AR18

CODE: 18CET314   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular Examinations, March, 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) What are assumptions in Limit State Design?   4M
    b) A Reinforced concrete beam 200 mm wide and 500 mm effective depth is   8M
        reinforced with 4 bars of 16 mm diameter. If the beam is simply supported
        over a span of 5 m, find the ultimate moment of resistance the beam can
        carry. Use M 20 grade concrete and Fe 415 grade steel.

(OR)

2. a) Differentiate between under reinforced and over reinforced sections.   4M
    b) Design a rectangular reinforced concrete beam for a clear span of 4200 mm.   8M
        The super imposed load is 35 kN/m and the size of the beam is limited to
        250 mm x 400 mm. Use M20 grade concrete and Fe 415 steel. Support
        width is 300 mm each and effective cover is 50 mm.

UNIT-II

3.   A rectangular beam of 300 mm width and 550 mm depth is subjected to a   12M
        bending moment of 60 kN-m and a shear force of 50 kN and twisting
        moment of 20 kN-m. Design the beam adopting M 20 grade concrete and Fe
        415 grade steel.

(OR)

4.   Calculate the ultimate moment of resistance of a 'T' beam having following   12M
        section properties, width of the flange 1500mm., thickness of the flange
        100mm, width of the rib 325mm, effective depth of the beam 500mm. Area
        of the steel 1600mm^2. Use M20 concrete and Fe415 steel.

UNIT-III

5.   Design a simply supported RC slab for a hall 6 m and 13.5m long which is   12M
        supported on RCC beams 250mm wide. live load is 2.75 kN/m^2. Floor
        finishing equal to 1.5 kN/m^2. Use M20 concrete and Fe 415 steel.

(OR)

6.   A R.C. Slab is to be provided for a room measuring 5.8m x 5m size. The   12M
        width of the supporting beams is 250 mm; the slab carries Live Load of 4
        kN/m^2 and Floor Finish of 1 kN/m^2. Use Concrete M 20 and steel grade Fe
        500. Design the slab for the corners free to lift condition. Draw the plan,
        section along short and long spans.

UNIT-IV

7. a) Explain the requirements of reinforcement in columns. 4M

   b) A R.C.C square column is to be designed to carry an axial load of 2400 kN The reinforcement is to be restricted to 2% of gross area. Adopting M 25 concrete and Fe 415 steel, design the column. The column may be considered as short. 8M

(OR)

8. a) State the importance of slenderness ratio in columns. 4M

   b) Design the reinforcements in a short column 400 x 600mm subjected to an ultimate load of 1500kNm together with ultimate moments of 120kNm about the major and minor axes. Adopt M-20 concrete and Fe 415 steel 8M

UNIT-V

9. Design a square footing for a square R.C.C. column 600mm size to carry an axial load of 1400kN including the self-weight of the column. The bearing capacity of the soil is 200kN/m2. Use M25 concrete and Fe 415 steel. 12M

(OR)

10. Design a suitable footing for a 500 mm x 500 mm square column transferring 100 kN axial load and a moment of 35 kN-m. The safe bearing capacity of soil is 190 kN/m^2. Use M 20 concrete and Fe 415 steel. Adopt limit state design method. 12M

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AR18

CODE: 18EEE311   SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular Examinations, March,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) Compare the ideal and practical characteristics of an Op-Amp?   6
   b) Explain the terms input bias current, input offset current and input offset   6
   voltage.

(OR)

2. a) What are the four different types of feedback configurations? Explain with   8
      relevant figures?
   b) Assume that an Op-Amp has I_{B1}=400 nA and I_{B2}= 300nA. Determine the   4
      average bias current I_B and the offset current I_{OS}.

UNIT-II

3. a) Draw the circuit diagram of an Op-Amp differentiator and derive the   6
      expression for the output in terms of the input?
   b) Explain the operation of Astable multi vibrator using 741 op-amp   6

(OR)

4. a) Draw an Op-Amp summing amplifier circuit and obtain an expression for   6
      the output voltage?
   b) Determine the V_o for the circuit shown? Derive the expression   6
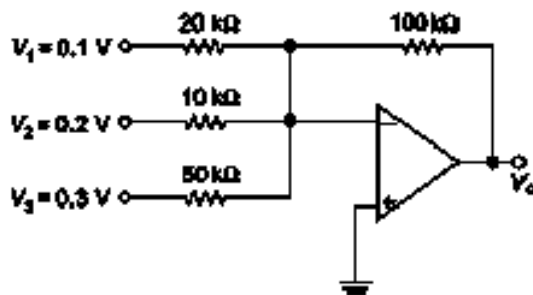
UNIT-III

5. a) How can you realise a second order low pass filter using Op-Amp and   6
      derive its output response.
   b) Draw the circuit diagram of all pass filter and derive its response.   6

(OR)

6. a) Compare the frequency response characteristics of first order and second order Butterworth filters?   6

    b) Design a first order high pass filter at a cut off frequency of 2 KHz with a pass band gain of 2. Also, plot its frequency response.   6

UNIT-IV

7. a) Explain the 4 bit weighted resistor type D/A converter in detail?   6

    b) Explain 3 bit parallel comparator ADC.   6

(OR)

8. a) With a neat block diagram, explain successive approximation type A/D converter in detail?   6

    b) An 8 bit D/A converter has a resolution of 10mV/bit. Find the analog output voltage for the inputs(i) 10001010 (ii) 00010000   6

UNIT-V

9. a) Derive the expression for the period of a pulse generated when 555 Timer is used as a monostable multivibrator?   6

    b) Draw the functional block diagram of 555 timer and explain.   6

(OR)

10. a) List various applications of 555 Timer?   6

    b) Design a astable multivibrator using 555 timer for a frequency of 1KHz and a duty cycle of 70 %. Assume C = 0.1 µs ?   6

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular Examinations, March,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.	With the help of line diagram explain the working of a ideal Rankile with P-V and T-S diagram.	12M

(OR)

2.	a)	Discuss the formation of steam using T-V diagram	6M
	b)	A steam power plant operates at a boiler pressure of 7MPa and steam enters turbine with a dry saturated condition & condenser pressure of 20kpa. Determine: 1) Energy supplied/kg of stem produced in boiler. 2) Quality of steam entering the condenser. 3) Rankine cycle efficiency considering the pump work. 4) Specific steam consumption.	6M

UNIT-II

3.	a)	Discuss the working the principle of water tube boiler with a neat sketch.	6M
	b)	Estimate the mass of flue gases flowing through the chimney as per data given below : Draught produced = 20 mm of water column Temperature of the flue gases = 573 K Ambient temperature = 303 K The mass of air used = 19 kg per kg of fuel burnt Diameter of the chimney = 2 m ; Neglect the losses.	6M

(OR)

4.	a)	Discuss the parameters to be considered during selection of good boiler.	6M
	b)	The chimney of 50 m height is used to discharge the flue gases at 350ºC to the atmosphere which is at 25ºC. The mass of air supplied per Kg of coal burnt is 19 Kg. Calculate i) The static draught in mm of water column and ii) The velocity of flue gases passing through the chimney if the friction losses are 30% of the theoretical draught.	6M

UNIT-III

5.	A steam condenser is supplied with 1000 kg/min steam in 0.9 dry state. The pressure at suction of air extraction pump on condenser is 70 cm of Hg and barometer reads 77 cm of Hg. Temperature in suction pipe is 30°C and air leaks at the rate of 5x10-4 kg per kg of steam. Cooling water temperature gets increased by 15°C. Determine the mass handled by dry air extractor and cooling water circulation rate in kg/min.	12M

(OR)

6. a) A vacuum of 710mm of Hg was recorded in a condenser when the barometer reads 755mm of Hg .The temperature of the condensate was 250C. Evaluate the pressure of steam and air in the condenser, mass of air per kg of steam and also calculate the vacuum efficiency. 6M

   b) Derive the expression for Critical pressure ratio in nozzles. 6M

UNIT-IV

7. a) The following data refer to a particular stage of a Parson's reaction turbine 6M
   Speed of the turbine = 1500 rpm ;   Mean diameter of the rotor = 1m
   Stage efficiency = 80%   ;Speed ratio = 0.7 ;   Blade outlet angle = 200
   Determine the available isentropic enthalpy drop in thestage.

   b) In a De Laval turbine steam issues from the nozzle with a velocity of 1200 m/s. The nozzle angle is 200,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 1000 kg, calculate: 6M
   i) Blade angles ii) Relative velocity of steam entering the blades.
   iii) Tangential force on the blades. iv) Power developed
   v) Blade efficiency.

(OR)

8. a) Explain differences between an Impulse and Reaction turbines? 6M

   b) What is compounding? What are the different methods of Compounding? With a neat sketch explain any one type of compounding. 6M

UNIT-V

9. a) Explain the principle of operation of a turbojet engine and state its advantages and disadvantages 6M

   b) Explain the difference between open cycle gas turbine to closed cycle gas turbine 6M

(OR)

10. a) A gas turbine plant, that makes use of Brayton cycle in an application, takes in air at 1.2 bar (abs) and 20^0C temperature and compresses it through a pressure ratio of 8. 6M
    It is then heated to 850^0C in a combustion chamber and is expanded back to a pressure of 1.2 bar (abs). Calculate (i) the work done, (ii) the cycle efficiency and (iii) the work ratio. It is given that the "isentropic efficiencies" of the "turbine" and the "compressor" are, respectively, 80% and 70%

    b) With a neat sketch and T-s diagram, explain the working of turbojet engine and also derive expression for the thrust developed. 6M

AR18

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 dynamic characteristics of an instrumentation system in brief. 6M
    b) What are the 3 general classes of errors? Explain them in detail and how to minimize or overcome these errors 6M

(OR)

2. a) Mention the advantages of an Aryton shunt ammeter over Multirange ammeter. 4M
    b) The circuit of shunt type ohmmeter uses a 10 mA basic D'Arsonval movement with an internal resistance of 5Ω. The battery voltage E = 3V. It is desired to modify the circuit by adding an appropriate resistor Rsh across the movement, so that the instrument will indicate 0.5Ω at the middle point on its scale. Calculate (i) the value of the shunt resistor, Rsh (ii) the value of current limiting resistor, R1. 8M

UNIT-II

3. a) Discuss about the working of resonance bridge type harmonic distortion analyzer? 6M
    b) Draw the block diagram of AF sine and square wave signal generator and explain? 6M

(OR)

4. a) Draw the block diagram of a general-purpose spectrum analyzer and explain its working. 6M
    b) Explain the working of an audio range wave analyzer with a neat block diagram. 6M

UNIT-III

5. a) Explain alternate mode and chop mode of dual trace oscilloscope. 6M
    b) With a neat sketch explain the operation of storage oscilloscope? 6M

(OR)

6. a) Describe the construction and working of a dual trace oscilloscope using block diagram. 6M
    b) Draw the block diagram of digital storage oscilloscope. 6M

UNIT-IV

7. a) With the help of circuit diagram explain how unknown frequency value can be determined using wien's bridge? 6M
    b) If the wien's bridge constants are R_1=3.1k, R_2=25k, R_4=100k, C_1=5.2µf, C_3=20.3pf, Find the value of frequency of oscillation of the circuit? 6M

(OR)

8. a) Explain the basic principle of wheatstone bridge and derive the expression to find the value of unknown resistance? 6M
    b) A Maxwell bridge is used to measure an inductive impedance. The bridge constants at balance are C, = 0.01 µF, R, = 470 kΩ, R2 = 5.1 k Ω, and R3 = 100 kΩ. Find the series equivalent of the unknown impedance? 6M

UNIT-V

9. a) Explain the method of measuring displacement using LVDT. State the advantage and disadvantages of LVDT. 6M
    b) Explain the working of resistive position transducer? 6M

(OR)

10. a) Explain the Principle and different forms of thermistors? 6M
    b) Explain the working principle and the construction of thermocouples. List the advantages and disadvantages of thermocouples. 6M

AR18

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular Examinations, March,2021

BIOMEDICAL INSTRUMENTATION
(Elective)
(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.		Block diagram of man- instrumentation system and explain each block.	12M
		(OR)	
2.	a)	Explain briefly about physiological systems of the human body with neat sketches.	6M
	b)	Explain in detail with neat diagram about Micro electrodes used in biomedical applications.	6M

UNIT-II

3.	a)	Explain about 12 lead ECG recording.	8M
	b)	Draw the ECG waveform and explain its significance.	4M
		(OR)	
4.	a)	Explain how the heart sounds are measured?	6M
	b)	Explain the measurement of blood pressure using sphygmomanometer.	6M

UNIT-III

5.	a)	What are the requirements of a patient monitoring display? Explain one monitoring display system.	6M
	b)	What is spirometer? Explain the principle of operation of it.	6M
		(OR)	
6.	a)	Elements of intensive care monitoring system?	6M
	b)	Draw and explain the working principle of dc defibrillator.	6M

UNIT-IV

7.	a)	Explain the different elements involved in bio telemetry circuits.	6M
	b)	Explain different types of implantable units in telemetry.	6M
		(OR)	
8.		Briefly explain the working of biolink PWM transmitter and receiver system.	12M

UNIT-V

9.	a)	Explain the generalized model of an electrical accident.	6M
	b)	Briefly explain the electric power distribution system for electrical equipment.	6M
		(OR)	
10.	a)	Explain the physiological effects of electrical current.	6M
	b)	Explain the methods of accident prevention?	6M

AR18

CODE: 18CSE312   SET-2
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech. I Semester Regular Examinations, March, 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.	a)	Explain Flynn's classification of computer architectures.	8 M
	b)	Write brief notes on any four performance factors.	4 M

(OR)

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

UNIT-II

3.	Explain in detail about the optimization of cache performance.	12 M

(OR)

4.	a)	Briefly describe memory hierarchy design.	6 M
	b)	Define the following terms:	6 M

    i.   Physical Address Space.   ii. Address Mapping.
    iii.   Page Fault   iv. Memory Replacement Policies
    v.   Hit Ratio   vi. Page Table

UNIT-III

5.	a)	Write in brief linear pipeline processor	6 M
	b)	Explain the following concepts in pipeline processors:	6 M

    i.   Speedup   ii. Efficiency iii. Throughput

(OR)

6.	Briefly describe Optimization of Pipeline Schedule.	12 M

UNIT-IV

7.	Explain the following multistage networks:	12 M

    a) Omega network   b) Butterfly network

(OR)

8.	Explain the following terms related to vector processing;	12 M

    a)   Vector and scalar balance point   b) Vectorization ratio in user code.
    c) Vectorization compiler or vectorizer.   d) Vector reduction instructions.
    e) Gather and scatter instructions.   f) Sparse matrix and masking
       instruction.

UNIT-V

9.	Write in detail about Message-Routing Schemes.	12 M

(OR)

10.	Explain in detail about flow control strategies.	12 M

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AR16

CODE: 16CE3015   SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular & Supplementary Examinations, March,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)	How do you test the quality of cement in a construction site?\	4 M
	b)	Write the classification of cement.	10 M

(OR)

2.		Write a detailed note on Classification of admixtures.	14 M

UNIT-II

3.	a)	Define Workability?	4 M
	b)	Write the manufacturing process of fresh concrete.	10 M

(OR)

4.	a)	Distinguish between Segregation & bleeding.
	b)	What are the various causes of Segregation and Bleeding?

UNIT-III

5.	a)	What are various methods of curing adopted for curing concrete?	8 M
	b)	Distinguish between Autogenous Shrinkage and Drying Shrinkage?	6 M

(OR)

6.	a)	Define Creep? What are various factors affecting creep in concrete?	7 M
	b)	Distinguish between Primary, Secondary and Tertiary Creep?	7M

UNIT-IV

7.	Design and determine the mix proportions for M35 grade concrete for the following data as per IS 10262 2019.	14 M

STIPULATIONS FOR PROPORTIONING	TEST DATA FOR MATERIALS
a) Grade designation: M 25 RCC	a) Cement used: Sagar 53 grade Ordinary Portland cement conforming IS 8112
b) Type of cement: 53 grade Ordinary Portland Cement conforming IS 8112	b) Specific gravity of cement: 3.14
c) Maximum nominal size of coarse aggregate: 20 mm	c) Chemical admixture: Super Plasticizer Conplast SP 430
d) Minimum amount of cement: 300 kg/m³ as per IS 456	d) Specific gravity of 1) Coarse aggregate 20 mm: 2.799 2) Coarse aggregate 10 mm: 2.789
e) Maximum water-cement ratio: 50 as per Table 5 of IS 456:2000	3)Combined Specific Gravity of aggregate (20 mm 60% & 10 mm 40%) = 2.795
f) Workability: 75-125 mm slump	4) Fine aggregate: 2.517
g) Exposure condition: Moderate (For Reinforced Concrete)	**e)** Water absorption: 1) Coarse aggregate 20mm: 0% and 10mm: 0% 3) Fine aggregate: 0%
h) Method of concrete placing: Pumping	f) Sieve analysis:
j) Degree of supervision: Good	1) Coarse aggregate: Conforming to all in aggregates of Table 2 of IS 383
k) Type of aggregate: Crushed Angular Aggregates	2) Fine aggregate: Conforming to Grading Zone II of Table 4 of IS 383
l) Chemical admixture type: Super Plasticizer conforming to IS 9103	

(OR)

8. a) What do you understand by quality control? What are the advantages of Quality control? List at least four measures adopted for field quality control?   6 M

    b) What are various factors affecting the proportioning of concrete mixes?   8 M

UNIT-V

9. Write a detailed note on method of manufacturing and applications of Fibre reinforced concrete.   14 M

(OR)

10. Write a detailed note on method of manufacturing and applications of Self compacting concrete.   14 M

AR16

CODE: 16EE3017   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular & Supplementary Examinations, March, 2021

ELECTRICAL MACHINES-III
(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 why a single phase single winding induction motor produces no starting torque.   7 M

   b) The following test results were obtained in case of a 230V, single –phase induction motor: 7 M

   No-load test : 230V, 7 A, 400W

   Locked rotor test: 115V, 20A, 600W.

   Stator winding resistance = 1.4Ω.

   Determine the approximate equivalent circuit of the motor.

(OR)

2. a) Discuss constructional details of single phase induction motor   7 M

   b) A 220volts,4pole, 50Hz, single phase induction motor has the following equivalent circuit parameters   7 M

   $$R_1 = 3.6 \ \Omega, X_1 = 15.6 \ \Omega, X_m = 96 \ \Omega, R_2 = 6.8 \ \Omega, X_2 = 15.6 \ \Omega$$

   The rotational losses of the motor are estimated to be 80 watts. Calculate the current, power factor, and efficiency when the motor is running 1440rpm.

UNIT-II

3. a) Compare operating characteristics of a resistance –start induction motor with those of a capacitor start induction motor.   7 M

   b) Explain why a universal motor can operate from dc as well as ac supply what are the differences in construction between universal motor and dc series motor.   7 M

(OR)

4. a) Describe the construction and working of shaded pole motor.   7 M

   b) Explain working principle of AC series motor.   7 M

UNIT-III

5.	a)	Write the principle of operation of stepping motor and give the difference between single stack and multi stack stepping motors.	7 M
	b)	Drive the torque equation of variable reluctance stepping motor.	7 M

(OR)

6.	a)	Explain the construction and operation of variable reluctance type stepper motor.	7 M
	b)	Analyze the stepping angle for a 3 phase 24 pole permanent magnet type stepper motor.	7 M

UNIT-IV

7.	a)	Write short notes on torque and emf equation of permanent magnet brushless DC Motor.	7 M
	b)	List out drawbacks of surface mounted permanent magnet BLDC motor.	7 M

(OR)

8.	a)	Draw and explain speed- torque characteristics of BLDC motor.	7 M
	b)	Compare conventional DC motor and BLDC motor.	7 M

UNIT-V

9.	a)	Discuss the goodness factor of linear induction motor? How it can be improved.	7 M
	b)	Explain about principle and operation of LIM	7 M

(OR)

10.	a)	Explain the constructional details of linear induction motor	7 M
	b)	Explain different types and applications of linear motors.	7 M

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AR16

CODE: 16ME3017   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Supplementary Examinations, March,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)	What are the various sources of gross, systematic and random errors in the measuring instruments? How those errors are minimized?	6M
	b)	Write notes on dynamic performance characteristics of a system.	4M
	c)	Write short notes on calibration procedures for transducers	4M

(OR)

2.	a)	Explain the use of wire wound potentiometers for the measurement of linear and rotary motions. Point out the advantages and limitations of transducers.	7M
	b)	Explain the principle of working of a seismic instrument used as an accelerometer.	7M

UNIT-II

3.	a)	How will you use an elastic transducer to measure force? Give at least three different configurations for such measurement and write down the relation between the force and resulting deformation in each case.	7M
	b)	Explain the principle of measuring shaft torques using electrical torsion meter with neat sketch.	7M

(OR)

4.	a)	What are the requirements of materials for strain gauges?	3M
	b)	Define Strain rosette. Classify strain rosette. How it is used for strain measurement.	5M
	c)	Distinguish between bonded and unbounded type of resistance strain gauges.	6M

UNIT-III

5.	a)	Sketch and explain bellows pressure gauge for measurement of differential pressure.	6M
	b)	Explain the working principle of McLeod pressure gauge. State advantages and disadvantages of Mc Leod pressure gauge	8M

(OR)

6.	a)	Classify temperature measuring instruments and explain working of various types of solid expansion thermometers.	7M
	b)	How to measure the level measurement by using capacitive transducer?	7M

UNIT-IV

7. a) Why Rotameter is called constant head variable area flow meter? and explain the working rorameter with neat sketch.   6M
   b) With the help of hot wire bridge circuit explain the working of hot wire anemometer in constant current mode and constant temperature mode.   8M

(OR)

8. a) Explain the measurement of humidity using absorption Hygrometer   8M
   b) Define the Psychometric terms: i) Relative humidity, ii) Dew point temperature and iii) Wet bulb temperature.   6M

UNIT-V

9. a) What are the basic elements of a control system? Explain   6M
   b) Illustrate with example, explain closed loop temperature control system.   8M

(OR)

10. a) What are the limitations of open loop systems?   6M
    b) Explain PID control algorithm and write their advantages and disadvantages?   8M

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AR16

CODE: 16EC3018   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular & Supplementary Examinations, March-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 dynamic characteristics of a instrument?	7M
	b)	Discuss in detail about thermocouple typeRF ammeter?	7M
		(OR)	
2.	a)	Explain design procedure of a shunt type ohmmeter?	7M
	b)	Explain design procedure for Multirange voltmeter?	7M

UNIT-II

3.	a)	Draw block diagram of function generator and explain function of each block. Also discuss about source of errors in measurement?	7M
	b)	Draw the block diagram of AF sine and square wave signal generator and explain?	7M
		(OR)	
4.	a)	Explain block diagram of a tuned harmonic distortion analyser?	7M
	b)	What is difference between CRO and spectrum analyser and also draw block diagram of spectrum analyser and explain each block?	7M

UNIT-III

5.		Explain operation of dual trace oscilloscope with a block diagram and discuss alternate mode and chop mode.	14M
		(OR)	
6.	a)	Explain principle involved in Sampling oscilloscope?	7M
	b)	Explain advantages of Dual trace oscilloscope?	7M

UNIT-IV

7.	a)	Derive the expression to find the value of unknown resistance measured by Wheatstone bridge?	7M
	b)	At bridge balance if R1=10k, R2=15k, R3=40k, find the unknown resistance value?	7M
		(OR)	
8.	a)	What are two balancing conditions for AC bridge? Explain how unknown inductance is measured using Andersons bridge?	7M
	b)	Explain how frequency is measured using weins bridge?	7M

UNIT-V

9.	a)	Define active and passive transducers? Give any two examples of active and passive transducers?	4M
	b)	Explain the construction and working of resistive position transducer?	10M
		(OR)	
10.	a)	Explain measurement of liquid level using capacitive type transducers?	7M
	b)	Explain measurement of temperature using Thermocouples?	7M

AR16

CODE: 16CS3015   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular/Supplementary Examinations, March-2021

JAVA PROGRAMMING
(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)	What are the various primitive data types available in Java?	8 M
	b)	Explain the Naming Conventions in Java	6 M
		(OR)	
2.	a)	Discuss any five features of Java.	10 M
	b)	How automatic type conversion can be done in java.	4 M

UNIT-II

3.	a)	Differentiate constructor and method. How overloading can be applied on method explains with suitable example.	10 M
	b)	What is the need of Garbage Collection? How it is achieved in Java.	4 M
		(OR)	
4.	a)	Define a rectangle class with length and breadth as fields and area, perimeter as operations. Using the given class structure find the area of at least two rectangles and compare their area. Write a proper java code for the above problem.	10 M
	b)	What is the difference between final variable and static variable?	4 M

UNIT-III

5.	a)	What is an abstract class? What is its use in Java?	8 M
	b)	Give suitable example java code with the use of **super** keyword.	6 M
		(OR)	
6.	a)	Identify the difference between Abstract class and Interface.	8 M
	b)	What is meant by dynamic method dispatch?	6 M

UNIT-IV

7.	a)	Define package. How many types of packages are existed in java? How to create a package in java.	8 M
	b)	Explain the use of different access protection keywords in java.	6 M
		(OR)	
8.	a)	What is an Exception? What are the types of exceptions? Discuss in detail exception handling in Java.	8 M
	b)	Difference between throw and throws.	6 M

UNIT-V

9.	a)	What is thread synchronization and why it is important.	8 M
	b)	What is the difference between calling wait() and sleep() method in Java multi-threading?	6 M
		(OR)	
10.	a)	Define an Applet and Describe the lifecycle of an applet.	6 M
	b)	Create an applet that receives two numeric values as input from the user and then displays the sum of them on the screen. Write a sample HTML page to include this applet	8M

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PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) Reproduce the meaning of integral and fractional slot windings of an alternator
   b) Recall the relationship between distribution, pitch and winding factors of an alternator
   c) List the significant methods used in your laboratory for determining regulation in an alternator
   d) On which type of rotor should you perform the slip test for determining X_d and X_q?
   e) List any two advantages of paralleling two alternators
   f) What are the conditions for parallel operation of alternators?
   g) Can a synchronous motor be called as a synchronous condenser? Give a reason to justify, if yes/no
   h) What is hunting in a synchronous motor?
   i) What did you understand about double field revolving theory?
   j) List any two applications of AC series motor

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. a) Explain the terms: 6M
      i) Pitch factor ii) Distribution factor   iii) Form factor.
   b) An alternator runs at 250rpm and generates and EMF at 50Hz. There are 216 slots   6M
      each containing 5 conductors. The winding is distributed and full pitch. All the conductors of each phase are in series and flux per pole is 30mWb which is sinusoidal distributed. If the winding is star connected determine the value of induced EMF available across the terminals.

(OR)

3. a) Derive an expression for induced E.M.F per phase in a three-phase alternator?   6M
   b) A 10-pole, 50 Hz, 600 RPM alternator has flux density distribution given by the   6M
      following expression B = sin θ + 0.4 sin 3θ + 0.2 sin 5θ. The alternator has 180 slots wound with 2-layer 3-turn coils having a span of 15 slots. The coils are connected in 60^0 groups. If armature diameter is 1.2 m and core length = 0.4 m, calculate (i) the expression for instantaneous EMF/conductor (ii) the expression for instantaneous EMF/coil

UNIT-II

4. a) Explain the two reaction theory and application to salient pole synchronous   6M
      generator.
   b) Describe the slip test method for the measurement of X_d and X_q of synchronous   6M
      machine.

AR13

(OR)

5. a) Explain the Potier triangle method of finding the voltage regulation of an alternator.   6M

   b) A 3-phase, 6000V alternator has the following OCC at normal speed: 6M

     Field Amps   : 14   18   23   30   43

     Terminal Vols : 4000   5000   6000   7000   8000

     With armature short-circuited and full load current flowing the filed current is 17 A and when the machine is supplying full-load of 2000 kVA at zero power factor the filed current is 42.5 A and the terminal voltage is 6000 V.

     Determine the field current required when the machine is supplying the full-load at 0.8 p.f. lagging

UNIT-III

6. A 3 MVA, 6 pole alternator runs at 1000RPM in parallel with other machine on 4.4Kv bus bar. The synchronous reactance is 20%. Calculate the synchronising power per one mechanical degree of displacement and the corresponding synchronising torque.   12M

(OR)

7. a) Explain the general procedure for paralleling of alternators. Also mention the advantages of parallel operating alternators.   6M

   b) Two alternators running in parallel supply the following loads: 6M

     (i) Lighting loaf 500 kW (ii) 1000 kW at p.f. 0.9 lagging (iii) 800 kW at p.f. 0.8 lagging (iv) 500 kW at p.f. 0.9 leading

     One alternator is supplying 1500 kW at 0.95 p.f. lagging. Calculate the kW output and p.f. of the other machine

UNIT-IV

8. a) Explain the construction and principle of three phase synchronous motor. .   6M

   b) Why synchronous motor is not self starting. Explain the various starting methods of synchronous motor.   6M

(OR)

9. a) Draw and explain the phasor diagrams of synchronous motor for leading and lagging power factor conditions   6M

   b) The input to a 11000 V, 3-phase, star connected synchronous motor is 60 A. The effective resistance and synchronous reactance per phase are respectively 1 ohm and 30 ohm. Find (i) the power supplied to the motor (ii) mechanical power developed and (iii) induced EMF for a power factor of 0.8 leading   6M

UNIT-V

10. a) Explain the double field revolving theory.   6M

   b) What are the types of signal phase induction motor. Explain split-phase motor and its applications.   6M

(OR)

11. a) Explain the principle of operation of Universal motor   6M

   b) List the advantages, disadvantages and applications of split-phase motor.   6M

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AR13

CODE: 13ME3017   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech. I Semester Supplementary Examinations, March, 2021

THERMAL ENGINEERING - II
(Mechanical Engineering)

Time: 3 Hours   **Max Marks: 70**

PART-A
ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) Why does the efficiency of a Rankine cycle increase with decreasing condenser pressure?
    b) Define minimum and excess air for combustion and air fuel ratio.
    c) Explain the function of a fusible plug in a boiler.
    d) State the advantages of artificial draught over natural draught
    e) What is the effect of friction on nozzle efficiency
    f) Write the source of air into a condenser.
    g) Distinguish between impulse and reaction turbines.
    h) Why are steam turbines compounded?
    i) List out various methods for improvement of thermal efficiency of gas turbine cycle.
    j) State the difference between air breathing and non-air breathing propulsion systems

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

UNIT-I

2. a) In a thermal power plant operating on an ideal Rankine cycle, superheated steam   [6M]
       produced at 5 MPa and 500°C is fed to a turbine where it expands to the condenser
       pressure of 10kPa. If the net power output of plant to be 20MW, determine: i) heat
       added in the boiler per kg of water ii) thermal efficiency of the cycle iii) mass flow rate
       of steam in kg/s
    b) What is the effect of regeneration on i) the specific output ii) the cycle efficiency iii)   [6M]
       steam rate iv) heat rate of a steam power plant?

(OR)

3. a) The volumetric analysis of flue gases obtained from the combustion of an unknown   [6M]
       hydrocarbon fuel is CO_2 = 12.1%, CO = 0.5%, O_2 = 3.2% and N_2 = 84.2%. Determine
       the excess air supplied in percentage of theoretical air.
    b) What is the use of Orsat apparatus ? Discuss its working with the help of a neat sketch.   [6M]

UNIT-II

4. a) Explain the working of Benson boiler with a neat sketch   [6M]
    b) Describe superheater, economiser and air preheater with neat sketches. Also indicate   [6M]
       suitable location of these on a boiler with line diagram.

(OR)

5. a) Describe briefly different types of mechanical draught.   [6M]
    b) A boiler evaporates 8 kg of water per kg of coal fired from feed water at 46°C when   [6M]
       working at 10 bar absolute. Determine the equivalent evaporation from and at 100°C
       per kg of coal fired when the steam produced is (i) 0.92 dry (ii) Dry saturated (iii)
       Superheated to 250°C.

6. a) Derive an expression for maximum discharge through nozzle [6M]
   b) In a convergent-divergent nozzle steam enters at 7 bar, 0.96 dry and back pressure is 1 [6M] bar. Throat area of nozzle is 6.5 cm². In the diverging portion the friction causes reduction in total enthalpy drop by 15% compared to ideal enthalpy drop. Determine mass flow rate, velocity and condition of steam leaving nozzle assuming negligible inlet velocity.

(OR)

7. a) What do you understand by condenser? How does condenser improve performance of [6M] steam power plant?
   b) A surface condenser having vacuum of 715 mm Hg and temperature of 32°C has [6M] cooling water circulated at 800 kg/min. The cooling water entering condenser becomes warmer by 14°C. The condensate is available from condenser at 25 kg/min. The hot well temperature is 30°C. Barometer reading is 765 mm of Hg. Determine the mass of air in kg/m³ of condenser volume and dryness fraction of steam entering.

UNIT-IV

8. a) Describe the velocity diagram for single stage impulse turbine. Also obtain the [6M] expressions for force, work done, and diagram efficiency
   b) A simple impulse turbine steam leaves the nozzles with a velocity of 1000m/s inclined [6M] at an angle of 20° to the plane of rotation. The blade velocity is 60% of the velocity for maximum efficiency. If the blading efficiency is 70% and axial thrust 40 N per kg of steam, calculate a) the blade angles (b) the blade velocity coefficient (c) the heat lost in friction in kJ/kg.

(OR)

9. a) Explain differences between an Impulse and Reaction turbines? [6M]
   b) A stage of Parsons turbine the blade speed is 70m/s and the ratio of blade speed/ steam [6M] speed is 0.48 of that required for maximum efficiency. The exit angle of both fixed and moving blade is 20°. The flow of steam is 16200 kg/hr at 1.4 bar, dry and saturated. Calculate (i) the required area of blade annulus, (ii) the heat drop in kJ required by the pair if the steam expands with an efficiency ratio of 0.8 and (iii) the pressure drop in the pair.

UNIT-V

10. a) The diameter of the propeller of an aircraft is 2.5 m. It flies at a speed of 540 km/h at [6M] an elevation of 8000 m, where air density is 0.525 kg/m3. The flight to jet speed ratio is 0.75. Calculate: (i) the air-flow rate through the propeller, (ii) thrust produced, (iii) specific thrust, and (iv) thrust power
    b) In an open cycle gas turbine plant, the air is drawn into the compressor at 1 bar 15°C [6M] and is compressed with an isentropic efficiency of 94% to a pressure of 9 bar. After heating, the gas temperature is 1000°C. The isentropic efficiency of the turbine is also 94%. The mass flow rate is 2.1 kg/s. Determine the following. i) The net power output. ii)The thermal efficiency of the plant. Take $\gamma = 1.4$ and $c_p = 1.005$ kJ/kg K.

(OR)

11. a) Explain the working of a ramjet engine with the help of a sketch. [6M]
    b) Describe the open cycle gas turbine plant and derive efficiency of cycle. [6M]

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Supplementary Examinations, March-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 sensitivity of instrument?
    b) What is advantage of thermocouple type Ammeter?
    c) What is use of spectrum analyser?
    d) What are source of errors in an AF Oscillator?
    e) What is use of delay line used in a CRO?
    f) What is advantage of a digital storage oscilloscope?
    g) What is disadvantage of shearing bridge?
    h) What is use of wagner ground connection?
    i) What is advantage of digital DAS?
    j) What are uses of thermisters and sensisters?

PART-B

Answer one question from each unit   [5x12=60M]

UNIT-I
2. a) Explain following terms (i)accuracy (ii) sensitivity (iii) error?   6M
    b) With a neat circuit explain working of a solid state voltmeter?   6M
(OR)
3. a) Draw circuit of electronic voltmeter and explain its working?   6M
    b) Explain working of a thermocouple type ammeter?   6M

UNIT-II
4. a) Draw block diagram of lab type square and pulse generator and explain function of   6M
        each block?
    b) Draw block diagram of an AF Oscillator and explain function of each block?   6M
(OR)
5. a) What is an attenuator and explain its importance in design of signal generators?   6M
    b) Draw block diagram of heterodyne type harmonic analyser and explain its   6M
        working?

UNIT-III
6. a) Draw block diagram of dual trace oscilloscope and explain its working?   6M
    b) Explain how frequency is measured using Lissajous method?   6M
(OR)
7. a) Draw block diagram of sampling oscilloscope and explain its working?   6M
    b) Explain necessity of delay lines used in a CRO?   6M

UNIT-IV
8. a) Draw Q meter circuit and explain how Q factor is measured?   6M
    b) Derive balancing condition for a DC wheatstone bridge, also write source of errors   6M
        in circuit?
(OR)
9. a) Explain measurement of unknown inductance using Maxwell's bridge?   6M
    b) Explain different source of errors in an AC bridge?   6M

UNIT-V
10. a) Derive expression for gauge factor of strain gauge?   6M
    b) With a neat diagram explain working of a LVDT?   6M
(OR)
11. a) Explain how resistive type transducers are used for displacement measurement?   6M
    b) Compare performance of analog and digital DAS?   6M

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech. I Semester Supplementary Examinations, March, 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) Categorize what virtual machine is and what are the advantages virtual machines.
   b) Summarize the objectives and functions of an operating system.
   c) Outline semaphore and mention the operations on semaphore.
   d) Distinguish pre-emptive and non-pre-emptive scheduling.
   e) Define page fault.
   f) Evaluate various page replacement algorithms to select the best one.
   g) List the responsibility of the file manager.
   h) Name the two types of system directories.
   i) Mention any three character devices?
   j) Give the Advantages of Contiguous allocation

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

UNIT-I

2. a) Discuss different types of operating system structures with a neat sketch   6
   b) Discuss the critical section problem. State the basic requirements of critical   6
      section problem solution
                              (OR)
3. a) Examine the criteria for evaluating the performance of scheduling   6
      Algorithms?
   b) Differentiate symmetric and asymmetric multiprocessing system   6

UNIT-II

4. a) Explain the Banker's algorithm for deadlock avoidance   6
   b) Consider the following page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3,   6
      2, 1, 2, 0, 1, 7, 0, 1? How many page faults would occur for the following
      replacement algorithms, assuming three frames that all frames are initially
      empty
                              (OR)
5. a) Explain the classic problems of synchronization.   6
   b) What is the important feature of critical section? State the dining   6
      philosopher's problem and how to allocate the several resources among
      several processes in a deadlock and starvation free manner?

UNIT-III

6. a) Suppose that your replacement policy (in a paged system) is to examine each page regularly and to discard that page if it has not been used since the last examination .What would you gain and what would you lose by using this policy rather than LRU or second-chance replacement? Formulate it.   6

   b) Distinguish between Internal fragmentation And External Fragmentation   6

(OR)

7. a) Explain the concept of Demand paging in detail.   6

   b) What are segmentation and paging sometimes combined in to one scheme? Explain them in detail with example?   6

UNIT-IV

8. a) Classify in detail about file types with usual extension and functions.   6

   b) Illustrate how the free space list is implemented and define what is free space management.   6

(OR)

9. a) Prepare a general graph directory in file system   6

   b) Formulate why logging metadata updates ensures recovery of a file system after a file system crash   6

UNIT-V

10. a) List and discuss the various methods for implementing a directory. Single-Level Directory   6

   b) Write a short note about disk management and swap-space management   6

(OR)

11. a) Write about the kernel I/O subsystem.   6

   b) Write short notes on: 2

     i) Disk structure   ii) Indexed allocation   2

     iii) Shortest-seek-Time-First (SSTF) scheduling   2

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