

# AR16

CODE: 16CE4034

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

IV B.Tech II Semester Regular Examinations, September, 2020

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) What is Air Pollution? Explain about various types of pollutants in detail. 8M
- b) Explain scope and significance of air pollution. 6M

(OR)

2. a) Explain the sources for Dust as pollutant into the atmospheric environment? 8M
- b) Distinguish between particulates and aerosols. 6M

## UNIT-II

3. a) Explain the effects of air pollutants on vegetation. 6M
- b) What is Global Warming? Describe Global effects of pollution? 8M

(OR)

4. a) Explain the effects of air pollutants on materials with examples. 7M
- b) Define Ozone Holes. Explain causes and effects of Ozone Holes. 7M

## UNIT-III

5. a) Discuss the general methods for monitoring of NO<sub>2</sub> emissions 6M
- b) What is meant by stack monitoring? Explain purpose and parameters of stack monitoring for SPM. 8M

(OR)

6. a) Discuss the general methods for monitoring of CO emissions. 6M
- b) What are the Guideline Emission Standards prescribed by WHO. 8M

## UNIT-IV

7. a) What are various strategies to control of particulates? Explain Process Changes in detail. 6M
- b) Explain the principle, construction and working of Gravity settling chamber with a neat sketch. 8M

(OR)

8. a) With a neat sketch explain the functioning, merits and demerits of a Fabric filters. 8M
- b) Explain about Centrifugal separators in detail with neat sketch. 6M

## UNIT-V

9. a) Discuss the general methods for control of SO<sub>2</sub> emissions. 6M
- b) Explain Absorption methods of control of gaseous pollutants. 8M

(OR)

10. a) Method of control of gaseous contaminants by Biological oxidation to form nontoxic compounds. 7M
- b) Explain dry methods of removal of SO<sub>2</sub> emissions. 7M

# AR16

**CODE: 16EE4030**

**SET-1**

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

**IV B.Tech II Semester Regular Examinations, September, 2020**

## **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) Explain different signals in a Digital control system with a block diagram 7 M
- b) Mention the significance of Sampling in Digital control systems 7 M

**(OR)**

2. a) State and explain Sampling theorem. 7 M
- b) Explain the operation of Zero order Hold circuit with neat sketches 7 M

### **UNIT-II**

3. a) State and explain initial and final value theorem. 7 M
- b) Determine the Inverse Z- Transform for the following 7 M

$$(i) F(Z) = \frac{Z}{(Z-1)(Z-2)} \quad (ii) M(Z) = \frac{Z-1}{(Z+1)(Z+2)}$$

**(OR)**

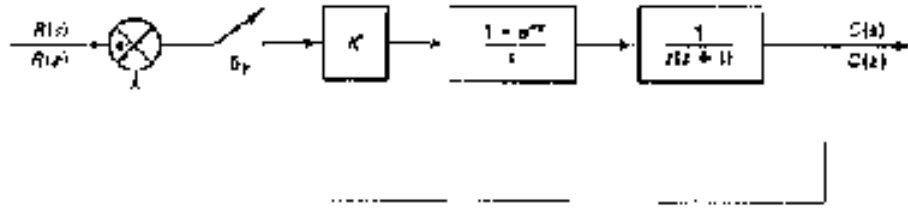
4. a) Explain the Mapping between S-Plane to Z-Plane 7 M
- b) Elaborate the Advantages and limitations of Z- Transforms 7 M

### **UNIT-III**

5. a) Discuss briefly about the role of Bilinear Transformation technique in assessing the stability 5 M
- b) Test the Stability of a Discrete system with a characteristic equation  $F(Z) = z^4 + 0.5z^3 - 2z^2 + z + 0.5 = 0$  using Bilinear Transformation. 9 M

(OR)

6. a) Explain the procedure for constructing root locus of a digital control system 5 M
- b) Sketch the Root locus for the system shown in figure below 9 M



### UNIT-IV

7. a) Elaborate the significance of State space equations in analysing Digital control systems 5 M
- b) Obtain the state space equations for the system with transfer function 9 M

$$\frac{Y(z)}{U(z)} = \frac{z^{-1} + 5z^{-2}}{1 + 4z^{-1} + 3z^{-2}}$$

(OR)

8. Determine the state and output equations for the difference equation  $y(k+2)+3y(k+1)+y(k)=u(k)$  in canonical form 14 M

### UNIT-V

9. Determine the Unit step Response of the system above mentioned and analyse the stability For the system with state model  $X(k+1)=\begin{bmatrix} 2 & -5 \\ 0.5 & -1 \end{bmatrix} x(k)+\begin{bmatrix} 1 \\ 0 \end{bmatrix} u(k); y(k)=2x_1(k)$ , 14 M

(OR)

10. a) Derive the state transition matrix by using Z transformation method. 9 M
- b) Mention the properties of State Transition Matrix 5 M

# AR16

**CODE: 16ME4039**

**SET-1**

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

**IV B.Tech II Semester Regular Examinations, September, 2020**

## **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) Explain in detail various kinds of renewable energy sources and their potential and discuss the solar energy option. 7M  
b) What is the basic principle of wind energy conversion? 7M  
Explain with neat sketch horizontal axis wind Turbine.
- (OR)
2. a) What is a fuel cell ? Describe the working principle of hydrogen fuel cell 7M  
b) Write short notes on MHD generator. 7M

### **UNIT-II**

3. a) Draw the general lay out of a thermal power plant and explain the working of different circuits 7M  
b) Explain the working of mechanical ash handling system with a neat sketch. 7M
- (OR)
4. a) Explain the principle of fluidized bed combustion with a neat sketch. 7M  
b) Explain the working of electrostatic precipitator with a neat sketch. 7M

### **UNIT-III**

5. a) Name and explain briefly the various fuel injection systems in diesel power plant. 7M  
b) Discuss with a simple sketch, thermostat cooling system in Diesel power plant. 7M

(OR)

6. a) Explain with neat sketches any two types of supercharging methods of diesel engines. 7M  
b) Explain the working of a closed cycle gas turbine with a neat sketch. 7M

#### **UNIT-IV**

7. a) Discuss the various factors for selecting a site for hydro electric power plant 7M  
b) Explain the working of a pumped storage power plant with a neat diagram 7M

**(OR)**

8. a) Explain with a line diagram, the working of homogeneous reactor. 7M  
b) Sketch and explain gas cooled reactor and also its advantages 7M

#### **UNIT-V**

9. a) Estimate the generating cost per unit supplied from a power plant having the following data. Plant capacity = 120 MW. Capital cost = Rs.  $600 \times 10^6$  Annual load factor = 40% Annual cost of fuel, taxation, oil and salaries = Rs 6,00,000 Interest and depreciation = 10% 7M  
b) Explain the construction of a load curve and give its significance. 7M

**(OR)**

10. a) Define peak load, demand factor, load factor and plant use factor. 7M  
b) The following data is given for a steam power plant: 7M  
Maximum Demand 25,000 kW; Load factor 40%; Coal consumption 0.86 kg/kWh; Boiler efficiency 85%; Turbine efficiency 90%; Price of coal Rs. 55 per Ton; Determine:  
(i) Thermal efficiency of the station (ii) Coal bill of the station for one year.