER1 of 8051.
- (vi) The ARM LPC2 148 controller having \_\_\_\_\_number of ports.
- (vii) The PIC 16F877 controller having an ADC of \_\_\_\_\_ bit.
- (viii) The ARM stands for \_\_\_\_\_
- (ix) If the task deadline of an embedded system is completed within its deadline, then it is called \_\_\_\_\_ type of embedded system.
  - (a) Soft real time
  - (b) Hard real time
  - (c) Stand alone
  - (d) Networked embedded system
- (x) The first and foremost step for embedded product development life cycle is-
  - (a) Design
  - (b) Analysis
  - (c) Implementation
  - (d) None of the above

2. (a) What is Embedded Systems? Draw the architecture of Von -Neuman and Harvard architecture. (5)
- (b) Explain the different addressing modes of 8051 microcontrollers. (5)
- (c) Develop an assembly program for Intel 8051 to add first 10 natural numbers. (5)
3. (a) What will be the content of PSW after execution of the following program: (5)

```

SETB PSW.4
MOV R7, #27H
MOV 12H, #2EH
MOVA, 17H
ADD A, R2

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- (b) Explain the role of TMOD and SCON register in serial communication of 8051.  
Develop an assembly program to receive 8 bits data serially. The B.R for serial data transfer should be 9600 bits/sec. Assume crystal frequency 11.0592MHz. (10)
4. (a) Write a delay function for Intel 8051 controllers to generate a delay of 20ms using TIMER1. (Assume XTAL frequency=11.0592MHz). (5)
- (b) Write a program in C or assembly to interface a 5x7 dot matrix LCD (16x2) with 8051 controllers in 4-bit mode. Display your name in the first row and roll number in the second row. (5)
- (c) Draw the memory organisation of 8051. (5)

5. (a) Explain and draw the architecture of PIC 16F877 microcontroller. (5)  
(b) What is the use of IODIRx, IOSETx, IOCLR<sub>x</sub>, IOPIN<sub>x</sub> and PINSEL<sub>x</sub> register in ARMLPC2 148 controller? (5)  
(c) Write an embedded C program for ARMLP2148 controller to toggle port 0. (5)
6. (a) Compare OS and RTOS. Describe in brief account types of RTOS. (6)  
(b) Discuss the Embedded product development life cycle and its importance. (6)  
(c) Define process, thread and task. (3)
7. Write short note on any *three*: (3 × 5 = 15)
- (a) Embedded systems Vs General computing systems.  
(b) Interrupt of 8051 microcontrollers.  
(c) Multiprocessing in RTOS.  
(d) Iterative Model in embedded system development.

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