Reg. No.								

B.E. /B.TECH.(FULL TIME) DEGREE END SEMESTER EXAMINATION APRIL / MAY 2011

BIOMEDICAL ENGINEERING BRANCH.

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SIXTH SEMESTER

EC9081 - MICROCONTROLLER ENGINEERING

(Regulations 2008)

Duration: 3 Hrs. **Max. Mark:100**

Answer All Questions.

Part A **10 X 2 = 20 Marks.**

1. Give the difference between RISC and CISC processor.
2. Give the role of CCP module available in PIC Microcontroller.
3. Give the flags available in R8C Microcontroller.
4. Explain the PWM available in R8C Processor.
5. Give the difference between hard real time and soft real time systems.
6. What is Hardware software Co-design?
7. What is the function of Cross Compiler?
8. What is the role of operating system in embedded software development?
9. Draw the circuit diagram for interfacing stepper motor using microcontroller.
10. Draw the schematic to interface RTC, EEPROM and ADC with a microcontroller using I2C Bus.

Part B **5 X 16 = 80 Marks.**

11(a)(i). With a neat block diagram explain the architecture of R8C 16 bit Microcontroller. (8 Marks).

(ii). Briefly explain the on chip peripherals available in R8C Microcontroller. (8 Marks).

12(a). Briefly explain the ADC Programming in the PIC 18F458 microcontroller. (16 Marks).

(OR)

12(b). With a neat diagram explain the Timer/Counter programming in PIC 18F458 microcontroller.(16 Marks).

P.T.O

(b) (i) Consider two random processes $X(t) = 3\cos(\omega t + \theta)$ and $Y(t) = 2\cos(\omega t + \varphi)$ where $\varphi = \theta - \frac{\pi}{2}$ and θ is uniformly distributed random variable over $[0, 2\pi]$. Verify that $|R_{XX}(\tau)| \leq \sqrt{R_{XX}(0)R_{YY}(0)}$. (8)

(ii) Show that Random process $X(t) = A\cos(w_0 t + \theta)$ is WSS, if A and w_0 are constants and θ is Uniformly distributed random variable over θ to 2π. (8)

15. (a) (i) If the power spectral density of a wide sense stationary process is given by

$S_{XY}(\omega) = \begin{cases} \frac{b}{a}(a - |\omega|), & |\omega| \leq a \\ 0, & |\omega| > a. \end{cases}$. Find the autocorrelation function of the process. (8)

(ii) Let $Y(t)$ be the output of a Linear system with impulse response $h(t)$, when $X(t)$ is applied as input. Show that $S_{XY}(\omega) = H(\omega)S_{XX}(\omega)$. (8)

(OR)

(b)(i) The cross power spectrum of real random process {X(t)} and {Y(t)} is given by

$S_{XY}(\omega) = \begin{cases} a + jb\omega, |\omega| < 1 \\ 0, elsewhere \end{cases}$. Find the Cross Correlation function. (8)

(ii) The autocorrelation function of the random binary transmission $X(t)$, is given by

$R(\tau) = \begin{cases} 1 - \frac{|\tau|}{T} & if\ |\tau| < T \\ 0, & otherwise \end{cases}$. Find the power spectrum of the process $X(t)$. (8)