M.E. Extc Sem I (CBGS).
Embedded Systems – 5/6/14.

(REVISED COURSE)
(3 Hours)

QP Code : BB-19469
[Total Marks: 80

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** questions out of remaining **five** questions.
(3) Assume **suitable** data wherever required with justification.
(4) **Figures** to the **right** indicate full marks.

1) For a Network router draw the system diagram (minimum system) and data flow diagram Explain the need of following system requirements to make it Real-time: a. Hardware Requirements b. Software requirements c. Task partition d. Need and type of scheduler e. Release time, deadline & execution time of tasks. **20**

2) A. Explain the interrupt structure of Mixed Signal Processors. **10**

B. Explain the pipeline performance issues of an ARM processor. **10**

3) A. Compare non Real Time Operating System versus RTOS. **10**

B. What is mail box? How it passes message during inter process communication? List theldifference between mail box and pipe. **10**

4) A. Draw and explain the operating modes and states of ARM Processor. **10**

B. List various internal bus interfaces of ARM Processor and explain their Performance issues. **10**

5) A. Write a program and explain ARM and THUMB interworking. **10**

B. Explain THUMB architecture. **10**

6) Explain any **four** of the following: **20**

A. Sensor interface I2C bus
B. ICE Debugging features
C. Write equivalent ARM code : if (a==0) func(1);
D. Saturation Arithmetic
E. RMA algorithm

ME EXTC I Digital Signal Processing & Application
26|5|May 2014 (BG)

QP Code : **BB-19448**

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question No.**1** is **compulsory**.
(2) Attempt any **three** questions from the remaining **six** questions.
(3) Assume any **suitable** data wherever **required** but **justify** the **same**.
(4) **Figures** to the **right** indicate **full** marks.
(5) **All** questions carry **equal** marks.

1. (a) What is dead band of a filter ? **5**
(b) Obtain polyphase decomposition of IIR system with transfer function :— **5**

$$H(Z) = \frac{1 - 3Z^{-1}}{1 + 4Z^{-1}}.$$

(c) Give the various steps involved in the parametric estimation process. **5**
(d) What are the advantages of DSP processors in relation to general purpose processors ? **5**

2. (a) The desired response of low pass filter is :— **10**

$$Hd\left(e^{jw}\right) = \begin{cases} e^{-j3w} & -\frac{3\pi}{4} \le w \le \frac{3\pi}{4} \\ 0 & \end{cases}$$

Determine $H(e^{+jw})$. For M = 7 using hamming window.
(b) How can energy density spectrum be determined for a discrete time signal ? **10**

3. (a) Discuss various architectures for a digital signal processors. **10**
(b) Obtain FIR linear-phase and cascade realizations of the system for M = 7 with system function : **10**

$$H(Z) = (1 + 0{\cdot}5Z^{-1} + Z^{-2})\,(1 + 0{\cdot}25Z^{-1} + Z^{-2})$$

4. (a) Explain power spectrum estimation using Welch method. **10**
(b) Design a Butterworth Low pass filter for the following specifications : **10**
(i) Pass band gain required = 0·9
(ii) Frequency upto which passband gain must remain more or less steady = 100 rad /sec.
(iii) Gain in attenuation band = 0·4
(iv) Frequency from which attenuation must start = 200 rad /sec.

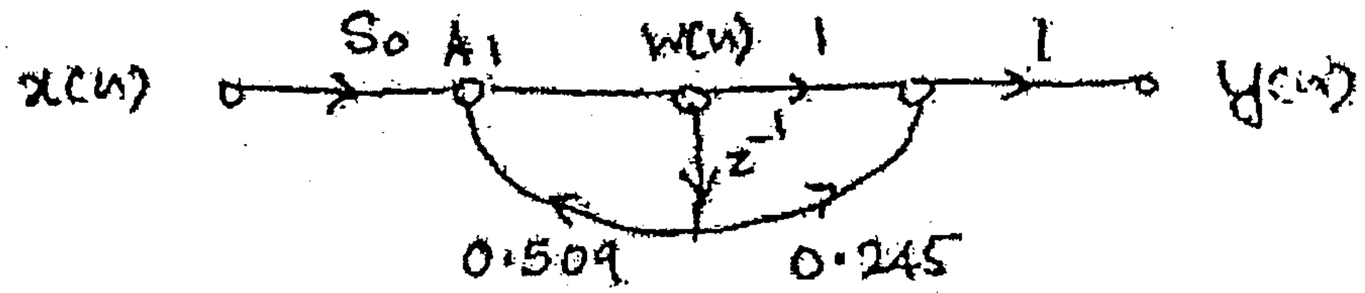
5. (a) Draw and explain the architecture of sixth generation TMS 320 C6X processor. **10**

(b) A digital system is characterized by the transfer function H(Z) using impulse in variant transformation technique for analog system function :— **10**

$$H(s) = \frac{1}{(s + 0{\cdot}5)\left(s^2 + 0{\cdot}5s + 2\right)}.$$

6. (a) Discuss the Audio applications of DSP. **10**

(b) For the digital network shown, find the transfer- function H(z) and scale factor 'So' to avoid overflow in register Al'. **10**



———S———

M.E SEM I (EXTC) (CBGS)
S.S.A 13/05/14

QP Code : **BB-19442**

(3 Hours) **[Total Marks : 80**

N.B. : (1) Attempt **four** questions out of **six**.
(2) **All** questions carry **equal** marks.
(3) Assume **suitable** data, if required and state it **clearly**.

1. (a) Consider random amplitude sinusoidal with period T. 20

$$x(t) = A\cos\left(2\pi t/_T\right)$$

Is X (t) cyclostaionary ? WSS ?

(b) A certain test for a perticular cance is known to be 90% accurate. A person submits to the test and the results are positive. Suppose that the person comes from a population of 1,20,000, where 2,000 suffer from the dicease. what is the probability that person under test has that perticular cancer.

(c) Define with examples in communication engineering WSS and Ergodic processes.

(d) Write short note on "Elements of queueing system".

2. (a) The random variables X and Y have joint pdf. 10

$$f_{x,y} = 2 * e^{-(x+y)} \quad 0 \le y \le x < \infty$$

Find the pdf of Z = X + Y. Note : X and Y are not independent.

(b) State and prove Chapman-Kalmogrove equation. 10

3. (a) The random variables X and Y have joint pdf. 10

$f_{xy} = C(1-X-Y)$ for the values of X and Y bounded by the triangle as shown.

Outside triangle f_{xy} is zero. Find (i) C (ii) $f_x(x)$ (iii) $f_y(y)$

(b) Explain Markov chain.

(c) Explain Central limit theorem.

Con. 11466-14.

[TURN OVER

4. (a) On an average working communication system fails once in a month. Average Repair is 5 days. if the equipment is working at time t = 0; find the probability that the instrument is working at a later time t, assuming constant failure and repair probabilities in time dt. If the above problem is applied to 5 equipments working at time t = 0, find probability of all working at a later time. Assume equipments are independent of each other for there failure and repair. **10**

(b) Find optimul casual filter for estimating Z (t) from the observation X (t) = Z (t) + N (t) where Z (t) and N (t) are independent random processes. N (t) is zero mean white noise with noise density and Z (T) has PSD **10**

$$Sz(f) = \frac{2}{1+4\pi^2 f^2}$$

Find the wiener optimum filter.

5. (a) Let x_n be sequence of iid gaussian randon variables with zero mean and Variance σ^2. Find the joint pdf and autocovariance of the corresponding sum process at time n1, n2. **10**

(b) Write short note on PSD and its properties. **10**

6. (a) Show that the sum of n Poissons variables is also a Poisons variable. **5**

(b) Write detailed note on Kalman Filter. **10**

(c) Explain M/M/1 queing system. **5**

ME | EXTC | I

2015 | 2014

OFC (CBGS)

QP Code : BB-19446

(3 Hours) **[Total Marks : 80**

N.B. (1) Question No. 1 is **compulsory.**
(2) Attempt any **three** out of **five** questions.
(3) Assume suitable data wherever necessary and justify the same.

1. (a) Explain frequency chirping in detail. **5**
   (b) Explain the method to mitigate effect of FWM in optical fiber communication. **5**
   (c) What are the various losses in optical fiber? **5**
   (d) Derive equations for numerical aperture and total number of modes in optical fiber. **5**

2. (a) Derive the wave guide equation for an optical fiber. **10**
   (b) With a neat sketch explain the working of an optical modulation. **10**

3. (a) What are different types of nonlinearity? Explain any two. **10**
   (b) Explain the different phenomena responsible for signal degradation as the light wave propagates through an optical fiber? **10**

4. (a) State the principal of EDFA and state its application. Draw neat labeled diagram. **10**
   (b) Explain the principle of resonant cavity enhancement detector? Compare RCE schottky photodiode and RCE avalanche photodiode. **10**

5. (a) Explain any one optical fiber network topology. **10**
   (b) A lithium Niobate modulator designed for operation at wavelength of 1.3 μm is 2cm long with a distance between the electrode of 25 μm. Determine the voltage required to provide a phase change of π radians given that the electro optic coefficient for lithium Niobate is 30.8×10^{-12} mv^{-2} and refractive index is 2.1 at 1.3 μm. **10**

6. Write short notes on any **two**:- **20**
   (a) SONET.
   (b) Optical switch.
   (c) Photonic crystal fibers.
