TE/INST/SEM-VI/C-2019/DEC.2023

**[Time: 3 Hours]** **[Marks: 80]**

---

Note:
1) Question 1 is compulsory.
2) Solve any THREE from remaining & assume suitable data wherever necessary.

Q1: Attempt any four. 20 M

a) What is Hazardous area in a typical chemical factory? Give classification.

b) Explain with suitable diagram basic Distillation equipment and accessories.

c) What is boiler? Explain swelling and shrinking effect in a water drum boiler.

d) Draw and explain drying curve.

e) Explain crystallization process and draw the influence of degree of supersaturation on nucleation & growth.

Q 2:

a) Explain with suitable diagram crystallizer operation with indirect heating. 10M

b) Explain with suitable sketch bypass control schemes for Heat exchanger. 10M

Q 3:

a) Explain various techniques used to reduce explosion hazards. 10M

b) Explain Feedback control for evaporator system 10M

Q 4:

a) Explain with suitable sketch basic refinery processes 10M

b) Explain temperature control system for distillation column to obtain product composition 10 M

Q 5:

a) Explain the construction and working of THREE element boiler feedwater control. 10 M

b) Derive steady state model for double effect evaporator. 10 M

Q 6 : Write a short note of any two. 20 M

a) Air dryer and its control

b) Temperature control of reactor

c) Instrumentation and control schemes for Iron and steel industry process

**********

P. CODE
38010

**Paper / Subject Code: 89402 / Digital Signal Processing**

TE | Sem-VII | INST | C-2019 | Dec-2023

[ Marks:80 ]

[Time:3:00 Hrs ]

**Please check whether you have got the right question paper.**

**N.B:**
1. **All question are compulsory.**
2. **Attempt any three Question from remaining five Question.**
3. **Assume suitable data if necessary.**

Q 1. Answer the following (Any four) 20

a) Draw and explain the block diagram of DSP processor.
b) Find the following signed in energy or power also find its energy or power. x(n)=u(n)
c) Find the inverse DFT of following $x(k) = [6 - 1 - j\ 0 - 1 + j]$
d) Draw the pole zero plot and transfer function of i) Comb filter ii) Notch filter
e) Find the liner convolution $x(n) = [1\ 2\ 3\ 4]\ h(n) = [1\ 2\ 2\ 1]$

Q 2. a) Find the DFT of following sequence $x(n)$ by using DITFFT algorithm 10
$x(n) = [1\ 2\ 2\ 3\ 3\ 2\ 1\ 4\ ]$

b) Find the z transfer of $h(z)$ for all possible Roc condition. 10

$$H(z) = \frac{z^2+\frac{1}{2}z}{z^2-\frac{1}{6}z-\frac{1}{6}}$$

Q 3. a) Find the Circular eonvolution of following by using DFT and IDFT 10
$x=[n] = [1,3,2,4]$ $h(n)[2,1,1,2]$

b) A low pass filter has the desire response as given below 10

$H_d(e^{jw}) = e^{-j2w}$ $0 \le w \le \frac{\pi}{4}$

$0$ $\frac{\pi}{4} \le w \le \pi.$

Determine the filter coefficent $h(n)$ also find Frequency response of it.

Q 4. a) Design Digital filter(Butterworth) to meet following specification 10

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

$|H(e^{jw})| \le 0.2$ $0.6\pi \le w < \pi$

Find the filter order and cut off frequency
i) By using BLP.
ii) By using IIT.

b) State any five properties of DFT and Derive any two properties of it. 10

Q 5. a) Realize the system by using DF-I, DF-II, cascade and parallel from. Of realization, 10
$y(n) = +6y(n-1) - 8y(n.2) + x(n) + x(n-1)$

b) Find the DFT of Two sequences by using DFT of Two sequences by using DFT only once. 10
$x(n) = [1\ 3\ 2\ 1]$
$x(n) = [4\ 3\ 1\ 2]$

Q 6. a) Explain Engineering application of DSP processor. 10

b) Find the following system is linear\nonlinear and time variant/invariant 10
1) $y(n) = x^2(n)$ 2) $y(n) = x(n) - x(n-1)$

**********

G.D.code

40303

INST / sem. VI / C-2019 / Industrial Data communication

**Paper / Subject Code: 89403 / Industrial Data Communication**

[TIME:3Hrs] [MARKS:80]

N.B:

1 Question 1 is compulsory

2 Attempt any three questions from remaining five questions

3 Assume suitable data wherever necessary

| | | | |
|---|---|---|---|
| Q.1 | a | Explain different communication Modes of HART protocol. | 5 |
| | b | Explain importance of physical layer in OSI model | 5 |
| | c | Elaborate operation of basic communication system | 5 |
| | d | Classify transmission media using tree diagram. | 5 |
| Q.2 | a | Compare AM, FM and PM in details | 10 |
| | b | Describe the complete OSI Model of TCP/IP Protocol suite. Discuss the function of each layer. | 10 |
| Q.3 | a | Describe PROFIBUS-PA and PROFIBUS - DP in details | 10 |
| | b | Elaborate OPC architecture with suitable diagram | 10 |
| Q.4 | a | Elaborate the detailed HART Commissioning and Troubleshooting | 10 |
| | b | Explain AS-i and Devicenet Protocols with suitable example | 10 |
| Q.5 | a | Define uplink and downlink frequency in satellite communication. Explain how the satellite communications works. | 10 |
| | b | Explain the method of implementing fieldbus in the safe and hazardous area. | 10 |
| Q.6 | a | What do you mean by good network establishment? What is the selection criteria for the same. | 5 |
| | b | Give functioning details of RFID | 5 |
| | c | Discuss IOT and IIOT. Brief them with an examples | 5 |
| | d | How does noise affect to Phase Modulation and Frequency modulation? | 5 |

**********

P. Code 38488

TE | Sem-VI | INST | C-2019 | Dec-2023

Time: 3 hour | Max. Marks: 80

N.B (1) Question **No.1 is compulsory**

(2) Solve any **three** questions of remaining **five**

(3) Assume suitable data if necessary

| | | |
|---|---|---|
| **Q1** | **Solve any 4 from the following** | **5 marks each (20)** |
| A | List out duties of Database Administrator. | |
| B | Draw an ER diagram for library system | |
| C | List out various Data Control commands with suitable examples. | |
| D | Explain shadow paging concept in detail. | |
| E | Write a short note on Recoverability. | |

| | | |
|---|---|---|
| **Q2** | **Solve the following** | **10 marks each (20)** |
| A | Analyze data independence concept in the view of database management. | |
| B | Discuss various issues in query processing. | |

| | | |
|---|---|---|
| **Q3** | **Solve the following** | **10 marks each (20)** |
| A | Explain the ACID properties of transactions. | |
| B | Discuss Implementation of atomicity and durability with neat diagram. | |

| | | |
|---|---|---|
| **Q4** | **Solve the following** | **10 marks each (20)** |
| A | Discuss necessary and sufficient conditions for deadlock. Explain methods to handle deadlock. | |
| B | Design a table in 3NF and 4NF with suitable examples. | |

| | | |
|---|---|---|
| **Q5** | **Solve the following** | **10 marks each (20)** |
| A | Write a short note on query processing and optimization. | |
| B | Explain mapping cardinalities. For a binary relationship design possible mapping cardinalities. | |

| | | |
|---|---|---|
| **Q6** | **Solve the following** | **10 marks each (20)** |
| A | Enlist fundamental operations of relational algebra with suitable example. | |
| B | Explain advantages of relational models with suitable examples. | |

**********

Q. P.code.
35944

**Paper / Subject Code: 89407 / Biosensors and Signal Processing (DLOC)**

TE | sem-VII | INST | C-2019 | Dec-2023

**Time: 3hours** **Marks: 80**

**N.B.: 1) Question no one is compulsory.**

**2) Attempt any 3 from remaining.**

| | | | |
|---|---|---|---|
| **Q1** | Answer any 4 | 5 marks each | **20** |
| **a** | What is the function of Electrode Electrolyte interface? Sketch | | |
| **b** | Summarize on general block diagram of biomedical instrumentation | | |
| **c** | What is FDA in food industry? | | |
| **d** | How to reduce noise in a system? | | |
| **e** | Explain the principle of piezoelectric Transducer? | | |
| **f** | What is enzyme electrode? | | |
| **Q2** | Solve any Two | 10 marks each | **20** |
| **a** | Which principle is used in Glucometer to measure diabetes? Explain amperometric measurement | | |
| **b** | List the static characteristics of Biosensors. Explain linearity Repetability | | |
| **Q3** | Solve any Two | 10 marks each | **20** |
| **a** | State the number of strain gauges used in Quarter bridge. Explain how Measurement is done | | |
| **b** | Explain in detail agricultural application of Biosensor | | |
| **Q4** | Solve any Two | 10 marks each | **20** |
| **a** | Why is signal processing important? | | |
| **b** | Explain with equation Fast fourier Transform technique for signal processing | | |
| **Q5** | Solve the following | 10 marks each | **20** |
| **a** | Memorize what is Action Potential. Sketch it and explain depolarization , Repolarization, Absolute recovery period | | |
| **b** | Sketch how circulating currents are generated in shielded cable and how to eliminate. | | |
| **Q6** | Write Short notes on any 4 | 5 marks each | **20** |
| **a** | Liquid ion selective electrodes | | |
| **b** | Fiber optic cable | | |
| **c** | Clarks Electrode | | |
| **d** | Medical Application of Biosensor | | |
| **e** | Immunosensors | | |

**********

Q.P.code.
40684