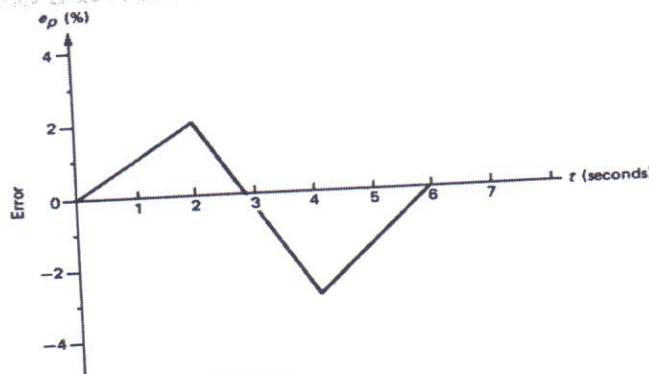


N.B:

- (1) Question No.1 is compulsory.
- (2) Answer any three questions from Question Nos. 2 to 6.
- (3) Assume suitable data if necessary.

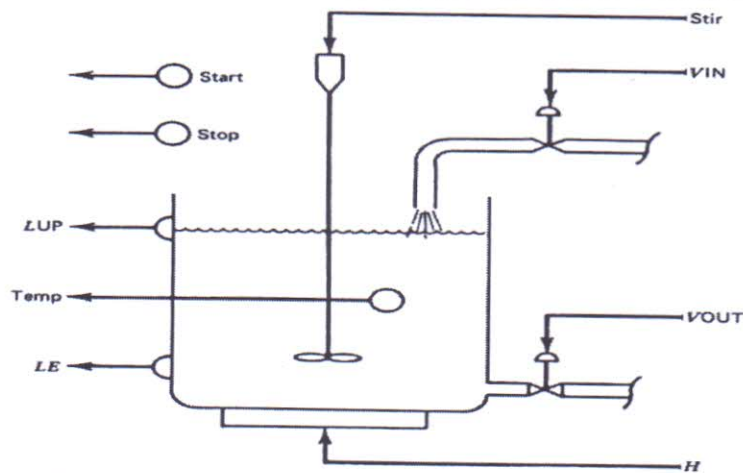
- 1 Answer any FIVE of the following questions:-
 - (a) Discuss the process characteristics. 20
 - (b) In the temperature measurement system, suppose the temperature range 20° to 120°C is linearly converted to the standard current range of 4 to 20 mA. What current will result from 60°C ? What temperature does 6.5 mA represent? 4
 - (c) Discuss the need of controller tuning and explain any one method. 4
 - (d) Draw and explain of cascade controller for CSTR. 4
 - (e) Explain the use of RGA in multivariable control. 4
 - (f) Discuss discrete state process control. 4
- 2 (a) Discuss dynamic behavior of first and second order systems. 10
- (b) For the error curve shown below, plot a graph of a PID controller output as a function of time. 10

$$K_p = 2.0, \quad K_i = 2.2 \text{ s}^{-1}, \quad K_D = 2 \text{ s}, \text{ and } p_i(0) = 40\%$$



- 3 (a) Differentiate electronic and pneumatic controller. 10
- (b) With example explain selective control scheme. 10

- 4 (a) Explain the advantages and disadvantages of F/B and F/F controller. 10
 (b) Discuss the need of adaptive controller and explain any one type adaptive controller. 10
- 5 (a) For the control problem shown in figure below, write the physical and programmed ladder diagram. The global objective is to heat a liquid to a specified temperature and keep it there with stirring for 30 min. The hardware has the following characteristics: 10
 1. START push button is NO, STOP is NC.
 2. NO and NC are available for the limit switches.



The event sequence is

1. Fill the tank.
2. Heat and stir the liquid for 30 min.
3. Empty the tank.
4. Repeat from step 1.

- (b) Discuss with example the batch and continuous process control. 10
- 6 Write short note on (any TWO):- 20
 (a) MRAC.
 (b) Elements of Process control.
 (c) Z-N method of PID tuning.
 (d) Ratio controller.

Sem - VI - CBSAC / NOV - 18

[3 Hours]

[Total Marks: 80]

NB. Q.1 is Compulsory.

Solve any three questions from the remaining
Assume suitable data if required and justify it.

Q.1 Solve the following

20

- Explain dynamic characteristics of SCR.
- Write advantages of IGBT and MOSFET
- Explain need of synchronizing circuit in converters
- Explain the effect of source inductance

Q.2

- What is the difference between series and parallel inverter? Explain the working of series inverter.
- Explain the current fed ac drives & state its applications

10

Q.3

- With the help of a neat diagram and associated waveforms discuss the operation of Buck-Boost converter. Also list the advantages and disadvantages of this type of converter.
- Explain variable frequency I.M. drive

10

10

Q.4

- Describe the working of 1phase fully controlled bridge with RL load.
- What are the different PWM techniques. Explain with neat waveforms

10

10

Q.5

- Explain the induction heating process with examples.
- Explain Step-up chopper with neat waveforms.

10

10

Q.6

- Design a dc power control circuit for input of 250V, 50 Hz, ac supply using SCRs and UJT trigger circuits for following requirements.
Dc output voltage variable = 75 to 110 V
Load resistance = 10Ω
The minimum supply voltage used for trigger circuit with temperature compensation is

20

Cμf	0.07	0.1	0.2	0.3
V _{BB}	18	16	14	13

UJT specifications are

$\eta_{\min} = 0.56$

$\eta_{\max} = 0.75$

$V_{BB\max} = 35V$

$I_p = 5\mu A$

$I_v = 4mA$

$V_v = 2V$

Sem-VI (CBSCS)

(3 Hours)

Q. P. Code : 37755

[Total Marks: 80]

N.B 1) Question number 1 is compulsory

2) Attempt any three questions out of remaining questions

3) Make suitable assumptions wherever necessary.

1 Solve Following

[20]

- a. How many ports are there in PIC18F452? What is the role of TRIS, LATCH and PORT registers in ports functioning?
- b. What is embedded system? List any four applications of it.
- c. Explain the following instructions of PIC18F with example
 - a. SWAPF b. CPFSLT c. RLNCF d. BTFSS
- d. Write a program to add two 8-bit numbers for PIC 18F.
- e. Write any eight important features of PIC18F452 microcontroller.

2 a What are design challenges of embedded system? Explain each in brief.

[10]

b Write a program to convert BCD number to ASCII with flowchart.

[10]

3 a Describe ADC module of PIC18. Write a program to read channel 1 and display result on PORTC and PORTD.

[10]

b Define task and explain different task scheduling algorithms.

[10]

4 a Draw an interfacing diagram of 4 seven segment LEDs to PIC18F. Write a program to display 1234 on it.

[10]

b Assuming crystal frequency is 10MHz, write a program to generate a square wave on Port C.0 with period of 10ms.

[10]

5 a What are the registers used in serial communication of PIC18F? Write a program to transfer 'W' continuously with baud rate of 9600 and crystal frequency of 10MHz.

[10]

b Write a program to add two 16 bit numbers with flowchart.

[10]

TURN OVER

6 a Explain the working of CCP module of PIC18F

[10]

b Describe working of I2C serial communication bus.

[10]

Reg. Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
INTCON	GIE/GIH	PEIE/GIEL	TMR0IE	INT0IE	PBIE	TMR0IF	INT0IF	RBIF
INTCON2	RBP	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	SEENB	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	PSPIF(1)	ADIP	RCIP	TXIP	SSPIP	CCP1IP	TMR2IP	TMR1IP
PIR2	OSCFIP	CMIP	---	EEIP	BCLIP	HLVDIP	TMR3IP	CCP2IP

Sem- VI CBSAS / OTR

[Time: Three Hours]

[Marks:80]

N.B:

1. Question.No.1 is compulsory.
2. Attempt any three questions from remaining five questions.
3. Assume suitable data wherever necessary

- | | | | |
|---|---|--|--------|
| 1 | a | Explain importance of session layer in OSI model. | 4×5=20 |
| | b | Describe Bust Mode of HART protocol. | |
| | c | Compare H1 and HSE segment of foundation Field bus. | |
| | d | What are different types of network topologies | |
| | e | Which standard is used for | |
| | | i. Wireless LAN ii GPRS iii Bluetooth iv ZigBee | |
| 2 | a | Draw and explain the TCP/IP model in detail. | 10 |
| | b | Explain the following network components and state in which layer of OSI model each of them work | 10 |
| | | I. Bridge | |
| | | II. Hub | |
| | | III. Router | |
| | | IV. Gateway | |
| | | V. Switch | |
| 3 | a | What is MODBUS and MODBUS Plus. | 10 |
| | b | Describe PROFI BUS-DP in detail | 10 |
| 4 | a | Discuss the OPC architecture with suitable diagrams. | 10 |
| | b | Explain different types of cables used in communication network along with its advantages and disadvantages. | 10 |
| 5 | a | Illustrate and explain the layered architecture of HART. | 10 |
| | b | What is satellite communication? Define uplink and downlink frequency? | 10 |
| 6 | | Write short notes on:- | 20 |
| | | I. GPIB | |
| | | II. Data Highway Plus | |
| | | III. CAN protocol | |
| | | IV. Advantages and Disadvantages of Field Bus | |