



R20 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 3E5DC

B.Tech V Semester Regular Examinations, January 2023

INTRODUCTION TO EMBEDDED SYSTEMS

(Professional Elective)

(Electronics and Communication Engineering)

Maximum Marks: 70

Date: 23.01.2023 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Define embedded systems.
- 2 What is a design metric?
- 3 What is a single-purpose processor?
- 4 Distinguish between a combinational circuit and a sequential circuit
- 5 List the RT-Level component.
- 6 What is main difference between general purpose processors and single-purpose processor.
- 7 Define the following terms: concurrent processes, real-time systems.
- 8 Distinguish between model vs language.
- 9 Name five service providers for cell phones in India
- 10 Name the types of Robots.

Part-B

Answer All the following questions.

(10MX 5=50Marks)

- 11 A. Discuss the main characteristics of the embedded system.
B. What are the design metrics used commonly used? Discuss each. [5+5]
- 12 A. What is a "market window" and why is it so important for products to reach the market early in this window?
B. What are the benefits of using each of the three different IC technologies? [5+5]
- 13 Design GCD as a custom single purpose processor. [10]
- 14 Design a soda machine controller, given that a soda costs 75 cents and your machine accepts quarters only. Draw a black-box view, come up with a state diagram and state table, minimize the logic, and then draw the final circuit. [10]
- 15 A. Discuss about the selection of a microprocessor for use in an embedded system.
B. Illustrate the concept of pipelining. [5+5]

OR

- 16 A. What is the role of development environments in embedded system design in the selection of a processor?
B. Draw the General-purpose processor basic architecture and explain each block. [5+5]
- 17 A. Discuss the Concurrent state machines (HCFSM) with example.
B. Write a short note on Concurrent process model. [5+5]
- OR
- 18 Describe the Elevator Controller Using Program-state machines (PSM) model. [10]
- 19 A. List out the fundamental blocks of a mobile phone and explain the function of each block.
B. Describe the strategy for designing an Autonomous Robotic system. [5+5]
- OR
- 20 Draw the Block diagram of a brain-machine interface and write about the non-invasive method and the invasive method of brain signal reading? [10]