TE/INST/Sem-VI(CBSGS)/Process Instrumentation System/May-2017

Q.P. Code :09985

Duration: 03 Hrs. **Total Marks: 80**

Note:

Q. No 1 is compulsory

Attempt any THREE questions from Q No 2 to Q No 6.

Q.1) Attempt Any Five **20 M**

a.Explain with Example Process Lag and Distance Velocity Lag.

b. Why Pneumatic instrumentation is preferred in processing plants?

c. Explain Dead Time process & Smith predictor compensator.

d. State significance of process control actions.

e. Compare Feed forward Vs. Feedback control system

f. Explain in brief Relative gain analysis.

Q. No 2)

a. Explain With a neat sketch working of pneumatic PID controller. **10 M**

b. Explain Dynamic Elements and inverse response behavior of a process control Loop. **10 M**

Q. No 3)

a. What is Controller? Give classification & explain working of ON OFF controller. State drawbacks of the same. **10 M**

b. Explain with suitable example Split Range Control scheme. **10 M**

Q. No 4)

a. Explain Block Diagram Analysis for MIMO system. **10 M**

b. Explain Dynamic behavior of Second order interacting & Non interacting systems. **10 M**

Q. No 5)

a. Why Tuning is required? Explain process reaction curve method. 10 M

b. Explain with a suitable Example cascade control scheme. 10 M

Q. No 6 Write Short Notes on (Any Four) 20 M

a. Relay based Tuning.
b. Reset wind up.
c. Override control.
d. Self Regulation & Non self-Regulation characteristic.
e. Gain Margin and Phase Margin.

INST / Sem - VII [CBSGS] / T3426 / T0873 POWER ELECTRONICS AND DRIVES / May - 2017

Q.P. Code :13025

[3 Hours] [Total Marks: 80]

N.B.
1. Question no.1 is compulsory.
2. Solve **any three** from the remaining.
3. Assume data wherever necessary.

1. Solve the following questions. [20]
   a) Define holding current and latching current of SCR.
   b) Explain the function of freewheeling diode.
   c) List out the applications of choppers and SMPS.
   d) Draw and explain fan regulator.
   e) Explain RC snubber circuit.

2. a) Explain 1 φ full controlled rectifier with inverting and rectifying mode. [10]
   b) Explain boost converter with neat waveforms. [10]

3. a) Explain parallel inverter with neat waveforms. [10]
   b) A full wave controlled rectifier with an inductive load is connected to a 120V source. The resistive portion of the load is equal to 10Ω. If the delay angle α is 30°, find: [10]
      1. The average voltage,
      2. avg. current,
      3. max load current,
      4. rms load current,
      5. The avg. current in each scr.
      6. The power supplied to the load.
      7. Form factor
      8. Ripple factor
      9. Efficiency.

4. a) Explain dielectric heating with example. [10]
   b) Explain Non Punch through IGBT. [10]

5. a) What are the different PWM techniques? Explain with neat waveforms. [10]
   b) Explain variable frequency speed control for AC drive. [10]

6. a) Differentiate between full converter and semiconverter and explain asymmetric semiconverter. [10]
   b) Explain Jones Chopper with neat waveform. [10]

E/Sem-VI/INST/CBSGS T3426 / T0874 DIGITAL SIGNAL PROCESING / MAY-2017

QP Code : 13491

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

N.B. : (1) Question No. **1** is **compulsory.**
(2) Attemt any **three** questions out of remaining **five** questions.
(3) Assume **suitable** data if **necessary.**

1. Answer the following any **four** :– **20**
   (a) Compare FIR and IIT filter
   (b) Determine the inverse DFT by using DIFFFT
   x[k] = {15 -5+4j 3 -5-4j}
   (c) Draw and explain block diagram of DSP processor
   (d) Compare the Impulse Invarianc and Bilinear Transformations
   (e) State and prove the circular time shift property of DFT.

2. (a) Perform circular convolution using DFT/IDFT **10**
   x(n) = {3 5 1 2} h(n) = {7 1 8 2}
   (b) Determine linear convolution using overlap save method **10**
   x(n) = {2 -1 3 1 -2 4 1 -3 -1 2 5 3}
   h(n) = {7 4 6}

3. (a) Explain Multirate signal processing. **10**
   (b) Find 8 point DFT of the given sequence using DIFFFT **10**
   x(n) = {3 1 6 2 1 5 8 4}

4. (a) For the following transfer function Draw Direct Form-I, Direct Form II, cascade and parallel **10**
   realization $H(z) = \frac{(z-0.2)(z-0.4)}{(z-0.1)(z-0.7)}$
   (b) A low pass filter has the following specifications **10**

$$0.8 \le \left|H\left(e^{jw}\right)\right| \le 1 \quad 0 \le w \le 0.2\pi$$

$$\left|H\left(e^{jw}\right)\right| \le 0.2 \quad 0.7\pi \le w \le \pi$$

find Filter order and cutoff frequency
   (i) by BLT method
   (ii) by IIT method used for design

[TURN OVER

5. (a) A low pass filter is to be designed with the following desired frequency response. 10

$$H_d\left(e^{jw}\right) = e^{-j3w} \quad , \quad -\pi/4 \le w \le \pi/4$$
$$= 0 \quad , \quad \pi/4 \le |w| < \pi$$

Determine the filter coefficients h(n), if the window used is hamming window.

(b) If x(n) = {7 5 9 2} find 10

(i) DFT of x(n)

(ii) Using result obtained in (i) and not otherwise find the DFT of the following sequences

1. x(n-1)
2. x(n-3)
3. x(-n)
4. $x_1(n)$ = {7 -5 9 -2}

6. (a) Frequency response of a filter is given by an expression 5

$h(e^{jw}) = e^{-j3w}[2+1.6\cos 3w+1.4\cos 2w+0.6\cos w]$ find impulse response h(n) of the filter.

(b) The transfer function of analog filter is $h(s) = \dfrac{1}{(s+1)(s+3)}$ 5

Find H(z) using Impulse Invariance method.

(c) Derive the DITFFT algorithm for N = 6 = 3.2 10

TE / INST / Sem-VI / [CBSGS] T3426 / T0875 / APPLICATION OF MICROCONTROLLER-II / MAY-2017

Q.P. Code :13270

(3 Hours) [Total Marks :80]

N.B. 1) Question no. 1 is compulsory. Attempt any 3 questions out of remaining questions.

2) All questions carry equal marks.

3 Make suitable assumptions if necessary.

1		Solve following	20
	a	Define embedded system. What are characteristics of embedded system?	
	b	Interface a pushbutton key to PIC 18.Write a program to read the status of the key and send it to RC0.	
	c	Explain Interrupt latency.	
	d	Explain following PIC 18 instructions. 1. BCF 2. ANDLW	
2	a	Assume XTAL=10 MHz, write a PIC 18 program to generate square wave of 50 HZ. Use Timer1 with maximum prescaling.	10
	b	Explain programming logic for converting HEX data to ASCII. Write a program to convert 1 byte hex data to ASCII.	10
3	a	Explain memory organization of PIC 18 in detail.	10
	b	Explain design challenges of embedded systems	10
4	a	Interface 16x2 LCD to PIC18F. Write a program to display "INSTRUMENTATION" on line 1 and "ENGINEERING" on line 2.	10
	b	What are the features of ADC module of PIC18.Write a program to get data from channel0 of ADC and display the result on PORTC and PORTD	10

5 a Draw and explain interfacing of 8 bit DAC to PIC18.Write a program to generate triangular waveform **10**

b Interface 4 seven segment LEDS to PIC18 using multiplexed display technique. Write a program to display 2017 on these LEDs **10**

6 a What is task? What are different states of task? Explain various task scheduling algorithm **10**

b Explain PIC18F serial port. Write a program to send letter "A" continuously on serial port at 9600 baud. Assume crystal frequency is 8 Mhz. **10**

PIC18F4520 SFRS

Reg. Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
INTCON	GIE/GIH	PEIE/GIEL	TMR0IE	INT0IE	PBIE	TMR0IF	INT0IF	RBIF
INTCON2	RBPU	INTEDG0	INTEDG1	INTEDG2	——	TMR0IP	——	RBIP
INTCON3	INT2IP	INT1IP	——	INT2IE	INT1IE	——	INT2IF	INT1IF
T0CON	TMR0ON	T08BIT	T0CS	T0SE	PSA	T0PS2	T0PS1	T0PS0
T1CON	RD16	T1RUN	T1CKPS1	T1CKPS0	T1OSCEN	T1SYNC	TMR1CS	TMR1ON
T2CON	—	T2OUTPS3	T2OUTPS2	T2OUTPS1	T2OUTPS0	TMR2ON	T2CKPS1	T2CKPS0
ADCON0	——	—	CHS3	CHS2	CHS1	CHS0	GO/DONE	ADON
ADCON1	——	——	VCFG1	VCFG0	PCFG3	PCFG2	PCFG1	PCFG0
ADCON2	ADFM	——	ACQT2	ACQT1	ACQT0	ADCS2	ADCS1	ADCS0
TXSTA	CSRC	TX9	TXEN	SYNC	SENDB	BRGH	TRMT	TX9D
RCSTA	SPEN	RX9	SREN	CREN	ADDEN	FERR	OERR	RX9D
IPR1	PSPIF	ADIF	RCIF	TXIF	SSPIF	CCP1IF	TMR2IF	TMR1IF
IPR2	OSCFIF	CMIF	—	EEIF	BCLIF	HLVDIF	TMR3IF	CCP2IF
PIE1	PSPIE	ADIE	RCIE	TXIE	SSPIE	CCP1IE	TMR2IE	TMR1IE
PIE2	OSCFIE	CMIE	——	EEIE	BCLIE	HLVDIE	TMR3IE	CCP2IE
PIR1	PSPIP(1)	ADIP	RCIP	TXIP	SSPIP	CCP1IP	TMR2IP	TMR1IP
PIR2	OSCFIR	CMIP	——	EEIP	BCLIP	HLVDIP	TMR3IP	CCP2IP

Q. P. Code: 09761

Total Marks: 80

(3 Hours)

Note:

1. Question No.1 is compulsory
2. Solve any THREE questions out of remaining FIVE questions.
3. Figure to the right indicate full marks.

1 Attempt following. (20)

A. Explain hubs and routers .
B. Compare RS 232 and RS 422
C. Explain application layer of HART protocol.
D. Compare H1 and H2 segment of foundation field bus.
E. Mention the ISO-OSI layers along with their functions.

2. (a)Explain architecture of HART protocol in detail (10)

(b)Write detail information about Modbus. (10)

3. (a)Explain Profibus-DP in detail. (10)

(b)Explain CAN bus along with its application. (10)

4.(a) Compare WIFI,GPS and GPRS. (10)

(b)Explain Data highway plus in detail (10)

5. (a)Explain foundation field bus along with its advantages and disadvantages. (10)

(b)Explain different types of cable used in communication network along with its advantages and disadvantages (10)

6. Write a short note on: (20)

1. WiFi
2. GPIB
3. TCP/IP

E | Sem-VI (CBSGS) | INST | T3426 / T0877 ANYLYTICAL INSTRUMENTATION | MAY-2017

Q.P. Code :18632

[Time: Three Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Question.No.1 is compulsory.
2. Attempt any three questions from the remaining questions.
3. Draw neat block diagrams wherever necessary.
4. Assume suitable data, if needed.
5. Figures on the right indicate maximum marks.

Q.1 Attempt **any four** from the following. All questions carry equal marks. **20**

i. Give the statement of Beer Lamberts law and derive the mathematical equation for the same.
ii. Explain the basic principle of mass spectroscopy.
iii. Why do we need magnetic field in NMR spectroscopy?
iv. Draw and explain the working of a pulse height analyser.
v. What is electromagnetic radiation (emr)? Explain. Also write the mathematical equations for energy and wavelength of emr.

Q.2 A. Draw and explain working of Raman spectroscopy. **10**
B. Explain the working of prism and grating type of monochromators. **10**

Q.3 A. Draw and explain the working of Atomic absorption spectroscopy. **10**
B. Explain the working of a photomultiplier tube. **10**

Q.4 A. Explain the working of quadrupole type of mass spectrometer. **10**
B. Explain working of any one type of detector used in mass spectroscopy. **10**

Q.5 A. Give the classification of chromatography. Explain the working of a gas chromatograph. **10**
B. Explain the working of Geiger Muller counter. **10**

Q.6 Write short notes on **any two** from the following. **20**

A) Gas density analyser.
B) X ray absorption meter.
C) Flame ionization detector.
D) Paramagnetic oxygen analyser.
