

**J-21-0104**

**B. Tech EXAMINATION, 2021**

Semester VI (CBCS)

ADVANCED MICROCONTROLLERS FOR  
EMBEDDED SYSTEMS

EC-601

*Time : 2 Hours*

*Maximum Marks : 60*

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*The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.*

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**Note :** Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. 9 is compulsory.

**Section A**

1. (a) What is an Embedded System ? Give classification of Embedded System. **7.5**

- (b) Define fixed point and floating point arithmetic operation in embedded system. **7.5**
- 2. (a) Define the architecture of ARM Cortex-M processor with block diagram. **7.5**
- (b) Define the addressing mode of ARM Cortex-M processor. How does the processor differentiate between data and the address ? **7.5**

### Section B

- 3. What are interrupts in the microcontroller ? Define various types of interrupts in microcontroller. **15**
- 4. What is parallel I/O programming ? Define the types of I/O programming of microcontroller. **15**

### Section C

- 5. (a) Define the following parameters of I2C protocol :
  - (i) Data transfer rate
  - (ii) Number of fields
  - (iii) Addressing bits
  - (iv) Application. **7.5**
- (b) Define UART protocol with suitable diagram. **7.5**

- 6. Define UART interface with synchronous and asynchronous mode. **15**

### Section D

- 7. (a) Define wireless sensor network. Explain different types of wireless sensor network. **7.5**
- (b) Compare the following networking technologies : Wi-Fi, Bluetooth and Zigbee. **7.5**
- 8. (a) What is CAN communication system ? Define it with block diagram. **7.5**
- (b) What is IoT ? Define TCP-IP model of IoT. **7.5**

### (Compulsory Question)

- 9. (a) Why are there so many buses on the ARM Cortex-M processor ?
- (b) Write any *two* features of SPI protocol.
- (c) Draw the formats of synchronous and asynchronous data communication.
- (d) What is Zigbee network ?
- (e) What are the differences between real time software and convention software ? **3×5=15**