AR16

CODE: 16CE4034 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech II Semester Supplementary Examinations, November-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 are the types and sources of particulate matter causing air pollution ?Briefly explain them.
   b) Classify air pollutants into different categories, indicating their sources.

(OR)

2. a) Write a short note on air pollution episodes.
   b) Explain the following : i) Photo chemical smog ii) Global effects of air pollution

UNIT-II

3. a) Explain the various effects of air pollutants on human beings.
   b) What do you mean by Ozone hole? What are the substances responsible for that? Explain the remedial measures for mitigation

(OR)

4. a) Explain the various effects of air pollutants on materials.
   b) Explain the acid rain phenomenon, indicating causes, effects and remedial measures.

UNIT-III

5. a) What are the primary meteorological factors that influence air pollution?
   b) What do you mean by atmospheric stability and explain the different types of inversion

(OR)

6. a) Explain with neat sketches, how different atmospheric conditions give rise to different kinds of plumes
   b) Name the global effects of air pollution and state pollutant responsible for those effects.

UNIT-IV

7. a) What is the principle of electrostatic precipitation.
   b) Calculate the minimum size of the particle that will be removed with 100% efficiency from a settling chamber of size 8m × 4 m × 1.5 m, designed for a flow rate of 4.2 m^3/sec at 75^oC.

(OR)

8. a) Explain with a neat sketch, the principle, construction, and working of a wet scrubbers.
   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 m3/sec, what will be the length of precipitator for obtaining a collection efficiency of 99.9%? What percent change in electrode collection area is required to increase the collection efficiency from 99.9 to 99.95%?

UNIT-V

9. a) Explain how do you control the emission of NOx by the following treatment methods:
   (i) Absorption by Alkaline solutions. (ii) Absorption by Lime.
   (iii) Adsorption by Solids
   b) What are the common absorbents used for removing gaseous pollutants.

(OR)

10. a) Write short notes on wet simultaneous NO_x process for the removal of pollutants from gas.
    b) What points should be kept in view? While selecting the equipment's for removing pollutants from the gas.

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CODE: 16EE4030 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech II Semester Supplementary Examinations, November-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 the block diagram of digital control system with each part	7M
	b)	Derive the transfer function of zero order hold device.	7M
		(OR)	
2.	a)	Explain how signal reconstruction is done in discrete system analysis.	7M
	b)	Summarize the functionality of fractional order hold ?	7M

UNIT-II

3.	a)	What are the properties of Z transform. .	7M
	b)	State and explain final value theorem.	7M
		(OR)	
4.	a)	Find the inverse z-transform of the following function. $X(z) = \frac{z^2 + 1}{z^2 + 7z}$	7M
	b)	What is pulse transfer function? How is it obtained?	7M

UNIT-III

5.	a)	Determine the stability of the system $F(z)=2z^4+5z^3+10z^2+2z+1=0$	7M
	b)	Define controllability and observability for discrete data systems.	7M
		(OR)	
6.		Draw the root locus of the system with $GH(z)=K(z-0.4)/(z-0.5)(z-2)$	14M

UNIT-IV

7.	a)	Construct the state model for the following from differential equation $\ddot{y}+11\dot{y}=u$	7M
	b)	Find the eigen values and eigen vectors of the following matrices [1 1; 0 2]	7M
		(OR)	
8.	a)	Elaborate the properties of state transition matrix	7M
	b)	What are the differences between difference equations and differential equations	7M

UNIT-V

9.	a)	Given $\dot{x} = AX + BU$ Where A is an identity matrix and B =[1;1]. Obtain the state diagram in signal flow graph	7M
	b)	Write short notes on canonical forms	7M
		(OR)	
10.		Explain sampled data control systems with the help of an example.	14M

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CODE: 16ME4039 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech II Semester Supplementary Examinations, November-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 the Principle of operation and constructional details of Savonius rotor with neat sketch 7M
   b) Explain the working of fuel cell with a neat sketch. 7M

(OR)

2. a) What are the merits and demerits of a fuel cell? 7M
   b) Discuss in detail about MHD power generation with neat sketch 7M

UNIT-II

3. a) Sketch and explain any two types of stokers used in thermal power plant. 7M
   b) Mention the points to be considered while selecting the site for a steam power station. 7M

(OR)

4. a) Identify various steps in designing thermal power plant. 7M
   b) Explain with a neat layout the working of ash handling and dust collection systems. 7M

UNIT-III

5. a) Discuss the working of open cycle gas turbines in detail. 7M
   b) Explain the essential components of Diesel power plant. 7M

(OR)

6. a) Explain how the overall efficiency of Diesel power plant can be improved with cogeneration unit. 7M
   b) Describe about the Classification, Construction and Layout of Gas Turbine Plant. 7M

UNIT-IV

7. a) The runoff data of a river at a particular site is tabulated below: 7M

Month	Mean Discharge per month(millions of cu.m)	Month	Mean Discharge per month(millions of cu.m)
Jan	45	July	80
Feb	20	Aug	95
Mar	20	Sept	120
Apr	10	Oct	55
May	0	Nov	50
June	50	Dec	40

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

b) Write notes on (i) Fission (ii) Fertilization (iii) Isotopes (iv) Heavy water 7M

(OR)

8. a) Explain the various methods for disposal of radioactive waste material. 7M

b) Discuss the advantages and disadvantages of water power plants. 7M

UNIT-V

9. a) A central power station has annual factors as follows: Load factor = 55% Capacity factor = 30% Use factor = 35% Power station has a maximum demand of 15,000kW.Determine: Annual energy production, Reserve capacity over and above peak load, Hours per year not in service? 7M

b) Explain various costs which form the total cost of power station. 7M

(OR)

10. a) The maximum (peak) load on a thermal power plant of 60 MW capacity is 50 MW at an annual load factor of 50%. The loads having maximum demands of 25 MW, 20 MW, 8 MW and, 5 MW are connected to the power station. Determine: (a) Average load on power station (b) Energy generated per year (c) Demand factor (d) Diversity factor 7M

b) Explain the following terms in detail: (i) Connected load (ii) Diversity factor (iii) Plant capacity factor. 7M