

AR18

CODE: 18CET314

SET-1

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

III B.Tech I Semester Supplementary Examinations, November-2021

**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) Find moment of resistance of a beam section 20 cm x 60 cm deep if it is reinforced with 2-20 mm bars in compression and tension, each at an effective cover of 50 mm. Use M20 mix and Fe415 grade steel. 8M
- b) Explain the differences between singly reinforced section and doubly reinforced sections. 4M

(OR)

2. a) Calculate the moment of resistance of the singly reinforced beam. The width and effective depth are 450mm, 715mm respectively. It is reinforced with 8 Numbers of Fe415 steel bars having dia 20mm. assuming M20 grade concrete. Determine also the steel when the beam is subjected to the above moment. 9M
- b) Write the assumptions of limit state collapse. 3M

UNIT-II

3. a) A simply supported beam, 300 mm wide and 600 mm effective depth carries a uniformly distributed load of 70 kN/m including self-weight, over an effective span of 5m. The reinforcement consists of 5 bars of 25 mm diameter. Design the shear reinforcement for the beam. Assume grade of concrete M20 grade of steel Fe 415 width of support = 400mm. 10M
- b) What is diagonal tension? How it is counteracted? 2M

(OR)

4. Calculate the ultimate moment of resistance of T beam having following properties. Width of the flange 1500 mm, thickness of the flange 100 mm, width of the rib 325mm, effective depth 600mm and area steel 400mm^2 . Use M20 concrete and Fe415 steel. 12M

UNIT-III

5. Design a RCC floor slab for a room having inside dimensions 6 m X 3.5 m, if the super imposed service load is 4 kN/m^2 . Use M20 grade concrete and Fe415 steel. 12M

(OR)

6. Design a simply supported R.C.C slab for a roof of a hall $4\text{m} \times 10\text{m}$ with 230mm walls all around. Assume a live load of 4 kN/m^2 and finish 1 kN/m^2 . Use M-20 grade concrete and Fe-415 steel. 12M

UNIT-IV

7. a) Design the reinforcements in column of 400mmx600mm subjected to an axial working load of 2500kN. Column has an unsupported length of 3m and is braced against side sway in both directions. Use M20 grade concrete and Fe415 steel. 8M
- b) What is the effective length of column? How the behaviour of column is affected by effective length. 4M

(OR)

8. a) Define the term foundation and give classification of foundations. 4M
- b) Design a short column axially loaded with 1000kN. Use M20 grade concrete and Fe415 steel. Assume 1% of steel. 8M

UNIT-V

9. Design an isolated footing for a square column 400 x 400 mm carrying an axial load of 800 kN. The SBC of soil may be taken as 200 kN/m². Use M20 grade concrete and Fe 415 steel. Sketch the reinforcement details. 12M

(OR)

10. The footing is to be designed for a column of size 300 x 450 mm carrying an axial load of 900 kN. Due to site condition one side of the footing is to be restricted to 2 m only. Design rectangular footing using M 20 concrete and Fe 415 steel. 12M

AR18

CODE: 18EEE311

SET-1

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

III B.Tech I Semester Supplementary Examinations, November-2021

INTEGRATED CIRCUITS APPALICATIONS

(Electrical and 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) What are the characteristics of an ideal OP-Amp? 6
- b) Draw the basic Block diagram of a general Op-Amp and explain the operation of each block? 6

(OR)

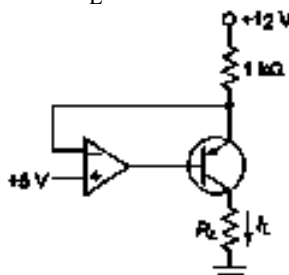
2. a) Define Slew rate and what causes it? 6
- b) The two input terminals of an Op-Amp are connected to voltage signals of strengths $745\mu\text{V}$ and $740\mu\text{V}$ respectively. The gain of Op-Amp in differential mode is 5×10^5 and CMRR is 80dB. Calculate the output voltage and % error due to common mode? 6

UNIT-II

3. a) Explain how an Op-Amp can be used as a sign changer and scale changer? 6
- b) What is a summing amplifier? Explain its operation 6

(OR)

4. a) Draw the circuit of an ideal integrator and explain its operation? 6
- b) Determine the output current I_L for the circuit shown? 6



UNIT-III

5. a) Explain the second order low pass Butterworth filter? 6
- b) Given a band pass filter with resonant frequency f_r of 1000 Hz and a bandwidth (B) of 3000 Hz find its (a) quality factor (b) lower cut off frequency (c) upper cut off frequency? 6

(OR)

6. a) Explain a band reject filter? 6
- b) Design a second order Butterworth low pass filter having upper cut off frequency 2 KHz? 6

UNIT-IV

7. a) Explain the 4 bit R-2R type ladder type D/A converter in detail? 6
b) Explain about dual slope type of A/D converter? 6

(OR)

8. a) With a neat block diagram, explain the counter type A/D converter in detail? 6
b) A system employs a 16 bit word for representing the input signal. If 6
maximum output voltage is set to 2 V, calculate the resolution of the system
and its dynamic range?

UNIT-V

9. a) What is the timer IC 555? Draw the internal structure of IC555 Timer? 6
b) Design a monostable multivibrator using 555 Timer for a pulse period of 1 6
ms

(OR)

10. a) Explain the operation of a Smith trigger using IC555? 6
b) Determine the frequency of oscillation if duty cycle $D = 20\%$ and the On 6
period $T_1 = 1\text{ms}$?

AR18

CODE: 18MET312

SET-1

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

III B.Tech I Semester Supplementary Examinations, November-2021

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

UNIT-I

1. a) Define the following terms 6M
 1. Saturated liquid
 2. Saturated Vapour
 3. Dryness fraction of steam
- b) Explain the working and analysis of the regenerative Rankine cycle with one feed water heater with T-S diagram and also find the mass of bleed steam.. 6M
- (OR)**
2. a) Discuss of the formation of steam using T-S diagram 6M
- b) A steam power plant operates on ideal Rankine cycle, receives the steam at 20 bar and 300⁰ C at a rate of 3kg/s and it is exhausted at 0.1 bar. Calculate the following 6M
 - i) quality at the end of the turbine ii) net power output iii) steam rate iv) heat rejected by the condenser in kW v) Rankine cycle efficiency.

UNIT-II

3. a) Differentiate between the boiler mountings and accessories. 6M
- b) Derive the equation for the chimney Height in natural draught. 6M
- (OR)**
4. a) Calculate the equivalent evaporation from and at 100⁰C for a boiler, which receives water at 600C and produces steam at 1.5MPa and 300⁰C. The steam generation rate is 16000kg/h. Coal is burnt at the rate of 1800 kg/h. The calorific value of coal is 34750 kJ/kg. Also evaluate the thermal efficiency of the boiler. If the efficiency of the boiler is increased by 5% due to use of economiser, find the saving in coal consumption per hour. 6M
- b) Discuss the working principle of high pressure boiler with a neat sketch. 6M

UNIT-III

5. a) Explain the working of surface condenser with a neat diagram and also mention the advantages of surface condensers over the jet condensers. 6M
- b) Derive the expressions for maximum velocity and discharge through a convergent-divergent nozzle in terms of initial pressure, specific volume and polytropic index. 6M

(OR)

6. a) What are the effects of super saturated flow on the performance of nozzle? 6M
 b) Draw the schematic diagram of counter flow jet condenser and explain its working. 6M

UNIT-IV

7. a) What is compounding, why compounding is required for steam turbines? 6M
 Explain the pressure and velocity compounding with neat sketch.
 b) Define the degree of reaction in axial flow turbines and show that for 50% of 6M
 degree of reaction the blades are symmetrical.

(OR)

8. a) Derive the required condition for maximum efficiency in case of 50% 6M
 reaction turbine.
 b) Derive an expression for maximum blade efficiency. 6M

UNIT-V

9. a) A gas turbine unit has a pressure ratio of 6:1 and maximum cycle 6M
 temperature of 610°C . The isentropic efficiencies of the compressor and
 turbine are 0.80 and 0.82 respectively. Air enters the compressor at 15°C at
 the rate of 16kg/s. Calculate
 i) work required for compression
 ii) power developed by the turbine
 iii) Net power output in kilowatts
 Take $C_p=1.005 \text{ kJ/kgK}$ and $\gamma=1.4$ for the compression process, and take
 $C_p=1.11 \text{ kJ/kgK}$ and $\gamma=1.333$ for the expansion process.
 b) Describe the working principle of the turbo jet engine. 6M

(OR)

10. a) What are the different thrust augmentation methods? 6M
 Explain.
 b) Explain regeneration in a gas turbine plant. 6M

AR18

CODE: 18ECE301

SET-1

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

III B.Tech I Semester Supplementary Examinations, November-2021

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) Write short notes on the following: (i) Accuracy (ii) Precision (iii) Sensitivity (iv) Resolution (v) Expected value (vi) Dead zone 6M
- b) Define the terms: (i) Speed of response (ii) Fidelity (iii) Lag 6M

(OR)

2. a) Explain about DC ammeter and multirange ammeter. What are the general requirements of a shunt? 6M
- b) Explain the working of Thermocouple type ammeter with neat diagram. 6M

UNIT-II

3. a) Discuss about (i) Wave analyzer (ii) FFT analyzer. 6M
- b) Explain with the help of a neat block diagram the working of Harmonic distortion analyzer. 6M

(OR)

4. a) Explain with the help of a neat block diagram the working of AF sine and square wave signal generator.. 6M
- b) Explain with the help of a neat block diagram the working of spectrum analyzer. 6M

UNIT-III

5. a) Explain about frequency and phase measurements using Lissajous patterns with figures. 6M
- b) Discuss about the following: (i) CRO probes (ii) Attenuators. 6M

(OR)

6. a) Draw the block diagram of a digital storage oscilloscope and explain its working. 6M
- b) Explain the working of Dual trace CRO with neat block diagram? 6M

UNIT-IV

7. a) Draw the Andersons bridge and derive the balancing conditions. 6M
- b) The arms of an ac Maxwell's bridge are arranged as follows: AB and BC are non-reactive resistances of 250Ω each, DA is a standard variable reactor 'L' of resistance 35.2Ω and CD comprises a standard variable resistor 'R' in series with a coil of unknown impedance. Balance is obtained when $L=25.6\text{mH}$ and $R=2.5\Omega$. Find the resistance and inductance of the Coil. 6M

(OR)

8. a) With a suitable bridge, explain the measurement of unknown capacitance with balancing equations. 6M
- b) Explain about Maxwell bridge in detail with neat circuit diagram. Write two advantages of Maxwell bridge. 6M

UNIT-V

9. a) Discuss about (i) Resistance potentiometers (ii) Piezo-electric transducers. 6M
- b) Explain the principle and operation of LVDT with neat sketches 6M

(OR)

10. a) What are the different types of strain gauges and explain how the strain can be measured using them? 6M
- b) Derive the expression for gauge factor of strain gauge. 6M

AR18

CODE: 18CSE312

SET-1

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

III B.Tech I Semester Supplementary Examinations, November-2021

**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. Discuss the hardware, software and programming elements of a modern computer system. 12 M

(OR)

2. Discuss the features of shared memory multiprocessor. 12 M

UNIT-II

3. a) Define the following terms: 6 M

- i. Virtual Address Space. ii. Cache Blocks
iii. Multilevel Page Tables iv. Hit Ratio
v. Hashing Function vi. Inverted Page Table

- b) Explain the operation of associative cache memories. 6 M

(OR)

4. Explain in detail Pipelined cache access to increase band width 12 M

UNIT-III

5. a) Give a systematic method for achieving collision-free scheduling in a nonlinear pipeline. 6 M

- b) Write brief notes on Latency Analysis of non-linear pipeline processors. 6 M

(OR)

6. a) Explain Clocking and Timing Control of linear pipeline processors. 6 M

- b) Discuss the Asynchronous and Synchronous Models of linear pipeline processors. 6 M

UNIT-IV

7. Describe the crossbar networks and multiport memory structures. 12 M

(OR)

8. a) Draw a 16-input Omega network using 2 x 2 switches as building blocks. 6 M

- b) Show the switch settings for routing a message from node 1011 to node 0101 and from node 0111 to node 1001 simultaneously. Does blocking exist in this case? 6 M

UNIT-V

9. a) Describe the cache coherence problem. 6 M

- b) Discuss store-and-forward and wormhole routing schemes. 6 M

(OR)

10. a) Explain how Snoopy protocols achieve data consistency among the caches and shared memory. 6 M

- b) Discuss Wilson's extension to the write-invalidate protocol. 6 M

AR16

CODE: 16CE3015

SET-1

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

III B.Tech I Semester Supplementary Examinations, November-2021

CONCRETE TECHNOLOGY

(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

Use of IS 10262 2019 (without solved examples at end) is permitted

UNIT-I

1. a) What is the Chemical composition of Ordinary Portland cement? 4 M
- b) Name the four the compounds into which these oxides transform into, during the process of hydration? 4 M
- c) What are their roles in fresh and hardened concrete? 4 M

(OR)

2. a) Write a detailed note on Classification of aggregates. 12 M

UNIT-II

3. a) Explain any three tests of Workability. 9 M
- b) State which test is performed respectively for low, medium and High workable concretes? 3 M

(OR)

4. a) Explain in detail, various steps in the manufacture of Concrete? 12 M

UNIT-III

5. a) State and explain Abram's Law? 4 M
- b) What are various factors affecting strength of concrete? 8 M

(OR)

6. a) Explain Maturity concept of Concrete? 4 M
- b) Explain briefly, any two non-destructive tests performed on concrete? 8 M

UNIT-IV

7. Design and determine the mix proportions for M25 grade concrete for the following data as per IS 10262 2019. 12 M

STIPULATIONS FOR PROPORTIONING

- a) Grade designation: M 25 RCC
- b) Type of cement: 43 grade Ordinary Portland Cement conforming IS 8112
- c) Maximum nominal size of coarse aggregate: 20 mm
- d) Minimum amount of cement: 300 kg/m³ as per IS 456
- e) Maximum water-cement ratio: 50 as per Table 5 of IS 456:2000
- f) Workability: 75-125 mm slump
- g) Exposure condition: Moderate (For Reinforced Concrete)
- h) Method of concrete placing: Pumping
- j) Degree of supervision: Good
- k) Type of aggregate: Crushed Angular Aggregates
- l) Chemical admixture type: Super Plasticizer conforming to IS 9103

TEST DATA FOR MATERIALS

- a) Cement used: Sagar 43 grade Ordinary Portland cement conforming IS 8112
- b) Specific gravity of cement: 3.14
- c) Chemical admixture: Super Plasticizer Conplast SP 430
- d) Specific gravity of
 - 1) Coarse aggregate 20 mm: 2.799 and 10 mm: 2.789
 - 2) Combined Specific Gravity of aggregate (20 mm 60% & 10 mm 40%) = 2.795
- 4) Fine aggregate: 2.517
- e) Water absorption:
 - 1) Coarse aggregate 20 mm: 0.41% and 10 mm: 0.59%
 - 3) Fine aggregate: 1.87 %
- f) Aggregate Impact Value: 20.52%
- g) Combined Flakiness & Elongation Index: 27.57 %
- h) Sieve analysis:
 - 1) Coarse aggregate: Conforming to all in aggregates of Table 2 of IS 383
 - 2) Fine aggregate: Conforming to Grading Zone III of Table 4 of IS 383

(OR)

8. a) What are the statistical parameters for cube strength? 6 M
- b) How do you assess the quality of two batches of concrete having the same average strength? 6 M

UNIT-V

9. Write a detailed note on method of manufacturing and applications of Light weight Concrete. 12 M

(OR)

10. Write a detailed note on method of manufacturing and applications of Polymer concrete. 12 M

AR16

CODE: 16ME3017

SET-2

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

III B.Tech I Semester Supplementary Examinations, November-2021

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) Sketch and explain with a block diagram generalized measurement system and its elements with an example 7M
- b) Explain the following terms. i) Range and span 7M
ii) Resolution iii) Calibration iv) Sensitivity

(OR)

2. a) What are the different types of errors occurred in measurement system? Explain them in detail 7M
- b) Explain principle and operation of resistive displacement transducer 7M

UNIT-II

3. a) Derive gauge factor of a resistance strain gauge 7M
- b) A $300\ \Omega$ strain gauge is bonded to allow carbon steel bar which has been subjected to a tensile load. The bar has pre load uniform cross sectional area of $0.5 \times 10^{-4}\ \text{m}^2$ and young's Modulus is $400\ \text{GN/m}^2$. If a load of $30\ \text{kN}$ produces a change of $1\ \Omega$ gauge resistance, determine the gauge factor 7M

(OR)

4. a) Explain principle and operation of torsion meter for torque measurement 7M
- b) What are the factors affecting measurement of tensile and compressive strains. 7M

5. a) Discuss the working of a bourdon tube pressure gauge with relevant sketch and mention merits and demerits 7M
- b) Explain different methods of temperature compensation in strain gauges 7M

(OR)

6. a) Explain the operation of any thermal conductivity gauge for pressure measurement with a sketch 7M
- b) Explain principle and operation of optical pyrometer with neat sketch 7M

UNIT-IV

7. a) Why rotameter is called variable area flow meter? Describe its construction and working with a neat sketch 7M
- b) Draw and explain Dew point meter for Measurement of moisture 7M

(OR)

8. a) Explain the following : 7M
i) humidity ratio ii) relative humidity iii) wet bulb temperature
- b) Explain the measurement of flow rate using ultrasonic flow meter 7M

UNIT-V

9. Explain how temperature can be measured by using a closed loop with a block diagram. What are the different units present in the block diagram and explain the functions of each unit 14M

(OR)

10. a) What is a closed loop? Show the various elements of closed loop and list out the functions of each element 7M
- b) Explain the different feedback systems with neat sketches 7M

AR16

CODE: 16EC3018

SET-2

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

III B.Tech I Semester Supplementary Examinations, November-2021

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(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) Discuss about various static characteristics of an instrument? 7M
b) Explain different types of errors in an instrument 7M
- (OR)**
2. a) Explain design of Multirange Ammeter? 7M
b) Explain design procedure of series type ohmmeter? 7M

UNIT-II

3. a) Explain how sine waves are generated from an AF Oscillator? 7M
b) With a neat circuit explain working of a square wave generator? 7M
- (OR)**
4. a) Draw block diagram of harmonic distortion analyser and explain function of each block? 7M
b) Explain working of digital Fourier analyser and also write its merits and demerits? 7M

UNIT-III

5. a) Distinguish between conventional CRT and storage CRT? 7M
b) Explain advantages of Sampling Oscilloscope? 7M
- (OR)**
6. a) Draw block diagram of dual trace Oscilloscope and explain function of each block? 7M
b) Explain advantages of Digital storage Oscilloscope? 7M

UNIT-IV

7. a) Derive balancing conditions for AC bridge? 7M
b) Explain measurement of unknown capacitance using Schering bridge? 7M
- (OR)**
8. a) Explain how stray capacitance is minimised using Wagner ground connection in Wein bridge? 7M
b) Explain measurement of unknown inductance using Maxwell's bridge? 7M

UNIT-V

9. a) Explain how displacement is measured using capacitive type transducer? 7M
b) Explain how force is measured using piezoelectric transducer? 7M
- (OR)**
10. a) Explain how displacement is measured using LVDT? 7M
b) Discuss about merits and demerits of LVDT? 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) What is object oriented programming and explain its features. 9 M
b) Write a Java program to implement Stack operations. 5 M
- (OR)**
2. a) Explain different types of operators in Java with suitable examples. 7 M
b) Write short notes on arrays and write a java program which accepts elements of matrix and display its transpose. 7 M

UNIT-II

3. a) What is the difference between default constructor and parameterized constructor? 8 M
b) Explain different access specifiers in java with examples. 6 M
- (OR)**
4. a) What is a recursion and explain with an example. 7 M
b) Explain about garbage collection and finalize methods in java. 7 M

UNIT-III

5. a) What is meant by inheritance? Explain the types of inheritance in java. 7 M
b) Demonstrate method overriding with an example. 7 M
- (OR)**
6. a) Explain dynamic method dispatch with an example program. 7 M
b) What is interface? Write a program to demonstrate how interfaces can be executed. 7 M

UNIT-IV

7. a) What is package? How do you create a package? Explain about the access protection in packages. 7 M
b) Explain Exception handling mechanism with an example. 7 M
- (OR)**
8. a) Explain about User defined packages and write a java program to create a user defined packages. 7 M
b) Create a try block that is likely to generate three types of exception and incorporate necessary catch blocks to catch and handle them. 7 M

UNIT-V

9. a) Explain how threads with different priorities execute in environment which supports priorities and which doesn't support priorities. 9 M
b) What are the functions available in java related to priority? 5 M
- (OR)**
10. a) What are applets? Explain the different stages in the life cycle of an applet. 9 M
b) Write a java program which draws a dashed line and dotted line using applet. 5 M

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****III B.Tech I Semester Supplementary Examinations, November-2021****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) Why is the field winding placed on rotor instead on stator of an alternator?
 - b) What happens to the value of synchronous reactance if air gap is increased?
 - c) What is the role of damper winding in synchronous generator?
 - d) Define synchronous impedance
 - e) Why is MMF method called as optimistic method?
 - f) What is the need for parallel operation of synchronous generators?
 - g) List any two applications of synchronous motors
 - h) Why synchronous motors are not self-starting?
 - i) List the different types of single-phase induction motors.
 - j) List any two applications of shaded-pole motor

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2.
 - a) Explain the effect of armature reaction in an alternator at unity power factor 6M
 - b) Explain the constructional features of salient pole and cylindrical rotor. 6M
- (OR)**
3.
 - a) Explain how different winding factors affect the induced E.M.F. 6M
 - b) In a 3-phase, star-connected alternator, there are 2 coil sides per slot and 16 turns per coil. The stator has 288 slots. When run at 250 rpm the line voltage is 6600 volts at 50 Hz. The coils are short pitched by 2 slots. Calculate the flux per pole. 6M

UNIT-II

4. What is meant by synchronization? List the ways of synchronizing an alternator to the infinite bus bars. Explain any one of them. 12M
- (OR)**
5.
 - a) What is voltage regulation? Explain the synchronous impedance method for the determination of voltage regulation of an alternator. 6M
 - b) A star connected 400 V, 50 Hz, 4 pole synchronous machine gave the following open circuit and short circuit test results: 6M
Open circuit test: $V_{oc} = 400V$ (rms, line-to-line) at field current, $I_f = 2.3 A$
Short circuit test: $I_{sc} = 10A$ (rms, phase) at field current, $I_f = 1.5 A$
Find the value of per phase synchronous impedance in Ω at rated voltage.

UNIT-III

6. a) Explain the effect of change of excitation in parallel operation of alternators 6M
b) Two alternators operating in parallel have induced emf of $220 \angle 0^\circ$ volts and $220 \angle 10^\circ$ volts per phase and their respective reactances are 3Ω and 4Ω . Calculate the terminal voltage, current and power delivered by each alternator when connected to a load of 6Ω .

(OR)

7. a) Explain the effect of mechanical power input in parallel operation of alternators 6M
b) Two alternators running in parallel have an induced emf of 1000 volts per phase. The synchronous impedance of each machine is $Z_1 = (0.1 + j 2) \Omega$ and $Z_2 = (0.2 + j 3.2) \Omega$. They supply a load of impedance $Z = (2 + j 1) \Omega$ per phase. Find their terminal voltage, load currents, power outputs and no load circulating current for a phase divergence of 10° electrical.

UNIT-IV

8. a) Explain the variation of current and power factor of a synchronous motor with excitation. 6M
b) What is meant by synchronous condenser and how it is useful? 6M
- (OR)**
9. a) Explain the different methods of starting of synchronous motors. 6M
b) Explain hunting in a synchronous motor and how can hunting be suppressed? 6M

UNIT-V

10. a) Draw and discuss the constructional details of a capacitor start single-phase induction motor. 6M
b) Explain the principle of operation of universal motor 6M
- (OR)**
11. a) Explain the principle of operation of AC series motor 6M
b) Explain the principle of operation of shaded pole motor 6M

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****III B.Tech I Semester Supplementary Examinations, November-2021****ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Electronics and Communication Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) Define accuracy of an instrument
- b) Mention the purpose of shunt resistance in dc shunt ammeter
- c) List the frequency techniques used in spectrum analyzer?
- d) Harmonic distortion analyzer is an instrument used to measure _____
- e) Mention few applications of CRO?
- f) What is the difference between active and passive transducer?
- g) Which bridge is used for measurement of capacitance?
- h) Define the sensitivity of a wheatstone bridge?
- i) Outline the various factors to be considered for selection of transducer?
- j) Summarize the various factors of data acquisition?

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) What is the difference between precision and accuracy of a measuring instrument? Define the sensitivity of a voltmeter with an example? 6M
 - b) What are the static characteristics of a measurement? Explain? 6M
- (OR)**
3. a) List the dynamic characteristics of a measurement and explain each characteristic? 6M
 - b) Write short notes on digital multimeters? 6M

UNIT-II

4. a) What is function generator and mention the requirements to produce a pulse? 6M
- b) Draw the block diagram and explain the operation of swept frequency type spectrum analyzer 6M

(OR)

5. a) Explain with neat diagram, the working of harmonic distortion analyzer? 6M
b) With a neat block diagram discuss about an AF square wave generator? 6M

UNIT-III

6. a) With the help of block diagram, explain the functioning of each component of CRO? 6M
b) With examples, explain how frequency of a waveform is measured using CRO? 6M

(OR)

7. a) Discuss in detail the operation of Digital Storage Oscilloscope? 6M
b) Explain Lissajous method of frequency measurement? 6M

UNIT-IV

8. a) With neat sketch, describe Wien's bridge and how it is used to measure the frequency? 6M
b) With neat sketch, describe Wheatstone's bridge and also derive the expression for bridge balance? 6M

(OR)

9. a) Describe the Maxwell's bridge with neat sketch and obtain the expression for unknown inductor? 6M
b) With neat sketch, describe Kelvin's bridge and derive the necessary equations? 6M

UNIT-V

10. a) Write short notes on Piezo-electric transducer? 6M
b) Explain the operation of LVDT? 6M

(OR)

11. a) Mention the objectives of a data acquisition system? 6M
b) Write short notes on strain gauge ? 6M

AR13

CODE: 13CS3014

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, November-2021

OPERATING SYSTEMS (Common to CSE & IT)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1.
 - a) Define system calls.
 - b) List the basic services provided by operating system.
 - c) Describe binary semaphore and counting semaphore?
 - d) Differentiate between Contiguous and Non Contiguous Memory allocation.
 - e) Classify global and local replacement algorithms.
 - f) What is Demand Paging?
 - g) What is the importance of TLB?
 - h) What are the operations that can be performed on files?
 - i) Define Boot block.
 - j) What is Belady's Anamoly Problem?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2.
 - a) Describe various services offered by operating system. 6M
 - b) Draw and explain how CPU switches from one process (P0) to another process (P1)? 6M
- (OR)
3.
 - a) Define Process Control Block (PCB). Discuss the different components of PCB. 5M
 - b) Calculate the Average Waiting time and Average Turnaround time for the following processes under SJF and Priority scheduling algorithms. 7M

Process	Burst	Priority
P ₁	8	4
P ₂	6	1
P ₃	1	2
P ₄	9	2
P ₅	3	3

UNIT-II

4. a) What are the requirements that a solution to the critical section problem must satisfy? Briefly explain. 6M
b) Discuss about semaphore usage and implementation. 6M
(OR)
5. a) What is a dead lock? What are four necessary conditions to deadlock occur? 5M
b) Consider the following snapshot of a system- 7M

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using the Banker's algorithm-

- i) What is the content of the matrix need?
ii) Is the system in a safe state?
iii) If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?

UNIT-III

6. a) Explain the paging H/w with TLB in detail? 6M
b) Give memory partition of 100K, 500K, 200K, 300K and 600K (in order). How would each of the first fit, best fit and worst fit algorithm place process of 212k, 417k, 112k and 426k (in order)? Which algorithm makes the most efficient use of memory? 6M
(OR)
7. a) Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs. 6M
b) Summarize the cause of thrashing and working-set model. 6M

UNIT-IV

8. a) Discuss various methods to implement directory in file management. 6M
b) Explain various file accesses methods 6M
(OR)
9. a) Illustrate the concept of File-system implementation. 6M
b) Discuss about Free-Space Management of file-system. 6M

UNIT-V

10. What are the different block and character devices? Explain in detail 12M
(OR)
11. Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive currently services a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending request in FIFO order is 86,1470,913,1774,948,1509,1022,1750,130 Starting from the current position, Analyze the total distance(in cylinders) that the disk arm moves to satisfy all pending requests, for each of the following algorithms i)FCFS ii) SSFT iii) SCAN iv) LOOK v) C-SCAN 12M