Roll No……..….. **Total No. of Printed Pages: 1**
Total No. of Questions: [09]

B. Tech. ECE (Semester – 6th)
EMBEDDED SYSTEMS
Subject Code: BECED1613
Paper ID: [18111331]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a. Define an embedded system.

b. What is the role of a Real-Time Clock (RTC) in embedded systems?

c. Briefly explain the purpose of a Watchdog Timer.

d. Mention advantages of using a model train controller in embedded system design.

e. Briefly describe the embedded system design process.

f. What is embedded networking?

g. Differentiate between serial and parallel buses.

h. State the role of the CPU bus in embedded systems?

i. What is the purpose of program linking?

j. What do you mean by program validation?

Section – B **(5 marks each)**

Q2. Explain the importance of DMA in an embedded processor.

Q3. Discuss the role of co-processors in enhancing CPU performance.

Q4. What is RS232 communication standard? Also, compare RS422 and RS485 communication protocols.

Q5. Discuss software performance optimization in embedded systems.

Q6. Describe the main features and applications of the CAN bus in embedded systems.

Section – C **(10 marks each)**

Q7. a) Explain the operation of an In-Circuit Emulator (ICE) and its importance in embedded systems.

b) Discuss the components needed for embedded program development and explain different models of programs.

Q8. Provide an in-depth analysis of the ARM processor, covering its architecture and suitability for embedded systems.

Q9. a) Describe the structure and function of device drivers, including their role in handling communication protocols such as SPI and I2C.

b) Explain how compilation techniques affect program performance in embedded systems.