(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)	Explain and differentiate the concept of non-preemptive vs. preemptive kernel, used in embedded operating systems.	6
b)	Explain a term DEADLOCK situation in RTOS, and hence what are the different strategies used to deal with it.	6
c)	Give details for Embedded processing element with type, Single-Purpose Processors? Also give TWO examples in brief.	6
d)	List a pair of design metrics that may compete with one another, for better embedded systems development.	6
Q.2	Attempt **any two** of the following	(12)
a)	Discuss the need for memory optimization in an embedded system.	6
b)	Explain the concept and use of super-loop used in an embedded C program? With its advantages and disadvantages	6
c)	"C" programming is preferred over other programming, during embedded system programming". Justify the statement	6
d)	Compare and contrast the implementation of embedded systems through hardware v/s software perspective.	6
Q.3	Attempt **any two** of the following	(12)
a)	Explain different ways to synchronize /interface I/O devices with microcontroller.	6
b)	Explain Data Acquisition Systems, in detail?	6
c)	Draw & explain '8-switch interfacing with interrupt facility' with microcontroller.	6
d)	Explain the need and implementation of high-speed memory for embedded systems.	6
Q.4	Attempt **any two** of the following	(12)
a)	With reference to ATMEL, explain the role of GIMSK and MCUCR peripherals?	6
b)	With reference to ATMEL, explain the peripheral for ADC with bitwise specification.	6
c)	Write a note on SPI peripherals in atmel microcontroller.	6
d)	Explain the configuration of Timer_0 to generate delay of 400 msec.	6
Q.5	Attempt **any two** of the following	(12)
a)	Explain the build & load process for embedded application programs	6
b)	Differentiate between C and Assembly language. Hence explain why we need to mix C and Assembly Language while writing application program for embedded systems.	6
c)	With suitable diagram, explain LCD interfacing with microcontroller.	6
d)	Write a note on watchdog timer.	6

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