

AR18

CODE: 18CET314

SET-2

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

III B.Tech I Semester Supplementary Examinations, June-2022

BASIC REINFORCED CONCRETE DESIGN

(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. a) Explain limit state of collapse, serviceability, durability. 6 M
- b) Explain assumptions of singly-reinforced beam. 6 M

(OR)

2. a) Explain loads and forces. 6 M
- b) A singly reinforced beam 250mm wide and 380mm deep to the centre of reinforcement is reinforced with 3 bars of 18mm dia. Now determine the depth of neutral axis and max stress in the concrete and stress in steel 150 N/mm^2 . 6 M

UNIT-II

3. a) Write the properties of beam section at limiting condition. 6 M
- b) Write the formulas for under reinforced condition for depth of neutral axis, lever arm, μ , percentage of steel, minimum percentage of steel. 6 M

(OR)

4. a) Define bond strength. Explain mechanism of bond strength 6 M
- b) Define anchorage bond length. Write development lengths for different steel grades and concrete grades. 6 M

UNIT-III

5. a) Design a cantilever slab to carry a live load of 3000 N/m^2 . the overhang of the slab is 1.25m. use M20 and Fe415. 6 M
- b) Give the detailed classification of slabs. 6 M

(OR)

6. Design a RCC slab for a room 6.3m x 4.5m. The slab is to be casted monolithically over the beam with all sides simply supported. It has to carry a live load of 4 kN/m^2 in addition to its own weight with a floor finish 1 kN/m^2 . Use M20 and Fe415. 12 M

UNIT-IV

7. a) Design a square column which carries an axial load of 1200 kN. M20 and Fe 415. Perform necessary checks. 6 M
- b) Distinguish between uniaxial and biaxial bending. 6 M

(OR)

8. a) Briefly explain about short and long columns. 6 M
- b) A RCC column 450mm x 450mm is reinforced with 8 bars of 20mm dia. The effective length of the column is 2.75m. find ultimate load for the column. Use M20 and Fe 415 6 M

UNIT-V

9. a) A reinforced concrete column of size 300mm x 300mm carries a load of 750kN. The safe bearing capacity of the soil is 200 kN/m^2 . Design an isolated column footing with uniform thickness and also M20 grade and Fe 415 6 M
- b) What are the different types of footings? Explain. 6 M

(OR)

10. a) Write detailed note on pedestal, square, rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments. 6 M
- b) What are the design considerations of footings? 6 M

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CODE: 18EEE311

SET-2

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

III B.Tech I Semester Supplementary Examinations, June-2022

INTEGRATED CIRCUITS APPALICATIONS

(Electrical & Electronics 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) Explain the following three open loop configurations of an op-amp. And derive the expression for output voltage. 6M
i. Differential amplifier ii. Inverting amplifier iii. Non inverting amplifier
- b) Design an inverting amplifier with a gain of -5 and an input resistance of 10K ohms. Assume necessary data. 6M

(OR)

2. a) List out the AC characteristics of an op-amp and discuss about them. 6M
- b) Design a non inverting amplifier with a gain of 10. Assume necessary data. 6M

UNIT-II

3. a) Draw the circuit diagram of a two input non inverting type summing amplifier and derive the expression for the output voltage. 6M
- b) Explain the operation of an op-amp based monostable multivibrator. And derive the expression for pulse width. 6M

(OR)

4. a) Discuss the following applications of comparator in detail. 6M
i. Zero crossing detector ii. Window detector
- b) Explain the operation of op-amp based astable multivibrator with necessary wave forms. And derive the expression for frequency of oscillations. 6M

UNIT-III

5. a) Obtain the expression for transfer function of 2nd order low pass filter. 6M
- b) Explain the working of wide band pass filter with the help of frequency response curve. And derive the expression for gain of the filter. 6M

(OR)

6. a) Design a second order high pass filter for a cut-off frequency of 1KHz. And draw the frequency response for the above filter. 6M
- b) What is meant by all pass filter? Explain the operation of the all pass filter. And derive the expression for gain. 6M

UNIT-IV

7. a) Explain the functioning of an inverted R-2R ladder type digital to analog converter and derive the expression for output voltage. 6M
- b) Explain in detail about the operation of a parallel comparator type analog to digital converter with the help of neat diagram. 6M

(OR)

8. a) Compare R-2R and weighted resistor types of digital to analog converters. 6M
- b) Describe the operation of Counter type analog to digital converter with neat diagrams. 6M

UNIT-V

9. a) Explain the significance of each of comparators in functional block diagram of 555 timer. 6M
- b) Explain monostable multivibrator operation using 555 timer. 6M

(OR)

10. a) Explain with a neat circuit diagram how a 555 timer can be used as a linear ramp generator? 6M
- b) Describe the operation of 555 timer as Schmitt trigger. 6M

AR18

CODE: 18MET312

SET-2

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

III B.Tech I Semester Supplementary Examinations, June-2022

APPLIED THERMODYNAMICS

(Mechanical 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

NOTE: Steam Tables must be supplied in the exam hall

UNIT-I

1. a) Explain the following terms related to steam (i) Sensible heat of water (ii) Latent heat of vaporization (iii) Dryness fraction (iv) Heat of superheat (v) Degree of super heat (vi) Saturation temperature and saturation pressure 6m
- b) Determine the quantity of heat required to produce 1 kg of steam at a pressure of 6 bar at a temperature of 250° C under the following conditions: 6m
 - (i) When the steam is wet having a dryness fraction 0.9
 - (ii) When the steam is dry saturated and
 - (iii) When it is superheated at constant pressure at 250° C, assuming the mean specific heat of superheated steam to be 2.3 kJ/kgK

(OR)

2. a) Explain the working of simple reheat cycle with the help of T-s diagram and derive the expression for its thermal efficiency. 4m
- b) A power generating plant uses steam as a working fluid and operates at a boiler pressure of 50 bar, dry saturated and a condenser pressure of 0.05 bar. Determine the cycle efficiency, work ratio and specific steam consumption for (i) Carnot cycle (ii) Rankine cycle. For Rankine cycle take pump work into account. 8m

UNIT-II

3. a) Classify boilers based on at least four considerations. 6m
 - b) Explain the working of Cochran boiler with the help of a simplified sketch. 6m
- (OR)**
4. a) List out the mountings used in boilers and discuss the function of each. 6m
 - b) Following data is available from boiler test: Duration of test : 7 hrs. Mass of water supplied-16400kg. Mass of coal burnt/hr-250 kg. Calorific value of coal = 33.5 MJ/kg. Feed water temp- 15 °C; Mean boiler pressure -12 bars.abs; Steam quality-0.95 dry; Determine (i) Actual evaporation/kg of coal (ii) Equivalent evaporation from and at 100 °C per kg of coal. (iii) Thermal efficiency of boiler. 6m

UNIT-III

5. a) What is critical pressure ratio? Derive the condition for maximum discharge through a nozzle. 6m
- b) An adiabatic steam nozzle is to be designed for discharge rate of 10 kg/sec of steam from 10 bar and 400°C to a back pressure of 1 bar. The nozzle efficiency is 0.92 and the friction loss is assumed to take place in the diverging portion of the nozzle only. Assume a critical pressure ratio of 0.5457. Determine the throat and exit area. 6m

(OR)

6. a) Explain the working of Evaporative condenser with the help of a neat sketch. 4m
- b) The air leakage into a surface condenser operating with a steam turbine is estimated as 84 kg/h. The vacuum near the inlet of air pump is 700 mm of hg when barometer reads 760 mm of Hg. The temperature at inlet of vacuum pump is 20°C. Calculate: (a) The minimum capacity of the air pump in m³/h; (b) The dimensions of the reciprocating air pump to remove air, if it runs at 200 rpm with L/D of 1.5 and volumetric efficiency of 100 %; and (c) The mass of vapour extracted per minute 8m

UNIT-IV

7. a) Explain the working of simple impulse turbine with the help of a simplified sketch. Also show the pressure and velocity variations across a single stage of turbine. 4m
- b) In a De Laval turbine steam issues from the nozzle with a velocity of 1200 m/s. The nozzle angle is 20°, the mean blade velocity is 400 m/s, and the inlet and outlet angles of blades are equal. The mass of steam flowing through the turbine per hour is 800 kg. Calculate: 8m
- i. Blade angles
 - ii. Relative velocity of steam entering the blades.
 - iii. Tangential force on the blades.
 - iv. Power developed
 - v. Blade efficiency.

Take blade velocity coefficient = 0.8

(OR)

8. a) Prove that the blade efficiency of a single stage reaction turbine is given by $\eta_{bl} = 2 - [2 / (1 + 2 \rho \cos \alpha_1 - \rho^2)]$ where $R_d = 50\%$ and $C_{f1} = C_{f2}$ 6m
- b) A single stage turbine is supplied with a steam at 5 bar, 200°C at the rate of 50 kg/min, it expands into a condenser at a pressure of 0.2 bar. The blade speed is 400m/s, the nozzles are inclined at an angle of 20° to the plane of the wheel and the outlet blade angle of 30°. Neglecting friction losses, determine the power developed, blade efficiency and stage efficiency 6m

UNIT-V

- 9 Briefly discuss the flowing methods of improving the performance of gas turbine power plant (i) Regeneration (ii) Reheating (iii) Inter cooling 12m

(OR)

10. a) What is the difference between atmospheric jet air crafts and rockets? What is rocket propellant and give some of the important characteristics of a propellant? 6m
- b) Explain the working of Pulse jet with the help of a neat diagram. 6m

AR18

CODE: 18ECE301

SET-1

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

III B.Tech I Semester Supplementary Examinations, June-2022

**ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Electronics and Communication 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) Classify the different types of errors that occur in measurements. 6M
- b) Derive the expression for multiplier resistance in voltmeter? 6M

(OR)

2. a) State the different types of thermocouples used for RF current measurements. 6M
- b) Draw and explain the circuit and operation of series type Ohm meter? 6M

UNIT-II

3. a) Draw and explain the operation of Function generator? 8M
- b) Explain the operation of a basic signal generator and their specifications? 4M

(OR)

4. a) Differentiate between AF wave analyzer and RF wave analyzer? 4M
- b) Explain the working of RF spectrum analyzers? 8M

UNIT-III

5. a) Explain the working of Dual beam CRO with neat block diagram? 6M
- b) Explain the working of electronic switch in Dual trace CRO with neat block diagram? 6M

(OR)

6. a) With a neat sketch explain the operation of storage oscilloscope? 6M
- b) With a neat sketch explain the operation of dual trace oscilloscope? 6M

UNIT-IV

7. a) Explain the basic principle of Maxwell bridge and derive the expression to find the value of unknown inductance and resistance? 8M
- b) At bridge balance if $R_1=470k$, $R_2=5.1k$, $R_3=100k$ and $C_1=0.01\mu f$, find the series unknown impedance? 4M

(OR)

8. a) With the help of circuit diagram explain how unknown frequency value can be determined using Wien's bridge? 8M
- b) If the Wheatstone bridge constants are $R_1=10k$, $R_2=15k$, $R_4=40k$, Find the value of unknown resistance? 4M

UNIT-V

9. a) With circuit diagram explain how temperature is measured using Thermocouple transducer? 6M
- b) With neat sketch explain how displacement can be measured using LVDT? 6M

(OR)

10. a) Explain the different types of thermistors? 8M
- b) Explain the Principle of piezo electric transducer? 4M

AR18

CODE: 18CSE312

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, June-2022

ADVANCED COMPUTER ARCHITECTURE (Common to CSE & IT)

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) Explain About Flynn's classification in detail with neat diagram 6M
b) Give and Explain Distribute Memory Processor Architecture 6M
(OR)
2. a) Explain About Uniform Memory Access and Non-Uniform Memory Access. And Give the Architectures. 6M
b) Write Short Notes on The Following Terms 6M
(i) Degree of Parallelism (ii) Scalability (iii) Clock Rate (iv) Speed up & Efficiency

UNIT-II

3. a) Describe About Memory Hierarchy Concept with a Diagram that Shows the Levels of Memory Hierarchy 6M
b) Write Short Notes on the Following 6M
(i) Write Hit Policy (ii) Write Miss Policy (iii) Replacement Policy
(OR)
4. Explain About Five Categories of Optimization Strategies in Detail 12M

UNIT-III

5. a) Write About Asynchronous and Synchronous Models 6M
b) Briefly Explain About the Following 6M
(i) Delay Insertion (ii) Pipeline Throughput (iii) Pipeline Efficiency
(OR)
6. a) Explain About Collision-Free Scheduling 6M
b) Explain About Pipelined Instruction Execution Phases in Detail with Neat Diagram 6M

UNIT-IV

7. a) Explain About Vector Instruction Types in Detail 6M
b) Explain briefly about crossbar switch network with neat diagram.. 6M
(OR)
8. a) Explain About the omega network with neat diagram. 6M
b) Elaborate the Concept of Vector Loops and Training 6M

UNIT-V

9. a) Explain About Snoopy Protocol Approach With respect to Cache Coherence in Detail 6M
b) Write Short Notes on 6M
(i) Directory based Protocol. (ii) Dead Lock Virtual Channels.
(OR)
10. a) Explain About Message Routing Schemes 6M
b) Elaborate Multi cast Routing Algorithm in Detail 6M

AR18

CODE: 18ITE311

SET-1

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

III B.Tech I Semester Supplementary Examinations, June-2022

OBJECT ORIENTED ANALYSIS AND DESIGN

(IT Branch)

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. Explain about basic building blocks of UML. 12M
(OR)
2. Explain the following with suitable examples 12M
 - a. Use case Generalization 4M
 - b. Include 4M
 - c. Extend 4M

UNIT-II

3. Define an Object. Write in details about UML Class diagram by considering Online Hotel Booking Management System(OYO) 12M
(OR)
4. Describe the following with suitable example 12M
 - a. Aggregation
 - b. Composition
 - c. Class Attributes and Methods

UNIT-III

5. Explain in detail about Sequence and Collaboration diagram with suitable example. 12M
(OR)
6. Elaborate about Activity diagram and create a UML Activity diagram for Railway Reservation System 12M

UNIT-IV

7. Elaborate complete design workflow with suitable design Class diagram. 12M
(OR)
8. Discuss the procedure to convert an Analysis Class diagram into Design class diagram with a system. 12M

UNIT-V

9. Discuss about Component and Deployment diagrams with an example. 12M
(OR)
10. What is State Machine? Explain State Transition diagram with suitable example. 12M

AR16

CODE: 16ME3017

SET-2

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

III B.Tech I Semester Supplementary Examinations, June,2022

INSTRUMENTATION AND CONTROL SYSTEMS

(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) Considering rotameter as an example give the functional description of various elements. 8M
- b) What is the need for calibration of measuring instruments? 4M
- (OR)
2. a) Explain various dynamic performance characteristics with sketches. 6M
- b) With a neat sketch explain the working of LVDT to measure linear displacement. 6M

UNIT-II

3. a) What is temperature compensation and how is it achieved when using a bonded strain gauge for the measurement of axial thrust, bending loads and torque? 6M
- b) Explain the two-arm and four-arm conditions used for strain measurements? 6M
- (OR)
4. a) What are the various types of Strain measurements? Derive an expression for gauge factor. 8M
- b) What properties are to be considered in selecting materials for strain gauges. 4M

UNIT-III

5. a) Explain the working of ionization pressure gauge with a neat sketch. 6M
- b) With the help of a neat sketch explain the working of the total radiation pyrometer. 6M
- (OR)
6. a) What are the different laws involved in thermocouples? Explain the working principle of thermocouple in measurement of temperature. 8M
- b) What factors are to be considered for level measurement sensor selection? 4M

UNIT-IV

7. a) Explain the working of absorption psychrometer with a neat sketch. 6M
- b) How absolute humidity is measured. 6M
- (OR)
8. a) Explain a resistive hygrometer for the measurement of humidity with a neat sketch. 6M
- b) Define the following : i) humidity ratio ii) relative humidity iii) wet bulb temperature. 6M

UNIT-V

9. a) How feedback control system is applied for temperature control of air conditioned system 6M
- b) Enumerate the merits and demerits of open loop and closed loop control systems. 6M
- (OR)
10. a) Explain in detail about different types of control actions and their effect on system performance. 6M
- b) What is a servo mechanism? Describe the features of a servomechanism. 6M

AR13

CODE: 13EE3015

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, June-2022

ELECTRICAL MACHINES – III
(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is the application of salient pole machine.
b) What is the nature of armature reaction for lagging pf load
c) What are the different methods used to determine voltage regulation of alternator
d) Define infinite busbar
e) What are the conditions for parallel operation of alternator
f) Write the characteristics infinite bus
g) What are the different methods of starting of synchronous motor
h) What is inverted V curves
i) Why is a single phase induction motor not self starting
j) Write at least two applications of AC series motor

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Distinguish between distributed and concentrated windings. Also explain any one type of distributed winding employed in synchronous machines [6M]
b) An 8-pole alternator has an armature with 30 slots and 8 conductors per slot. The flux per pole is 0.08 Wb and machine rotates at 750 rpm. Calculate EMF generated, if winding factor is 0.94 and all conductors in a phase are connected in series [6M]
- (OR)
3. a) With neat sketch, describe the constructional features and operation of salient pole alternator. [6M]
b) Derive the EMF equation of an alternator. [6M]

UNIT-II

4. Develop an expression for regulation of a synchronous generator using EMF method. [12M]
- (OR)
5. a) Describe the method of finding synchronous impedance of a given alternator [6M]
b) A 1500 KVA, 6600V 3 phase star connected alternator with a resistance of 0.4 ohm and reactance of 6 ohm per phase, delivers full load current at power factor 0.8 lagging, and normal rated voltage. Estimate the terminal voltage for the same excitation and load current at 0.8 power factor leading. [6M]

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SET-1

UNIT-III

6. a) Discuss the condition required for paralleling two synchronous generators. [6M]
b) Explain the effect of change of excitation and mechanical power input. [6M]
- (OR)
7. a) What is synchronizing power and explain its role in load sharing during parallel operation? [6M]
b) Calculate the maximum load of a 5000KVA, 1 phase alternator having an equivalent reactance of 5 ohm when connected to 6600 V bus bar, if its excitation is such that the electromotive force on open circuit would be 6000V. Find the armature current and power factor at this load. [6M]

UNIT-IV

8. a) Explain the construction and principle of operation of a synchronous motor? [6M]
b) What is meant by hunting and how do we suppress. [6M]
- (OR)
9. a) Explain the various starting methods of synchronous motor [6M]
b) A 1000 HP, 6 kV, 3-phase, star connected synchronous motor has a synchronous impedance of $(1.5+j16)$ ohms per phase. It is excited to develop an open circuit e.m.f of 5 kV. Draw the locus diagram of the current for loads up to 1250 HP with constant excitation. Determine the maximum value of the power factor. [6M]

UNIT-V

10. a) Explain the operation of a single phase induction motor using split phase technique [6M]
b) Explain the construction of shaded pole motor. [6M]
- (OR)
11. Explain why a universal motor operate both on AC and DC supply. What are the differences in construction between universal motor and DC series motor? Discuss its applications. [12M]