

AR16

CODE: 16CE4034

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

IV B.Tech II Semester Regular & Supplementary Examinations, July-2021

AIR POLLUTION CONTROL

(Civil Engineering)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Classify the materials causing air pollution. Describe the methods adopted for air pollution control.
b) Distinguish between Natural and Artificial air pollution.
(OR)
2. a) Define Air pollution? And also Define the following popular terms of air pollution
i. Aerosol
ii. Smog
iii. Smoke
b) Distinguish between primary and secondary air pollution.

UNIT-II

3. a) Explain the various effects of air pollutants on animals
b) What do you mean by Green house effect? What are the substances responsible for that? Explain the remedial measures for mitigation.
(OR)
4. a) Explain the various important gases in air pollutants and how they affect mankind.
b) Write about effects of air treasures and Heat Islands

UNIT-III

5. a) Describe the procedure for monitoring of particulate matter (PM) using high volume air sampling method.
b) Explain procedure for stack monitoring for flue gases
(OR)
6. a) What is meant by Inversion? What are the factors that influence formation of inversion?
b) Discuss various options in detail to control Particulate emissions

UNIT-IV

7. a) What are the merits and demerits of electrostatic precipitators
b) Explain with a neat sketch, the principle, construction, and working of a settling chamber.

(OR)

8. a) Calculate the minimum size of the particle that will be removed with 100% efficiency from a settling chamber of size $7\text{m} \times 3\text{m} \times 1.5\text{m}$, designed for a flow rate of $4.4\text{ m}^3/\text{sec}$ at 75°C .
b) A cylindrical electrostatic precipitator of diameter 0.4 m is used for separating pulverized coal fly ash particles from a furnace gas stream. If the volumetric flow rate of the gas is $0.04\text{ m}^3/\text{sec}$, what will be the length of precipitator for obtaining a collection efficiency of 99.8% ? What percent change in electrode collection area is required to increase the collection efficiency from 99.9 to 99.96% ?

UNIT-V

9. a) Mention the common methods of control of gaseous contaminants and describe any of them in detail
b) What are the various wet methods of control of SO_2 ? Explain with a neat sketch,
how do you control SO_2 by Magnesium oxide scrubbing

(OR)

10. a) Write short note on the solvent used in the removal of toxic gas in industries.
b) What are the advantages and disadvantages of three way process and regenerative process.

AR16

CODE: 16EE4030

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

IV B.Tech II Semester Regular & Supplementary Examinations, July-2021

DIGITAL CONTROL SYSTEMS (Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

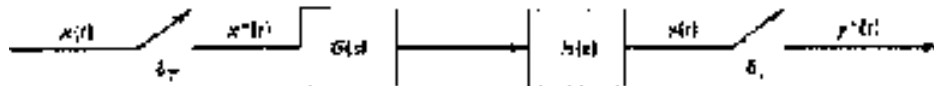
All parts of the Question must be answered at one place

UNIT-I

1. a) Draw the block diagram of digital control system and explain of each block. 7M
b) State and explain sampling theorem in detail 7M
- (OR)**
2. a) Derive the pulse transfer function of First order Hold 7 M
b) Explain the process of Reconstruction of a signal in Digital controller 7 M

UNIT-II

3. a) $X(s) = \frac{1 - e^{-Ts}}{s} G(s)$ 10 M
Obtain the Z- Transform for the function
where $G(s) = 10/(s+1)$
b) Elaborate the limitations of Z- Transform 4 M
- (OR)**
4. a) Obtain the pulse transfer function for the following system 10 M



- b) List any Four properties of Z- Transform 4 M

UNIT-III

5. a) Elaborate the necessary conditions for the system to be using Jury's stability test 5 M
b) Using Jury's stability criterion, determine the stability of the following discrete time systems. 9 M
 $Z^3 + 3.3Z^2 + 4Z + 0.8 = 0$

(OR)

6. A system described by the following state model. 14 M

$$X(k+1) = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} X(k) + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} U(k)$$

$$Y(k) = [3 \quad 4 \quad 1] X(k)$$

Test its i) State controllability ii) Observability

UNIT-IV

7. a) Experiments are conducted on system results a difference equation 9 M
 $X(K-2)-X(K-1)+X(K) = 2U(K-1)+U(K)$ obtain the Transfer function
 b) Elaborate the procedure to obtain the solution of State Space equation 5 M
(OR)
 8. Write the solution of time invariant discrete state equations by the Z 14 M
 transform method.

UNIT-V

9. a) A discrete system is given by 7 M

$$\begin{bmatrix} x_1(k+1) \\ x_2(k+1) \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1(k) \\ x_2(k) \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(k) \quad x_1(0)=x_2(0)=1$$

- Determine the state transition matrix
 b) Write the properties of state transition matrix. 7 M
(OR)
 10. obtain the canonical form of state model for the following pulse 14 M
 transfer function. $\frac{Y(z)}{U(z)} = \frac{z+1}{z^2+1.3z+0.4}$

AR16

CODE: 16ME4039

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

IV B.Tech II Semester Regular & Supplementary Examinations, July-2021

**POWER PLANT ENGINEERING
(Mechanical Engineering)**

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Write notes on (i) Flat Plate solar collector (ii) Parabolic collector. 7M
b) Explain with a neat sketch the working of horizontal wind mill. 7M
(OR)
2. a) List the advantages of solar power plant. 7M
b) What are the functions & use of wind mills? State different types of wind mills? 7M

UNIT-II

3. a) Explain with neat layout the working of cooling system in thermal power plant. 7M
b) Explain with neat sketch about Fluidised Bed Combustion (FBC) 7M
(OR)
4. a) Explain various types of coal available and their main characteristics. 7M
b) Explain with a neat sketch the working of chain grate stoker. 7M

UNIT-III

5. a) Explain the essential components of diesel power plant. 7M
b) Discuss the working of closed cycle gas turbines in detail. 7M
(OR)
6. a) Explain with a neat layout the Engine Cooling system of Diesel power plant. 7M
b) Write short notes on Fuels used in gas turbines, Pollution from gas turbines 7M

UNIT-IV

7. a) Discuss the factors considered in selecting a prime mover for a hydro-electric plant. 7M
b) How the nuclear reactors are classified? Discuss the advantages and disadvantages of pressurized water reactor. 7M

(OR)

8. a) At a particular site the mean monthly discharge is as follows:

Month	Discharge m ³ /s	Month	Discharge m ³ /s
Jan	100	July	1010
Feb	225	Aug	1250
Mar	350	Sept	950
Apr	600	Oct	600
May	750	Nov	400
June	800	Dec	200

7M

Draw the (i) Hydrograph and (ii) flow duration curve

- b) Describe with a neat sketch the construction and working of a BWR plant.

7M

UNIT-V

9. a) An undertaking consumes 12×10^6 KWh/year and its maximum demand is 4000 KW. It is offered 2 tariffs

i) Rs.100 per KW of maximum demand + 10paise per KWh.

7M

ii) A flat rate of 20 paise per KWh. Calculate annual cost of energy.

- b) List any three objectives and requirements of Tariff

7M

(OR)

10. a) A power station has to supply load as follows:

Load (MW)	35	95	65	110	60
Time (hours)	0-6	6-12	12-14	14-18	18-24

7M

Draw the load curve and load duration curve. Calculate the load factor and plant capacity factor.

- b) What is the difference between demand factor and diversity factor?

7M

AR16

CODE: 16EC4036

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

IV B.Tech II Semester Regular & Supplementary Examinations, July-2021

**RADAR ENGINEERING
(Electronics and Communication Engineering)**

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Derive the radar range equation. 7M
- b) Find the maximum range of radar whose transmitted power is 200kw. Cross-sectional area of the target is 10sq.m. The minimum power received is 1mw. The power gain of the antenna used is 2000 and the operating frequency is 3GHz. 7M

(OR)

2. a) What is meant by integration of radar pulses? Explain. 7M
- b) Write short notes on Minimum Detectable signal. 7M

UNIT-II

3. a) What is Doppler effect? Write the applications and limitations of CW radar. 7M
- b) Calculate f_d for a car travelling at a speed of 150 kmph with a CW radar of frequency 15 GHz. 7M

(OR)

4. a) Why the isolation is needed between the transmitter and receiver in CW radar. 7M
- b) Draw a block diagram of the FMCW radar and explain its operation. 7M

UNIT-III

5. a) With neat block diagram explain the operation of Non-coherent MTI radar. 7M
- b) Differentiate single -delay-line canceller and double-delay-line canceller. 7M

(OR)

6. a) Describe the operation of MTI Radar with power oscillator transmitter. 7M
- b) An MTI radar operates at 5 GHz with a PRF of 900 PPS. Calculate the three lowest blind speeds of this radar. 7M

UNIT-IV

7. a) Discuss how error signal is generated from sequential lobing. 7M
- b) Explain with the help of a block diagram amplitude comparison monopulse radars for extracting error signals in both elevation and azimuth. 7M

(OR)

8. a) Compare search and acquisition radars. 7M
- b) Write short notes on acquisition and scanning patterns. 7M

UNIT-V

9. a) Explain the characteristics of a matched filter receiver with necessary equations. 7M
- b) Draw and explain branch type duplexer. 7M

(OR)

10. a) Define Noise figure and noise temperature of a radar receiver and derive the expressions for it. 7M
- b) Write notes on Matched filter with Non-white noise. 7M

AR16

CODE: 16CS4032

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

IV B.Tech II Semester Regular & Supplementary Examinations, July-2021

HUMAN COMPUTER INTERACTION (Computer Science and Engineering)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- | | | |
|-------------|--|----|
| 1. a) | What is HCI ? Explain importance of user interface | 7M |
| b) | What are principles of user interface | 7M |
| (OR) | | |
| 2. a) | Explain different characteristics of GUI | 7M |
| b) | Discuss popularity of graphics | 7M |

UNIT-II

- | | | |
|-------------|---|-----|
| 3. | Explain in detail various human aspects that are important and must be considered in designing a good interface | 14M |
| (OR) | | |
| 4. a) | Explain requirement analysis | 7M |
| b) | Write about basic business functions | 7M |

UNIT-III

- | | | |
|-------------|---|-----|
| 5. | What is menu ? Why menus are important and also explain the function of menus | 14M |
| (OR) | | |
| 6. a) | What is Navigating menu | 7M |
| b) | Discuss about graphical menus | 7M |

UNIT-IV

- | | | |
|-------------|---|----|
| 7. a) | Explain various types of windows with suitable example | 7M |
| b) | Write about window presentation styles | 7M |
| (OR) | | |
| 8. a) | Explain about organizing window function and operations | 7M |
| b) | Discuss about web systems | 7M |

UNIT-V

- | | | |
|-------------|--|-----|
| 9. a) | What is an Icon ? What are the characteristics of an Icon | 7M |
| b) | What are the possible problems with colour | 7M |
| (OR) | | |
| 10. | Explain in detail about statistical graphs screens and web pages | 14M |

AR16

CODE: 16IT4003

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

IV B.Tech II Semester Regular & Supplementary Examinations, July-2021

**MACHINE LEARNING
(Information Technology)**

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) How is Candidate Elimination algorithm different from Find-S ALGORITHM? 8M
- b) List the goals of machine learning and Discuss application of machine learning with examples 6M

(OR)

2. a) Write the Candidate elimination algorithm and illustrate with Example 8M
- b) Explain the various stages involved in designing a learning system 6M

UNIT-II

3. a) Identify the entropy, information gain and draw the decision trees for the following set of training example given in **Table 1** 8M
- b) Discuss the effect of reduced Error pruning in decision tree algorithm 6M

(OR)

4. a) Illustrate the Inductive bias with respect to Decision tree learning. 8M
- b) What are the alternative measures for selecting attributes? 6M

UNIT-III

5. a) Explain Naive Bayes classifier with example. 7M
- b) Write about the Brute-force Map Learning algorithm. 7M

(OR)

6. a) Consider a football game between two rival teams: Team 0 and Team 1. 8M
Suppose Team 0 wins 65% of the time and Team 1 wins the remaining matches. Among the games won by Team 0 only 30% of them come from playing on Team 1's football field. On the other hand, 75% of the victories for Team 1 are obtained while playing at home. If Team 1 hosts the next match between the two teams, which team will most likely emerge as the winner? Using Baye's Theorem.

- b) It is known that in a population, one in 50,000 has X-disease and one in 20 has red eye. It is also observed that 50 percent of the X-disease patients have red eye. A doctor observes that a patient has red eye. What is the probability that the patient has X-disease? 6M

UNIT-IV

7. a) Explain the probably approximately correct (PAC) Learning model with neat sketch 8M
 b) Explain about Agnostic Learning. 6M
 (OR)
 8. a) Explain the two key difficulties that arise while estimating the Accuracy of Hypothesis. 7M
 b) Discuss the major drawbacks of K-nearest Neighbour learning Algorithm and how it can be corrected. 7M

UNIT-V

9. a) Write the basic algorithm for learning sets of First-Order Rules. 7M
 b) Discuss the Inverse Resolution rule for first order logic. 7M
 (OR)
 10. a) Write the Learn-One –rule algorithm. 7M
 b) Explain the inverting resolution with an example 7M

Table 1

Gender	Car ownership	Travel cost	Income Level	Transportation (Class)
Male	0	Cheap	Low	Bus
Male	1	Cheap	Medium	Bus
Female	1	Cheap	Medium	Train
Female	0	Cheap	Low	Bus
Male	1	Cheap	Medium	Bus
Male	0	Standard	Medium	Train
Female	1	Standard	Medium	Train
Female	1	Expensive	High	Car
Male	2	Expensive	Medium	Car
Female	2	Expensive	High	Car

PART-A

ANSWER ALL QUESTIONS

[1x10=10M]

1. a) Define ideal sampler.
- b) What is the function of holding circuits?
- c) Define Pulse Transfer Function.
- d) Write the stability condition in Z-Plane?
- e) Write the expression for state transition matrix.
- f) Write the general state equation for discrete time systems.
- g) What are the different methods available to compute STM?
- h) Define state and state variable.
- i) What is meant by observability?
- j) List the different canonical representations.

PART-B

Answer one from each unit

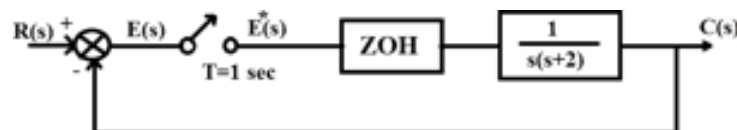
[5x12=60]

UNIT-I

2. a) Discuss the elements of discrete control systems with help of block diagram. 6M
 - b) Explain briefly about Zero Order Hold. 6M
- (OR)**
3. Explain with the help of neat diagram the sampling theorem. 12M

UNIT-II

4. a) Find the Z-transform of the following functions 6M
 - i. $X(K+3)$
 - ii. $X(K-2)$
 - b) List out various methods to find out inverse Z-transform for given function. 6M
- (OR)**
5. Obtain the pulse transfer function for the system shown in figure. 12M



UNIT-III

6. a) Explain the solution of Discrete LTI system using Z- transformation. 6M
b) Find the state space representation for the discrete time system 6M
 $y(k+3)+6y(k+2)+11y(k+1)+8y(k)=10u(k).$

(OR)

7. Obtain the state space equations for the system with given transfer function

$$\frac{Y(z)}{U(z)} = \frac{z+1}{z^2+5z+6}$$

UNIT-IV

8. (a) State and Derive the state transition matrix by using Z-transformation method? 6M
(b) Write the properties of State Transition Matrix? 6M

(OR)

9. a) Derive the relation between state equation and transfer function. 6M
b) Obtain the Controllable canonical form for the pulse transfer. 6M

$$G(z) = \frac{(z+1)(z+2)}{z(z+5)^2(z+4)}$$

UNIT-V

10. What is root locus? Write the steps to draw root locus for DCS? 12M

(OR)

11. a) Check the stability of the system by using Extended R.H Criteria for the given function

$$Z^3+3.3Z^2+3Z+0.8=0 \quad 6M$$

- b) Check the stability of the given system by using Jury stability technique

$$Z^4+3Z^3+2Z^2+Z+0.6=0 \quad 6M$$

AR13

CODE: 13EC4037

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

IV B.TECH II SEM SUPPLEMENTARY EXAMINATIONS, JULY, 2021

**OPTICAL COMMUNICATIONS & NETWORKS
(Electronics and Communication Engineering)**

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What are the conditions for total internal reflection?
b) What are skew rays?
c) Define – Internal Quantum Efficiency
d) List the benefits and drawbacks of avalanche photo diodes
e) Define the term group delay
f) What is meant by intermodal dispersion?
g) List the advantages of preamplifiers.
h) Define Bit Error Rate
i) What is meant by fiber splicing?
j) What are the advantages of WDM?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) What is the significance of total internal reflection and numerical aperture of an optical fiber? 6M
b) A silica optical fiber with core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.5 and cladding refractive index of 1.47. Determine (i) Critical angle at the core-cladding interface 6M
(ii) Numerical Aperture
(iii) Acceptance angle in air for the fiber

(OR)

3. a) What are the various elements involved in optical communication? Explain each element in brief? 6M
b) Discuss in detail about various fiber materials? 6M

UNIT-II

4. a) Draw the schematic of edge emitting double hetero junction LED and explain its working principle? 6M
b) List the difference between LED and Injection Laser diode (ILD)? 6M
- (OR)**
5. a) Write short note on following terms 6M
(i) Quantum Efficiency
(ii) Responsivity
b) Explain how temperature effect on Avalanche gain in PIN diode? 6M

UNIT-III

6. a) Explain information capacity determination and group delay with necessary equations? 6M
b) Describe Intermodal dispersion in step index fibers? 6M
(OR)
7. a) Explain material dispersion in optical fibers? 6M
b) Explain the power launching from light source to optical fiber? 6M

UNIT-IV

8. a) With a neat block diagram explain about Digital signal transmission through an optical data link? 6M
b) What are the possible sources of errors in optical fiber receivers? Briefly explain them? 6M
(OR)
9. a) With necessary equations explain probability of error of an optical receiver? 6M
b) Explain about link power budget with an example? 6M

UNIT-V

10. a) Write short notes on 6M
(i) Fiber optic Transceiver
(ii) Optical filters
b) Explain in detail about optical CDMA? 6M
(OR)
11. a) Explain briefly about Wavelength division multiplexers and demultiplexers? 6M
b) Discuss briefly about couplers and splicers? 6M