

AR18

CODE: 18CEE311

SET-2

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

III B.Tech II Semester Regular Examinations, Sep/Oct-2021

ADVANCED DESIGN OF REINFORCED CONCRETE

(Professional Elective-1)

(Civil Engineering)

Time: 3 Hours

Max Marks: 60

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. Design a cantilever type retaining wall to retain horizontal earth fill of 4m high above the ground level. SBC of soil is 160kN/m^2 . Unit weight of soil is 18kN/m^3 and angle of repose is 30° . The coefficient of friction between concrete base slab and soil is 0.45. 12M

(OR)

2. Write steps to design the counter fort retaining wall. 12M

UNIT-II

3. Design a Circular tank with flexible base for a capacity of 200 kilo litres resting on ground having a soil with SBC of 180kN/m^2 . Provide a depth of 3.5m with a free board of 250mm. The construction materials to be used are M30 grade concrete and Fe415 steel. 12M

(OR)

4. Design a Rectangular tank resting on ground with internal dimensions as $5\text{m} \times 4\text{m} \times 3\text{m}$ high. Take the free board as 300mm. Use M30 grade concrete and HYSD steel of grade Fe415. 12M

UNIT-III

5. Design a typical flat slab which is supported on 450mm diameter circular columns spaced $6\text{m} \times 5\text{m}$ apart in both the directions. The live load on the flat slab is 4kN/m^2 . Use Fe 415 steel and M20 concrete 12M

(OR)

6. Design a roof slab for a circular room 5m inside diameter. The thickness of wall is 230mm and the slab projects outside the walls by 1m all around. The live load on the slab is 3kN/m^2 at service Use M25 concrete and Fe 415 steel. 12M

UNIT-IV

7. Design a pile cap for supporting a column of section $400\text{mm} \times 400\text{mm}$ carrying an axial load of 1200kN at service state. The pile cap contains a group of four friction piles each of 250mm diameter for transfer of load from column to soil. Use M30 concrete and Fe 415 steel. 12M

(OR)

8. a) Explain various types of pile foundation. 6M
b) Write the steps to design pile cap. 6M

UNIT-V

9. Explain provisions for ductile detailing of structures as per IS13920. 12M

(OR)

10. Explain the procedure to determine the wind loads on multi-storeyed structure with an example. 12M

AR18

CODE: 18CSE324

SET-2

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

III B.Tech II Semester Regular Examinations, Sep/Oct-2021

CRYPTOGRAPHY AND NETWORK SECURITY

(Professional Elective – II)

(Computer Science and Engineering)

Time: 3 Hours

Max Marks: 60

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 about X.500 security mechanisms and services. 6M
b) What is buffer overflow? Explain with an example program. 6M
- (OR)**
2. a) With suitable examples explain monoalphabetic and polyalphabetic ciphers. 6M
b) Explain Caesar cipher and transposition techniques. 6M

UNIT-II

3. a) Write about IDEA conventional encryption algorithm. 6M
b) Describe the encryption/decryption process of triple DES algorithm. Also explain the cryptanalysis of Triple DES. 6M
- (OR)**
4. a) Write about AES parameters, substitution and permutation operations. 6M
b) Explain the ECB and CBC block cipher modes of operation. 6M

UNIT-III

5. a) Write in detail about feistel cipher structure. 6M
b) Explain RSA algorithm. In a public-key system using RSA, you intercept the ciphertext C = 10 sent to a user whose public key is e = 5, n = 35. What is the plaintext M? 6M
- (OR)**
6. a) Differentiate direct and arbitrated digital signatures. 6M
b) Explain the X.509 version 1, version2, version3 certificates formats. 6M

UNIT-IV

7. a) Write about the five principal services provided by PGP? 6M
b) What is the difference between transport mode and tunnel mode in IPSec? 6M
- (OR)**
8. a) With example explain MIME message structure. 6M
b) Draw and explain the IPSec ESP packet format. 6M

UNIT-V

9. a) Explain SSL protocol stack and SSL record format. 6M
b) What is a dual signature? Explain the importance and construction of dual signature in SET. 6M
- (OR)**
10. a) List and explain different types of viruses. 6M
b) Describe firewall characteristics and limitations. 6M

ADVANCED MACHINE LEARNING**(Professional Elective – II)****(Information Technology)**

Time: 3 Hours

Max Marks: 60

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) Illustrate boosting ensemble technique. 6M
b) Explain the importance of the activation function in an artificial neural network by drawing an appropriate and relevant diagram. 6M
(OR)
2. a) Explain back propagation algorithm with a neat diagram. 6M
b) Illustrate advantages of bagging application on the top of the Ensemble methods with neat sketch diagram. 6M

UNIT-II

3. a) What is the goal of the support vector machine (SVM)? How to compute the margin 6M
b) Where you will use an SVM over a Random Forest Machine Learning algorithm and vice-versa? Explain the situations 6M
(OR)
4. a) What is a kernel in SVM? Why do we use kernels in SVM? 6M
b) Demonstrate the Pros and Cons of SVM Classifiers. 6M

UNIT-III

5. a) Explain Bayes theorem. 6M
b) Illustrate Bayesian Belief Net with a suitable example 6M
(OR)
6. a) Explain EM algorithm. 6M
b) Demonstrate how Naïve Bayes algorithm is useful for learning and classifying text with your own example 6M

UNIT-IV

7. a) What are the advantages of dimensionality reduction? 6M
b) What are the limitations of PCA? 6M
(OR)
8. a) Why do we need dimensionality reduction? What are its drawbacks? 6M
b) What is the difference between a variance-covariance matrix and a correlation matrix? 6M

UNIT-V

9. a) Explain Reinforcement learning with Tic-Tac-Toe. 6M
b) What are the elements of reinforcement learning? 6M
(OR)
10. a) Show the interaction of an agent with its environment in detail. 6M
b) Summarize the methodology of Reinforcement learning algorithm 6M

AR16

CODE: 16CE3020

SET-2

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

III B.Tech. II Semester Regular & Supplementary Examinations, Sep/Oct, 2021

ADVANCED DESIGN OF CONCRETE STRUCTURES

(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. Briefly describe the behavior of the various elements of a counterfort retaining wall 14M

(OR)

2. Determine suitable dimensions of a cantilever retaining wall, which is required to support a bank of earth 4.0 m high above the ground level on the toe side of the wall. Consider the backfill surface to be inclined at an angle of 15° with the horizontal. Assume good soil for foundation at a depth of 1.25 m below the ground level with a safe bearing capacity of 160 kN/m^2 . Further assume the backfill to comprise granular soil with a unit weight of 16 kN/m^3 and an angle of shearing resistance of 30° . Assume the coefficient of friction between soil and concrete to be 0.5. 14M

UNIT-II

3. a) Write about classification of liquid retaining structures 6 M
b) Write the steps involved in design of circular water tank. 8 M

(OR)

4. A rectangular water tank of 6m x 4m in plan and 3m in height is resting on a firm ground with its wall hinged at base and free at top. Use M20 grade concrete and Fe415 steel 14M

UNIT-III

5. Design a circular slab of 3.5 m diameter to cover an underground sump. The slab is simply supported at the periphery by a wall 200 mm thick. Assume a finish load of 1.0 kN/m^2 and live loads of 4.0 kN/m^2 . Use M 20 concrete and Fe 415 steel. Assume mid exposure conditions. 14M

(OR)

6. Design the interior panel of a large single-storey warehouse flat slab roof with a panel size of $6 \text{ m} \times 6 \text{ m}$ supported by columns of size $500 \text{ mm} \times 500 \text{ mm}$. The height of the columns is 5 m. Take live load as 3.0 kN/m^2 and the weight of finishes including waterproof treatment as 2.5 kN/m^2 . Use M25 concrete and Fe 415 steel. Assume mild environment. 14M

UNIT-IV

7. Write design steps for **pile** foundation with neat sketch. 14M
(OR)
8. An RC column of size 500 mm x 500 mm is supported on **four** piles of 300 mm diameter (bored cast in situ piles). The column carries a load of 1000 kN, a moment of 300 kNm in the $x-x$ direction, and a shear force of 50 kN on top of the pile. Design the pile cap assuming M25 concrete and Fe 415 steel. Further, assume that the piles are capable of resisting the reaction from the pile cap. 14M

UNIT-V

9. a) What are the objectives of earthquake-resistant design of reinforced concrete structures as per IS1893 04M
b) Write the design steps on wind speed for the building. 10 M
(OR)
10. What is meant by ductility? Give a qualitative description and also describe briefly the qualitative measures of ductility in reinforced concrete. 14M

AR16

CODE: 16CE3021

SET-2

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

III B.Tech. II Semester Supplementary Examinations, Sep/Oct, 2021

INDUSTRIAL WASTE AND WASTE WATER MANAGEMENT

(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. What is mean by equalization? What is the purpose of equalization? List the methods of equalization and explain any two methods in detail. 14 M

(OR)

2. Explain in detail about basic theories of industrial waste management and explain in detail about volume reduction. 14 M

UNIT-II

3. a) Explain how recirculation in wastewater will helpful in industries 7 M
b) Explain how oil is removed from the wastewater 7 M

(OR)

4. a) Explain in detail about the problems arising when industrial wastewater is discharged in to rivers. 7 M
b) Explain in detail about combined treatment of industrial and domestic wastewater system. 7 M

UNIT-III

5. Explain in detail about different sources of pollutants that leads to water pollution 14 M

(OR)

6. Explain in detail about sources of pollution in diary industry and recommend the treatment methods to remove the pollutants 14 M

UNIT-IV

7. Explain in detail about the treatment of complex fertilizer wastewater with neat sketch 14 M

(OR)

8. Explain in detail about sources, characteristics and treatment of wastewater generating from steel plants. 14 M

UNIT-V

9. List any 14 effluent standards for disposal into environment 14 M

(OR)

10. Explain in detail about the treatment of corn starch wastewater with neat sketch 14 M

AR16

CODE: 16EE3020

SET-2

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

III B.Tech. II Semester Regular & Supplementary Examinations, Sep/Oct, 2021

ELECTRICAL DISTRIBUTION SYSTEMS

(Elective-I)

(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) Define and explain the following terms with suitable examples: 8M
(i) load factor, (ii) loss factor, (iii) Maximum Demand and (iv) diversity factor
 - b) The annual input to a sub-transmission system is 87,000 MW. On the peak-load day of the year, the peak is 25 MW and the energy input that day is 300 MWh. 6M
Find the load factor for the year and for the peak load day.
- (OR)**
2. a) What are the basic differences between radial and loop types of primary distribution feeders? 6M
 - b) The annual peak load input to a primary feeder is 2 MW. The total copper loss at the time of peak load is 0.1 MW. The total annual energy supplied to the sending end of the feeder is 5.61×10^6 KWh. Determine (i) the annual loss factor (ii) the total annual copper loss energy and its value at Rs. 1.50 per KWh. 8M

UNIT-II

3. a) How do you optimally locate the substations and explain the benefits derived from optimal location. 7M
 - b) Compare the four and six feeder patterns in substation location? 7M
- (OR)**
- 4 Analyze a substation service area with 'n' primary feeders. 14M

UNIT-III

5. a) Derive the expression for voltage drop and power loss in 3 phase primary lines. 6M
- b) A single phase 50 Hz ac distributor AB 300m long is fed from one end and is loaded as under: 8M
(i) 100A at 0.707 pf lag 200m fed from one end A
(ii) 200A at 0.8 pf lag 300m fed from one end A The total resistance and reactance of the distributor is 0.2 ohms and 0.1 ohm per kilo meter.
Calculate the total voltage drop in the distributor AB.

(OR)

6. a) Discuss importance of voltage drop and power loss calculations in distribution system. 6M
b) Prove the power loss due to the load currents in the conductors of single-phase lateral ungrounded neutral case is 2 times larger than one in the equivalent three phase lateral. 8M

UNIT-IV

7. a) List out types protective devices used and explain principle of operation of any one of them. 5M
b) Discuss the co-ordination procedure between fuse and a circuit breaker. 9M
(OR)
8. a) What is an automatic line sectionalizer? Explain its operation, purpose and advantages. 7M
b) Discuss about the objectives of distribution system protection. 7M

UNIT-V

9. a) Explain the necessity of voltage control and p.f. correction in distribution systems. 6M
b) A single-phase motor connected to a 230V, 50 Hz supply takes 25 A at p.f. of 0.7 lag. A capacitor is shunted across the motor terminals to improve the p.f to 0.9 lag. Determine the capacitance of the capacitor to be used. 8M
(OR)
10. a) Explain the line drop compensation on voltage control. 8M
b) Explain the power factor correction by installing the series capacitor bank. 6M

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) Define a) Refrigerating effect b) Ton of Refrigeration c) C.O.P. 6M
 b) A cold storage plant is required to store 20 tons of fish. 8M

The temperature of fish when supplied = 27°C

Storage temperature of fish required = -9°C

Specific heat of fish above freezing point = 2.95 kJ/kg °C.

Specific heat of fish below freezing point = 1.25 kJ/kg °C.

Freezing point of fish = -3°C.

Latent heat of fish = 230 kJ/kg.

If the cooling is achieved in 10 hours, find

a) Capacity of the refrigerating plant.

b) Carnot cycle C.O.P. between this temperature range.

If the actual C.O.P is one third of Carnot C.O.P., find the kW required to run the plant.

(OR)

2. a) Explain the simple cooling evaporative type aeroplane air conditioning system with neat sketch and T-s diagram. 6M
 b) A dense closed cycle air-refrigeration system working between 4 bar and 16 bar extracts 120×10^3 kJ of heat per hour. The air enters the compressor at 5°C and into the expander at 20°C. Assuming the unit runs at 300 r.p.m. Find a) kW required to run the unit b) bore of compressor c) Refrigerating capacity in tons of ice at 0°C per day. Take the following: Compressor and expander are double acting and stroke for compressor and expander = 30cm. Mechanical efficiency of compressor = 80%, Mechanical efficiency of expander = 85%. Latent heat of ice = 336 kJ/kg. Assume the compression and expansion are isentropic and $C_p = 1$ kJ/kg K. 8M

UNIT-II

3. a) Explain desirable properties of an ideal refrigerant. 7M
 b) A F-12 vapour compression refrigeration system has a condensing temperature of 50°C and evaporating temperature of 0°C. The refrigeration capacity is 7 tons. The liquid leaving the condenser is saturated liquid and compression is isentropic. Determine: (1) the refrigerant flow rate, (2) the power required to run the compressor, (3) the heat rejected in the plant, (4) COP of the system. Use the properties of F-12 as listed in the table: 7M

Saturation temperature(°C)	Saturation pressure(bar)	Enthalpy(kJ/kg)		Entropy(kJ/kgK)	
		h_f (kJ/kg)	h_g (kJ/kg)	s_f (kJ/kg)	s_g (kJ/kg)
50	12.199	84.868	206.298	0.3034	0.6792
0	3.086	36.022	187.397	0.1418	0.6960

(OR)

4. a) How the refrigerants are classified. Explain. 6M
 b) Describe the mechanism of a simple vapour compression refrigeration system. 8M

UNIT-III

5. a) Explain Three fluid absorption refrigeration system with neat sketch. 7M
 b) In an absorption type refrigerator, the heat supplied to NH_3 generator by condensing steam at 3 bar and 85% dry. The temperature to be maintained in the refrigerator -10°C . The temperature of the atmosphere is 30°C . Find the maximum COP possible of the refrigerator. If the refrigeration load is 20 tons and actual COP is 40% of maximum COP, find the mass of steam required per hour. 7M

(OR)

6. a) Explain Lithium bromide absorption refrigeration system with neat sketch. 7M
 b) In an absorption refrigeration system, heating, cooling and refrigeration take place at the temperatures of 150°C , 30°C , -20°C . Find the theoretical COP of the system. If the heating temperature is increased to 200°C refrigeration temperature is decreased to -40°C , find the percentage change in theoretical COP. 7M

UNIT-IV

7. a) Explain pulse tube refrigeration system with neat diagram. 7M
 b) Explain thermo electric refrigeration system 7M
(OR)
 8. Explain steam jet refrigeration system with neat diagram and derive the formula for quantity of steam required per ton of refrigeration. 14M

UNIT-V

9. a) 100 m^3 of air per minute at 15°C DBT and 80% RH is heated until its temperature becomes 22°C . Find 1) Heat added to air per minute 2) R.H of heated air and its WBT. Take atmospheric pressure = 1.013 bar. 8M
 b) Explain the requirements of comfort air-conditioning. 6M
(OR)
 10. a) Write short notes on. 6M
 1. Cooling with adiabatic humidification of air
 2. Sensible cooling.
 b) 200 cu m of air is passed through an adiabatic humidifier per minute. The condition of air at inlet is 40°C DBT and 15% R.H. and outlet condition is 25°C DBT and 20°C WBT. Find the following. 1) DPT 2) Relative humidity of the exit air 3) Amount of water vapour, added to the air per minute. Take $p_t = 1.033 \text{ bar}$. 8M

AR16

CODE: 16ME3025

SET-2

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

III B.Tech. II Semester Supplementary Examinations, Sep/Oct, 2021

ROBOTICS

(Elective - I)

(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. Explain about classification of robots based on configuration system with advantage and disadvantages 14 M

(OR)

2. a) What is the function of end effector? Explain the classification of end effectors 10 M
b) Explain any four present applications of robots 4 M

UNIT-II

3. Explain about different types of drive systems used in industrial robots. 14 M

(OR)

4. a) Define sensor and explain the types of sensors used in robots 7 M
b) Explain the working principle and advantages of potentiometer 7 M

UNIT-III

5. Explain the importance of DH notation and discuss steps in DH algorithm 14 M

(OR)

6. a) Write down the properties of transformation matrix. 4 M
b) Determine the rotational matrix for rotation of 45° about y-axis, followed by a rotation of 120° about z-axis, then rotation of 90° about x-axis. 10 M

UNIT-IV

7. a) Explain the following terms in trajectory planning? 7 M
1. Path 2. Trajectory 3. joint space trajectory planning
b) Explain about 4-3-4 trajectory 7 M

(OR)

8. Explain about any three programming methods used in robots 14 M

UNIT-V

9. a) What are the various robot cell layouts? Explain them in detail. 7 M
b) List out any three important factors in the selection of robot for an application. 7 M

(OR)

10. a) Explain the need and importance of the robot in inspection and testing 7 M
b) Explain about various manufacturing applications of robot 7M

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) Differentiate between Multiprogramming and Multitasking. [6M]
b) Explain basic operational concepts of computer [8M]

(OR)

2. a) Write briefly about various types of computers. [6M]
b) Explain the Arithmetic micro operations with examples. [8M]

UNIT-II

3. a) Explain the algorithm for add and subtraction operations on signed magnitude data with the help of a flow chart. [8M]
b) Discuss the BCD Adder with neat diagram. [6M]

(OR)

4. a) Perform the arithmetic operations using 2's complement method. [6M]
i) $(+52) + (-13)$ ii) $(-52) - (-13)$
b) Illustrate with a diagram the procedure for multiplication of 2x2 bit using array multiplier [8M]

UNIT-III

5. a) What is the need of cache memory and explain different methods of writing into cache memory. [7M]
b) What is page fault? Write briefly about various page replacement algorithms. [7M]

(OR)

6. a) Explain virtual memory concept in detail. [7M]
b) Describe the memory management hardware with a diagram. [7M]

UNIT-IV

7. a) What is Direct Memory Access? Explain the working of DMA. [8M]
b) Explain clearly the operation of an I/O interface unit with the help of a block diagram. [6M]

(OR)

8. a) With a neat diagram explain the Interrupt driven I/O mode of transfer. [6M]
b) Explain handshake method for asynchronous data transfer using the timing diagram and sequence of events. [8M]

UNIT-V

9. a) Draw the flowchart for an instruction pipeline and explain. Show the timing diagram. [10M]
b) Differentiate between hardwired control and micro programmed control unit. [4M]

(OR)

10. a) Explain basic concepts of micro programmed control. [6M]
b) Define the following terms: Control word, Micro instruction, Control memory and Micro program. [8M]

AR16

CODE: 16CS3018

SET-2

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

III B.Tech. II Semester Regular & Supplementary Examinations, Sep/Oct, 2021

SOFTWARE TESTING AND PROJECT MANAGEMENT

(Common to CSE & IT)

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) Discuss economics of testing? 7M
b) Explain about verification and validation in detail. 7M
(OR)
2. a) Why are defects hard to find? 7M
b) Explain in detail about functional and structural testing. 7M

UNIT-II

3. a) Explain about regression testing also state its need? 7M
b) Explain about white box testing? 7M
(OR)
4. Illustrate cause effect graphing with example? 14M

UNIT-III

5. Explain the process of software test life cycle? 14M
(OR)
6. List and explain the steps involved in testing process. 14M

UNIT-IV

7. a) Explain in detail about pragmatic software cost estimation. 7M
b) Discuss in detail about software economics. 7M
(OR)
8. a) Explain about conventional software management performance? 7M
b) Draw and explain waterfall model? 7M

UNIT-V

9. a) Explain the various methods to reduce the software product size. 7M
b) How do you improve software process? Explain? 7M
(OR)
10. a) How do you improve the team effectiveness? Explain? 7M
b) State the principles of modern software management 7M