(2 ½ Hours) **[Total Marks: 60]**

N.B: (1) **All questions are compulsory.**
(2) **Figures to the right indicate full marks.**
(3) **Assume additional data if necessary but state the same clearly.**
(4) **Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.**
(5) **Use of calculators and statistical tables are allowed.**

Q.1	Attempt **any two** of the following:	**(12)**
a)	Define and explain the terms 'NRE Cost' and 'Renaissance Engineer' with reference to embedded system design.	**6**
b)	Write a short note on 'mailboxes', 'pipes', and 'queues' used in Embedded System as data structure.	**6**
c)	Discuss the TWO strategies used for limiting the duration of an unbounded priority inversion in real-time embedded operating systems.	**6**
d)	Write a note on RTOS.	**6**
Q.2	Attempt **any two** of the following:	**(12)**
a)	Explain Real Time Methods in detail.	**6**
b)	Compare C and Assembly Language (Any Four Differences). State need of mixing C and Assembly Language for Embedded Programming.	**6**
c)	Explain advantages and disadvantages of Super Loops and Software delays.	**6**
d)	Write a short note on preprocessor directives used in embedded C.	**6**
Q.3	Attempt **any two** of the following:	**(12)**
a)	What do you mean by Data Acquisition Systems? Draw a suitable block diagram and explain each component of it, in detail.	**6**
b)	With suitable block diagram, explain how to interface LCD to the 8-bit output port.	**6**
c)	Explain Blind counting synchronization and Gadfly Busy waiting in details.	**6**
d)	How to interface keyboard to I/O ports of embedded systems. Explain with a block diagram.	**6**
Q.4	Attempt **any two** of the following:	**(12)**
a)	Write a note on FLASH Code memory and EEPROM Memory.	**6**
b)	With reference to ATMEL microcontrollers explain the role of MCUCR and GIMSK peripherals?	**6**
c)	Explain the configuration of Timer_ 2 to generate delay of 500 msec.	**6**
d)	Write a note on Digital Camera.	**6**
Q.5	Attempt **any two** of the following:	**(12)**
a)	What is the need of Memory optimization in Embedded Systems?	**6**
b)	Explain Non-Preemptive Context switching and Preemptive Context Switching.	**6**
c)	How will you differentiate Macros and Functions?	**6**
d)	Explain Timer_1 with structure in details.	**6**

****

72993