

B.E. Instrumentation Engineering (Model Curriculum) Semester-VIII
IN804M-II - Core Elective-II : Embedded System for Instrumentation

P. Pages : 2

Time : Three Hours



GUG/W/23/14367

Max. Marks : 80

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- Notes :
1. All questions carry marks as indicated.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) What are some of the applications of embedded systems, and how do these systems improve efficiency and productivity in various industries? **8**

b) Name any 4 on chip peripherals in AVR microcontroller and explain their working? **8**

OR

2. a) Explain some of the key embedded design concepts and definitions, including hardware-software co-design, real-time operating systems, and system-on-chip (SOC) architectures. **8**

b) Discuss the hardware and software design and testing processes for embedded systems, including the use of simulation tools, debugging techniques, and verification methods. **8**

3. a) What is assembly language programming, and how is it used to program AVR microcontrollers? **8**

b) Explain the concept of interrupts in AVR microcontrollers, and discuss some examples of how interrupts are used in embedded systems. **8**

OR

4. a) Describe some common peripherals and interfaces available on AVR microcontrollers, such as timers, analog-to-digital converters, and serial communication interfaces. **8**

b) What is an AVR microcontroller, and what are some of its key features and advantages over other microcontrollers? **8**

5. a) How does a microcontroller communicate with an external device using its I/O ports? Give an example and explain with diagram. **8**

b) List the on-chip peripherals in AVR Microcontroller and What are the advantages of using on-chip peripherals in microcontrollers? **8**

OR

6. a) What is a power-down mode in a microcontroller? How is it different from other modes of operation? Draw and explain the configuration register with it. **8**

b) Explain the function of a Watch-Dog Timer in a microcontroller. What happens when it is triggered? Give a real-time example on it. **8**

7. a) What is the purpose of a serial port in microcontrollers? Draw and explain the registers used for Serial communications. **8**
- b) What is PWM, Draw and explain the registers used to program the PWM pin, and where is it used in microcontrollers? **8**

OR

8. a) What are interrupts, and how are they programmed in microcontrollers? Give an example of an interrupt-driven program. **8**
- b) How are timers programmed in microcontrollers? Explain with an example. Write steps to program Timer(). **8**
9. a) Draw and explain what is process management, and how is it implemented in an operating system? **8**
- b) Explain the concepts of tasks and task states in a real-time operating system. **8**

OR

10. a) What are timer functions, and how are they used in an RTOS environment? **8**
- b) How are interrupt routines handled in an RTOS environment Explain in brief? **8**
