

AMIETE – ET (Current & New Scheme)

Time: 3 Hours

DECEMBER 2018

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

- Hazards in pipelined stages are of
(A) Two types (B) Three types
(C) Four types (D) Five types
- When multiple-instructions are overlapped during execution of program, then function performed is called
(A) Multitasking (B) Multiprogramming
(C) Hardwired control (D) Pipelining
- Instruction being read from memory using address placed in PC and then is placed in IF/ID pipeline register in,
(A) Instruction Fetch stage (B) Instruction Decode stage
(C) Execution (D) Memory Access
- When control change is unconditional, then instruction we use is
(A) Branch (B) Jump
(C) Call (D) Transfer
- Big Endian byte order putting byte having address
(A) Least significant position (B) Middle significant position
(C) Registry (D) Most significant position
- Width of object like a double-word will be having a size of
(A) 2 bytes (B) 4 bytes
(C) 7 bytes (D) 8 bytes
- Example/s of general-purpose RISC architectures is/are
(A) MIPS (B) PowerPC
(C) SPARC (D) All of these

- h. RTOS is used in most embedded systems when the system does
 (A) concurrent processing of multiple real-time processes
 (B) sequential processing of multiple processes when the tasks have real time constraints
 (C) real time processing of multiple processes
 (D) the concurrent processing of multiple processes, tasks have real time constraints and deadlines, and high priority task preempts low priority task as per the real time constraints.
- i. Sophisticated embedded systems development requires
 (A) IPs and several ASIPs,
 (B) IPs and several ASIPs, and hardware-software co-design
 (C) multi-core processors
 (D) system on chip with large memory
- j. Besides the main microcontroller in digital camera, the following processors are used in digital camera to enable taking pictures with higher resolution of 4 or 6 M Pixel within required time interval
 (A) single purpose processors —CCD signal processor, CODEC and pixel display processor
 (B) single purpose processors— graphic and display processors
 (C) DSPs
 (D) embedded processors

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

- Q.2** a. What is the embedded system? List and define the three main characteristics of embedded systems. (8)
- b. Discuss the factors for selection of DSP processor for Embedded System. (8)
- Q.3** a. Design a Greatest Common Divisor (GCD) Custom Single Purpose Processor. Start with the functional computing results, translate into state diagram and sketch a part data path. (8)
- b. Explain the Top to Down Embedded System Design flow methodology (8)
- Q.4** a. Explain the successive approximation method of ADC and the resolution of DAC. (8)
- b. Draw the interfacing diagram of Stepper Motor controller. Explain operations with block diagram. (8)
- Q5** a. Draw the Block diagram of the Cache Memory organization. Explain the Read operation in Cache memory with an example. (8)
- b. Explain the tradeoffs of Memory Write Ability and Storage Permanence. (8)

- Q.6** a. Explain and draw the block diagram of Universal Asynchronous Receiver Transmitter (UART) (8)
- b. Explain Direct Memory Controller used for Peripheral to memory transfer. (8)
- Q.7** a. What is the function of Scheduler in Real Time Operating System? Also explain the task states in brief with an example. (8)
- b. Discuss the semaphore execution flow with suitable diagram. (8)
- Q.8** a. What is RTOS? Explain whether it is necessary to use RTOS in the embedded system or not? (8)
- b. Discuss the advantage of Software Programming in Assembly languages and High Level languages. (8)
- Q.9** a. Write the different methods to achieve the power saving in embedded system design. (6)
- b. Explain the hard-real time scheduling consideration in RTOS. (6)
- c. Discuss the advantages and disadvantages of using to many tasks (4)