LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram-521 230 :: Krishna Dist. :: A.P
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada

B.Tech.(III Semester) (R17) Supplementary Examinations, September 2021

TIME TABLE

TIME :10.00 AM to 01.00 PM

A.Y. 2020-21

DATE	ASE	CE	CSE	ECE	EEE	EIE	IT	ME
20-09-2021 (Monday)	17FE07 - Numerical Methods and Fourier Analysis	17FE07 - Numerical Methods and Fourier Analysis	17FE08 - Probability and Statistics	17FE07 - Numerical Methods and Fourier Analysis	17FE07 -Numerical Methods and Fourier Analysis	17FE07 - Numerical Methods and Fourier Analysis	17FE07 - Numerical Methods and Fourier Analysis	17FE07 - Numerical Methods and Fourier Analysis
21-09-2021 (Tuesday)	17AE01 - Engineering Fluid Mechanics	17EE51 - Fundamentals of Electrical Engineering	17FE03 - Environmental Science	17CI01 - Computer Programming	17EE02 - Electric and Magnetic Fields	17FE03 - Environmental Science	17FE03 - Environmental Science	17FE03 - Environmental Science
22-09-2021 (Wednesday)	17AE02 - Engineering Thermodynamics	17CE04 - Strength of Materials - I	17CI03 - Discrete Mathematical Structures	17EC05 - Signals and Systems	17EE03 - Network Theory - I	17EE53 - Electrical Technology	17CI07 - OOPs through Java	17EC50 - Basic Electronics Engineering
23-09-2021 (Thursday)	17AE03 - Strength of Materials	17CE05 - Engineering Geology	17CI04 - Python Programming	17EC06 - Random Variables and Stochastic Processes	17EE04 - Digital Logic Circuit Design	17EI02 - Transducers	17IT01 - Operating System Principles	17ME03 - Thermodynamics
24-09-2021 (Friday)	17AE04 - Elements of Aerospace Engineering	17CE06 - Mechanics of Fluids	17CI05 - Data Structures	17EC07 - Pulse and Switching Circuits	17CI05 - Data Structures	17EC03 - Analog Electronic Circuits	17CI02 - Digital Logic Design	17ME04 - Mechanics of Solids
25-09-2021 (Saturday)	17ME05 - Metallurgy and Material Science	17CE07 - Concrete Technology	17CI06 - Computer Architecture	17EC08 - Analog Integrated Circuits	17EE05 - Power Generation and Utilization	17EC04 - Digital Electronic Circuits	17CI09 - Data Base Management Systems	17ME05 - Metallurgy and Material Science
27-09-2021 (Monday)	17PD03 - Professional Ethics and Human Values	17PD03 - Professional Ethics and Human Values	---	17PD03 - Professional Ethics and Human Values	17PD03 - Professional Ethics and Human Values	---	---	---

Note: Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately.

Date: 07-09-2021

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. Vice-Principal, Deans & HoDs 2. Transport in-charge & Librarian
3. Canteen, Security & Hostels 4. All Notice Boards

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17PD03-PROFESSIONAL ETHICS AND HUMAN VALUES
(ASE,CE,ECE&EEE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define moral dilemma. Explain the logical steps in confronting moral dilemma.	6M	CO1	L2
(b)	Describe the rights advocated under the rights theory stressing certain ethical principles.	6M	CO1	L3
	(OR)			
2(a)	Distinguish the theories of moral development by Kohlberg and Gilligan.	6M	CO1	L2
(b)	Define moral autonomy. Examine the engineering skills related to moral autonomy.	6M	CO1	L3
3(a)	Describe civic virtues. Explain the different virtues indispensable for a self-governing administration.	6M	CO2	L2
(b)	Define values. Explain the core human values.	6M	CO2	L2
	(OR)			
4(a)	What is empathy? Explain its characteristics and advantages.	6M	CO2	L2
(b)	Discuss the importance of good character in the workplace.	6M	CO2	L2
5(a)	Describe the general features of morally-responsible engineers. Explain each with appropriate examples.	6M	CO3	L2
(b)	Discuss the contrasts of scientific experiments and the engineering experiments.	6M	CO3	L2
	(OR)			
6(a)	What is code of ethics? Explain the essential roles that codes exhibit.	6M	CO3	L2
(b)	Discuss the problems with law in engineering practice with illustrations.	6M	CO3	L2
7(a)	Examine the ways and means of reducing occupational crimes in industries.	6M	CO4	L3
(b)	Describe institutional authority. How do you correlate institutional authority, expert authority, and power?	6M	CO4	L2
	(OR)			
8(a)	Explain in detail about the effect of information on risk assessments.	6M	CO4	L2
(b)	Examine the management policies that influence the maintenance of confidentiality.	6M	CO4	L3
9(a)	Discuss the duties of engineers as experimenters towards environmental ethics.	6M	CO5	L2
(b)	Outline the rules of practice adopted by National Society of Professional Engineers.	6M	CO5	L4
	(OR)			
10(a)	Discuss the various issues and requirements for engineers who act as advisors.	6M	CO5	L2
(b)	Examine the role of an engineer's in weapon development.	6M	CO5	L3

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17ME05-METALLURGY AND MATERIAL SCIENCE

(ASE&ME)

Time : 3 hours Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Distinguish between solidification process of pure metal and alloy.	6M	CO1	L2
(b)	Enumerate and explain the conditions that favour the formation of substitutional solid solutions.	6M	CO1	L2
	(OR)			
2(a)	Define atomic packing factor and calculate packing factor for B.C.C structure.	6M	CO1	L2
(b)	Explain the importance of alloying element in metals with examples.	6M	CO1	L2
3(a)	State the Gibb's Phase rule? Explain its significance?	6M	CO2	L2
(b)	Draw Iron-Iron Crabide equilibrium diagram and explain the phase changes which occur in 0.8%C steel, cooled from austenitic region to room temperature.	6M	CO2	L2
	(OR)			
4(a)	From the data given below for Cu-Ni system, plot the equilibrium diagram to scale and label the diagram. Weight % Ni: 0 | 20 | 40 | 60 | 80 | 100 Liquidus Temperature °C: 1084 | 1200 | 1275 | 1345 | 1440 | 1455 Solidus Temperature °C: 1084 | 1165 | 1235 | 1310 | 1380 | 1455 Answer the following for 70% Ni alloy: (i) What is the composition of first solid crystallizing out from liquid? (ii) What is the composition of last solid formed at the end of solidification? (iii) What are the amounts of solid and liquid at 1360°C?	6M	CO2	L3
(b)	Describe the following invariant reactions (i) Peritectic Reaction (ii) Eutectic Reaction (iii) Eutectoid Reaction.	6M	CO2	L2
5(a)	Draw the microstructure of nodular cast iron and explain its properties and applications.	6M	CO3	L2
(b)	Enumerate and explain the classification of steels.	6M	CO3	L2
	(OR)			
6(a)	Explain the properties and applications of copper.	6M	CO3	L2
(b)	Enumerate and explain the properties and applications of aluminum.	6M	CO3	L2
7(a)	Sketch and explain the structural changes that occur during age hardening processes.	6M	CO4	L2
(b)	With the help of TTT diagram explain how bainite is formed.	6M	CO4	L2
	(OR)			
8(a)	Discuss the mechanism of recovery, recrystallisation and grain growth in materials.	6M	CO4	L2
(b)	What test is used for determining the hardenability of steels? Explain.	6M	CO4	L2
9(a)	Define composite material. Explain how the composite materials are classified.	6M	CO5	L1
(b)	What is Rule of mixture? Derive an equation for modulus of elasticity of composite in the terms of elastic modulie of the matrix and fiber material.	6M	CO5	L2
	(OR)			
10(a)	Explain any two methods for the manufacture of fiber reinforced composites.	6M	CO5	L2
(b)	Calculate the tensile modulus of elasticity of a laminated composite consisting of 60% by volume of unidirectional carbon fibres and epoxy matrix under isostress and isostrain conditions. The tensile modulus of elasticity of the carbon fibres is 350 GPa and tensile modulus of elasticity of the epoxy is 3000 MPa.	6M	CO5	L3

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17AE04-ELEMENTS OF AEROSPACE ENGINEERING

(ASE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define the following components of aircraft wing. (i) Flaps (ii) Ailerons (iii) Spoilers (iv) Winglets (v) Pylons (vi) Vortex Generators.	6M	CO1	L2
(b)	Summarize about the engines and landing gear system used in aircrafts.	6M	CO1	L2
	(OR)			
2(a)	At 12 km in the standard atmosphere, the pressure, density, and temperature are 1.9399×10^4 N/m^2, 3.1194×10^{-1} kg/m^3, and 216.66 K, respectively. Using these values, calculate the standard atmospheric values of pressure, density, and temperature at an altitude of 18 km.	6M	CO1	L3
(b)	Assume that you are ascending in an elevator at sea level. Your eardrums are very sensitive to minute changes in pressure. In this case, you are feeling a 1 percent decrease in pressure per minute. Calculate the upward speed of the elevator in meters per minute.	6M	CO1	L3
3(a)	With the help of neat sketch draw the figure of forces acting on airfoil and define the following terms (i) Camber line (ii) Chord line (iii) Angle of Attack	6M	CO2	L2
(b)	Illustrate in brief about $C_l - \alpha$ curve.	6M	CO2	L2
	(OR)			
4(a)	Describe the following series of NACA airfoils (i) One-series (ii) Six-series.	6M	CO2	L2
(b)	Consider an NACA 23012 airfoil at 8 degrees of angle of attack. Calculate the normal and axial force coefficients. (At $\alpha = 8^0$, $C_l = 1.0$ & $C_d = 0.0078$).	6M	CO2	L3
5(a)	Illustrate about the working process of an reciprocating engine.	6M	CO3	L2
(b)	With the help of p-v diagram summarize about the pressure raise process in turbojet engine.	6M	CO3	L2
	(OR)			
6(a)	Derive the fundamental thrust equation for jet propulsion.	6M	CO3	L3
(b)	State the advantages and disadvantages of solid propellants over liquid propellant rocket engines.	6M	CO3	L2
7(a)	Discuss about the truss type of fuselage construction with neat figure.	6M	CO4	L2
(b)	Generalize the construction of wing structure based on three fundamental designs.	6M	CO4	L2
	(OR)			
8(a)	Discuss about the composite materials in aircraft.	6M	CO4	L2
(b)	Identify the five basic stresses acting on an aircraft.	6M	CO4	L2
9(a)	Consider the following example. A body of mass m is falling freely in the earth's gravitational field. Let x be the vertical distance of the body from the ground. Ignoring drag, find the equation of motion of this body using newton's second law.	6M	CO5	L3
(b)	Derive orbit equation for spacecraft.	6M	CO5	L3
	(OR)			
10(a)	Summarize types of reentry possible from outer space.	6M	CO5	L2
(b)	Classify the types of satellites based on their purpose and size.	6M	CO5	L2

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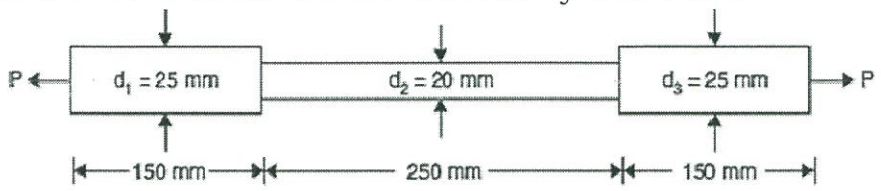
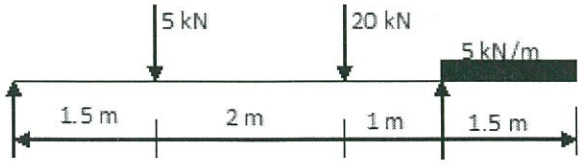
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations
17AE03-STRENGTH OF MATERIALS
(ASE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Determine the intensity of stress, strain and the elastic modulus for the rod 25 mm in diameter, 200 mm long extends by 0.25 mm under a tensile load of 40 kN.	6M	CO1	L3
(b)	Determine the Young's modulus of the material.The bar shown in Figure is tested in universal testing machine. It is observed that at a load of 40 kN the bar extends by 0.280 mm. 	6M	CO1	L3
	(OR)			
2(a)	An axial pull of 20 kN is suddenly applied on a steel rod of 2.5 m long and 1000 mm^2 in cross-section. Calculate the strain energy, which can be absorbed in the rod. Take E = 200 GPa.	6M	CO1	L3
(b)	Calculate the total extension of the bar, stresses, strains and changes in length of different portions of beam as described below. A straight bar of 60 cm long consists of three portions: the first portion is 18 cm length with 30 mmas diameter, the middle one is 26 cm length and 20 mm diameter and the remaining portion is 16 cm length and25 mm diameter. It is subjected to an axial pull of 100 kN. Take E = 200 GPa.	6M	CO1	L3
3(a)	A cantilever of length lcarrying a uniformly distributed load (UDL) of W per unit run over the whole length. Determine the shear force (SF) and bending moment (BM) and sketch the SF and BM diagram for the beam.	6M	CO2	L3
(b)	Determine shear force (SF) and bending-moment (BM) for a simply supported beam carrying UDL W/m over whole span of length L. Sketch the SF and BM diagrams.	6M	CO2	L3
	(OR)			
4.	Evaluate Shear force and Bending moment for the overhang beam as shown in the Figure and draw shear force and bending moment diagrams. 	12M	CO2	L3

5(a)	List out the assumptions involved in the theory of simple bending.	6M	CO3	L1
(b)	A rectangular beam 75 mm wide and 150 mm deep is simply supported over a span of 5 m. if the beam is subjected to a UDL of 4.5 kN/m. Calculate the maximum bending stress induced in the beam.	6M	CO3	L3
	(OR)			
6(a)	A solid shaft of 200mm diameter has the same cross-sectional area as a hallow shaft of the same material with inside diameter of 150 mm. Determine the ratio of (i) Power transmitted by both the shafts at the same angular velocity (ii) Angle of twist in equal lengths of these shafts, when stressed to the same intensity.	6M	CO3	L3
(b)	Determine the diameter of a solid shaft which will transmit 90kW at 160 rpm if the shear stress in the shaft is limited to 60 N/mm^2. Find also the length of the shaft, if the twist must not exceed 1 degree over the entire length. Take G = 8×10^4 N/mm^2.	6M	CO3	L3
7(a)	Calculate the maximum shear stress value of a beam of triangular cross section having base width of 200 mm and height of 300 mmwhich is subjected to a shear force of 25 kN.	6M	CO4	L3
(b)	Derive an expression for the shear stress at any point in the cross-section of a beam.	6M	CO4	L2
	(OR)			
8(a)	The principal tensile stresses at a point across two perpendicular planes are 80 N/mm^2 and 40 N/mm^2. Find the normal and tangential stress on a plane at 20^0.	6M	CO4	L3
(b)	A point in a strained material is subjected to two mutually perpendicular tensile stresses of 200 Mpa and 100 Mpa. Determine the intensities of normal, shear and resultant stresses on a plane inclined at 30^0 with the axis.	6M	CO4	L3
9(a)	Calculate the maximum slope and deflection at the center of the simply supported beam of span 2.4 m is subjected to a central point load of 15 kN. Consider EI for the beam as $6x10^{10}$N-mm^2.	6M	CO5	L3
(b)	A simply supported beam of span 2.4 m is subjected to a central point load of 15 kN. Determine the maximum slope and deflection at the center of the beam. Take EI for the beam as $6x10^{10}$N-mm^2.	6M	CO5	L3
	(OR)			
10(a)	A cylinder has an internal diameter of 230 mm, has walls 5 mm thick and is 1 m long. It is found to change in internal volume by 12.0 x $10^{-6}m^3$ when filled with a liquid at a pressure p. If E = 200 GN/m^2 and v = 0.25, and assuming rigid end plates. Determine the values of hoop and longitudinal stresses.	6M	CO5	L3
(b)	A spherical shell of 1 m diameter is subjected to a pressure of 2.4 Mpa. Calculate the stress induced in the vessel plate, if its thickness is 15 mm.	6M	CO5	L3

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17AE02-ENGINEERING THERMODYNAMICS
(ASE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Illustrate quasi-static process and state its characteristic features.	6M	CO1	L2
(b)	Air undergoes two process: Process 1-2 expansion from P_1=300kPa, V_1=0.019m^3/kg to P_2=150 kPa during which the p-v relation is given by PV=constant. Process 2-3 constant pressure compression to V_3=V_1. Sketch the process on a P-V diagram and determine the work done per unit mass.	6M	CO1	L3
	(OR)			
2(a)	Formulate the relation between Celsius scale and Fahrenheit scale?	6M	CO1	L2
(b)	The temperature on a new scale is established by the relation t = a ln(p) + b. Where t is the temperature and p is the thermodynamic property. The 'a' and 'b' are constants. The property values at ice and steam point are 1.75 and 8.25, respectively. Calculate the temperature on the Celsius scale equivalent to the thermodynamic property value of 5.75.	6M	CO1	L2
3(a)	Apply first law of thermodynamics and prove that the change in enthalpy for an isobaric process is equal to the heat transfer.	6M	CO2	L2
(b)	A Piston and Cylinder machine contains a fluid system which passes through a complete cycle of four processes. During a cycle the sum of heat transfer is -340 kJ. The system completes 200 cycles/min. Complete the following table.	6M	CO2	L3
	(OR)			
4(a)	Discuss any three engineering applications of steady flow energy equation with neat diagrams.	6M	CO2	L3

Process	Q (kJ/min)	W (kJ/min)	ΔU (kJ/min)
1-2	0	4340	---
2-3	42,000	0	---
3-4	-4,200	---	-73,200
4-1	-----	---	---

(b)	In oil cooler, oil flows steadily through a bundle of metal tubes submerged in a steady stream of cooling water. Under steady flow conditions, the oil enters at 90°C and leaves at 30°C, while the water enters at 25°C and leaves at 70°C. The enthalpy of oil at t°C is given by $h = 1.68\ t + 10.5 \times 10^{-4}\ t^2$ kJ/kg. What is the cooling water flow required for cooling 2.78 kg/s of oil?	6M	CO2	L4
5(a)	Define coefficient of performance (COP). Derive the relation between the COP of heat pump and the COP of the refrigerator.	6M	CO3	L2
(b)	Using an engine of 30% thermal efficiency to drive a refrigerator having a COP of 5, what is the heat input into the engine for each MJ removed from the cold body by the refrigerator? If this system is used as a heat pump, how many MJ of heat would be available for heating for each MJ of heat input to the engine?	6M	CO3	L4
	(OR)			
6(a)	Prove that entropy is a property of the system.	6M	CO3	L3
(b)	A heat engine is supplied with 1130 kW of heat at constant temperature of 292°C and rejects heat at 5°C. The following results were obtained. Determine whether the results report a reversible cycle or irreversible or impossible. (i) Heat rejected is 834 kW (ii) If heat rejected is 556 kW.	6M	CO3	L4
7(a)	Discuss Dalton's law of additive pressures and Amagat's law of additive volumes.	6M	CO4	L2
(b)	Air in a closed stationary system expands in a reversible adiabatic process from 0.5 MPa, 15°C to 0.2 MPa. Find the final temperature, and per kg of air, the change in enthalpy and the heat transferred.	6M	CO4	L4
	(OR)			
8(a)	Discuss the phase change process of water by using Pressure (P)-Volume (V) diagram	6M	CO4	L2
(b)	Calculate volume, density, enthalpy and entropy of 3 kg of steam at 90°C, having a dryness fraction of 0.92.	6M	CO4	L4
9(a)	Illustrate the working of Bell-Coleman cycle with help of Pressure (P)-Volume (V) diagram and Temperature (T)- Entropy (S) diagrams.	6M	CO5	L2
(b)	A diesel engine has a compression ratio of 14 and cut-off takes place at 6% of the stroke. Find the air standard efficiency.	6M	CO5	L4
	(OR)			
10(a)	Compare Otto and Diesel cycles for same maximum pressure and temperature of the cycle.	6M	CO5	L2
(b)	An air standard dual cycle has a compression ratio of 16 and compression begins at 1bar, 50°c. The maximum pressure is 70 bar. The heat transferred to air at constant pressure is equal to that at constant volume. Estimate (i) the pressures and temperatures at cardial points of the cycle (ii) the cycle efficiency.	6M	CO5	L4

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21 SEP 2021

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17AE01-ENGINEERING FLUID MECHANICS

(AE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Prove that the pressure is the same in all directions at a point in a static fluid.	6M	CO1	L3
(b)	Explain about viscosity and its effect with temperature.	6M	CO1	L2
	(OR)			
2(a)	The right limb of a simple U-tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of sp.gr. 0.9 is following. The centre of the pipe is 12 cm below the level of mercury in the right limb. Find the pressure of fluid in the pipe if the difference of mercury level in the two limbs is 20 cm.	6M	CO1	L5
(b)	An oil film of thickness 1.5 mm is used for lubrication between a square plate of size 0.9 m x 0.9 m and an inclined plane having an angle of inclination 20^0. The weight of the square plane is 392.4 N and it slides down the plane with a uniform velocity of 0.2 m/s. Find the dynamic viscosity of the oil.	6M	CO1	L5
3(a)	Derive an expression for discharge through a venturimeter, using a net sketch.	6M	CO3	L3
(b)	A pipe line carrying oil (sq.gr.0.8) changes in diameter from 300mm at position 1 to 600mm diameter at position 2 which is 5 meters at a higher level. If the pressures at positions 1 and 2 are 100 KN/m^2 respectively and the discharge is 300 lit/sec. Determine (i) Loss of head (ii) Direction of flow.	6M	CO1	L5
	(OR)			
4(a)	Derive the Bernoulli's equation from the Euler's equation with assumptions.	6M	CO2	L3
(b)	Explain path line, streak line, stream tube and the stream line. For what type of flow these lines are identical.	6M	CO2	L2
5(a)	State and describe Buckingham's π theorem for dimensional analysis.	6M	CO4	L2

(b)	Two pipes one of 10cm diameter, 200 m long and another 15cm diameter, 400 m long are connected in parallel. The friction factors are 0.0075 for the smaller pipe and 0.006 for the large pipe. The total discharge through the system is 50 lit/sec. Find the discharge and head loss in each pipe. Neglect minor losses. Calculate the equivalent length of a 20 cm diameter having f = 0.005.	6M	CO4	L5
	(OR)			
6(a)	The rate of flow of water through a horizontal pipe is $0.25m^3/sec$. The diameter of the pipe which is 200mm is suddenly enlarged to 400mm. The pressure intensity in the smaller pipe is 11.772 N/cm^2. Determine (i) loss of head due to sudden enlargement (ii) pressure intensity in the large pipe	6M	CO4	L5
(b)	Derive an expression for the loss of head due to friction in flow through circular pipes.	6M	CO3	L3
7(a)	A Pelton turbine develops 3000KW under a head of 300m. The overall efficiency of the turbine is 83%. If speed ratio=0.46, Cy= 0.98 and specific speed is 16.5 then find (i) Diameter of the turbine (ii) Diameter of jet.	6M	CO5	L5
(b)	Define specific speed of a turbine and derive an expression for the specific speed.	6M	CO5	L3
	(OR)			
8(a)	Explain governing of a Pelton wheel turbine with a neat sketch.	6M	CO5	L2
(b)	A Kaplan turbine produces 60,000KW under a net head of 25m with an overall efficiency of 90%. Taking the value speed ratio as 1.6, flow ratio as 0.5 and the hub diameter as 0.35 times the outer diameter, find the diameter and speed of the turbine.	6M	CO5	L5
9(a)	Explain about manometric efficiency, mechanical efficiency and overall efficiency of a centrifugal pump.	6M	CO5	L
(b)	A centrifugal pump having an overall efficiency of 80% delivers 1850 liters of water per minute to a height Of 20 meters through a pipe of 100mm diameter and 95 meters length. Taking f = 0.0075, find the power required to drive the pump. Assume inlet losses in suction pipe equal to 0.33m.	6M	CO5	L5
	(OR)			
10(a)	Explain the multistage pumps with impellers in series and parallel.	6M	CO5	L2
(b)	A single acting reciprocating pump has a plunger of diameter 0.3m and stroke of length 0.4m. If the speed of the pump is 60 rpth and coefficient of discharge is 0.97, determine the percentage slip and actual discharge of the pump.	6M	CO5	L5

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20 SEP 2021

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17FE07-NUMERICAL METHODS AND FOURIER ANALYSIS

(ASE,CE,ECE,EEE,EIE,IT&ME)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Find a root of the equation $x^3 - x - 1 = 0$ by Regula –Falsi method.	6M	CO1	L2
(b)	Using Trapezoidal rule evaluate $\int_1^2 \frac{1}{x} dx$, by dividing the range into ten equal parts. Also compare it with actual value.	6M	CO1	L3
	(OR)			
2(a)	Find a root of the equation $xe^x = 2$, using the Newton-Raphson method.	6M	CO1	L2
(b)	Evaluate $\int_4^{5.2} \log x dx$ by Simpson's 1/3 rule.	6M	CO1	L3
3(a)	Find y(1.6) using Newton's Forward interpolation formula from the following data x: 1, 1.4, 1.8, 2.2, 2.6 y: 3.49, 4.82, 5.96, 6.5, 7.2	6M	CO2	L2
(b)	Use Lagrange's interpolation to find u_4 given $u_0 = 648, u_2 = 704, u_3 = 729, u_6 = 792$	6M	CO2	L3
	(OR)			
4(a)	The population of a certain town is shown in the following table Year: 1990, 1995, 2000, 2005, 2010 Population in: 40, 60, 79, 102, 130 Find the population in 2007 using Newton's backward interpolation formula.	6M	CO2	L2
(b)	For the given data evaluate f(9) by using Lagrange's interpolation x: 5, 7, 11, 13, 17 f(x): 15000, 392, 1452, 2366, 5202	6M	CO2	L3
5(a)	Solve $y' = y + x, y(0) = 1$ by using Taylor's method and hence find y(0.1)	6M	CO3	L3
(b)	Use Runge - Kutta fourth order method to obtain solution to differential equation with y(0)=1 $y^1 = xy$ for x=0.2 with h=0.1	6M	CO3	L3
	(OR)			
6(a)	Use Picards method to find the value of y when x=0.1, given that y=1 when x=0, $\frac{dy}{dx} = 1 + xy$	6M	CO3	L3

(b)	Given that $y' = x^2 - y$, $y(0)=1$ using modified Euler's method obtain y(0.1).	6M	CO3	L3
7 (a)	Using the data given below, fit a straight line of the form y=a+bx x: 0, 5, 10, 15, 20, 25 y: 12, 15, 17, 22, 24, 30	6M	CO4	L2
(b)	Find a second degree curve by the method of least squares to the following data x: 1, 2, 3, 4, 5, 6, 7 y: 2.3, 5.2, 9.7, 16.5, 29.4, 35.5, 54.4	6M	CO4	L2
	(OR)			
8 (a)	Using the given data fit a power curve $y = ab^x$ X: 2, 3, 4, 5, 6 Y: 8.3, 15.4, 33.1, 65.2, 127.4	6M	CO4	L2
(b)	Construct a parabola by the method of least squares to the following data x: 0, 1, 2, 3, 4 y: 1, 1.8, 1.3, 2.5, 6.3	6M	CO4	L2
9 (a)	Show that the Fourier expansion of $x^2 = \frac{\pi^2}{3} + 4\sum_{n=1}^{\infty}(-1)^n \frac{\cos nx}{n^2}$ $in(-\pi,\pi)$.	6M	CO5	L2
(b)	Express the function $f(x)=e^x$ as half – range sine series on $0 < x < \pi$.	6M	CO5	L3
	(OR)			
10(a)	Find Fourier sine and cosine transform of e^{-ax}	6M	CO5	L2
(b)	Obtain the Fourier Transform of $f(x) = e^{\frac{-x^2}{2}}$, $-\infty < x < \infty$	6M	CO5	L2

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17CE07-CONCRETE TECHNOLOGY
(CE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Discuss the following types of cements with their uses in detail: (i) Rapid Hardening cement. (ii) Sulphate resisting cement (iii) Ordinary Portland cement.	6M	CO1	L2
(b)	In a sieve analysis of 1000 grams of sand, the weights (grams) retained on different IS sieve are: 10mm = 0, 4.75mm = 20, 2.36mm = 100, 1.18mm = 100, 600 microns = 190, 300microns = 350, 150microns = 170 and passing 150microns = 70. Determine the fineness modulus of sand.	6M	CO1	L3
	(OR)			
2(a)	Describe briefly the chemical composition, major compounds formed and hydration of cement.	6M	CO1	L1
(b)	Discuss Alkali-Aggregate Reaction. State factors promoting it and control of the reaction.	6M	CO1	L2
3(a)	Demonstrate how do you measure the workability by using slump cone test with sketch.	6M	O2	L3
(b)	Discuss the importance of compressive strength, tensile strength of concrete.	6M	CO2	L2
	(OR)			
4(a)	Describe the phenomenon of 'bleeding' in concrete and discuss factors affecting it.	6M	CO2	L2
(b)	Define durability of concrete. Explain how concrete is made durable against (i) Permeability (ii) Frost action.	6M	CO2	L1
5(a)	Discuss the following methods of placing of concrete, in detail (i) Mass concreting (ii) Under water concreting.	6M	CO3	L2
(b)	Explain the influence of silica fume on fresh and hardened concrete.	6M	CO3	L2
	(OR)			
6(a)	Describe the factors affecting the properties of fibre reinforced concrete.	6M	CO3	L2
(b)	Name the various types of plasticizers used in concrete and discuss the action in detail.	6M	CO3	L1
7(a)	Describe light weight concrete and it's applications.	6M	CO4	L2

(b)	List the test methods for workability properties of self-compacting concrete and discuss the self-compacting concrete in detail.	6M	CO4	L1
	(OR)			
8(a)	Name the various types of polymer concrete and discuss the polymer impregnated concrete in detail.	6M	CO4	L1
(b)	Discuss"Gunite" and "shotcrete" concretes in detail.	6M	CO4	L2
9.	Design a concrete mix by IS method for the following requirements: Characteristic compressive strength at 28 days-25 N/mm^2 Maximum nominal size of aggregate - 20 mm Shape of aggregate - angular Degree of workability, slump of concrete - 50 mm Type of exposure – mild Test data for concrete making materials Specific gravity: cement = 3.15, coarse aggregate = 2.7 and fine aggregate = 2.6 Water absorption: Coarse aggregate=0.5% Fine aggregate=1% Sand is conforming to zone I. Assume any data required.	12M	CO5	L6
	(OR)			
10.	Discuss the step by step procedure for mix design of IS method.	12M	CO5	L2

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17CE06-MECHANICS OF FLUIDS
(CE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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UNIT-I

1(a) List out the pressure measuring devices and explain the working of an inverted U tube differential manometer. [6M]

(b) A thin plate of very large area is placed in a gap of height h with oils of viscosities μ_1 and μ_2 ($\mu_1 < \mu_2$) and densities ρ_1 and ρ_2($\rho_1 > \rho_2$) on the two sides of the plate. The plate is pulled at a constant velocity V. Assuming linear variations of velocity, determine the position of the plate so that i) the shear force on the two sides of the plate is equal and ii) the force required to drag the plate is minimum. [6M]

(OR)

2(a) Deduce an expression for the depth of center of pressure from free surface of liquid of an inclined plane surface submerged in the liquid. [6M]

(b) A circular plate of diameter 3m with a concentric circular hole of diameter 1m is immersed in water vertically such that its top surface is 1.2m below the free surface of the water. Evaluate the pressure force on the plate and the position of the center of pressure. [6M]

UNIT-II

3(a) Describe Lagrangian and Eulerian methods of describing fluid flow. [6M]

(b) The diameters of a pipe at the sections 1-1 and 2-2 are 200mm and 300mm respectively.If the velocity of water flowing through the pipe at section 1-1 is 4m/s,determine i) Discharge through the pipe, and ii) Velocity of water at section 2-2. [6M]

(OR)

4(a) Define stream function and velocity potential. Judge these lines of constant stream function and velocity potential must intersect orthogonally. [6M]

(b) The stream function in a two dimensional, incompressible flow field is given as $\psi=9+6x-4y+7xy$. Evaluate the velocity potential. [6M]

UNIT-III

5(a) State Bernoulli's theorem for steady flow of an incompressible fluid. Formulate an expression for Bernoulli's theorem from first principle and state the assumptions made for such a derivation. [6M]

(b) An oil of density 850kg/m^3 is flowing through a pipe having diameter 30cm and 15cm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 200kPa and at the upper end is 98kPa.If the rate of flow through pipe is 50lps. Evaluate the difference in datum head. Neglect friction. [6M]

(OR)

6(a) Discuss the advantages of triangular notch over a rectangular notch. [6M]

(b) A 150mm x 75mm venturi meter with Cd is 0.98 is to be replaced by an orifice meter having a value of Cd is 0.60, if both the meters are to give the same differential mercury manometer reading for a discharge of 100lps and the inlet diameter to remain 150 mm, determine the diameter of orifice. [6M]

UNIT-IV

7 (a) How would you evaluate in a steady uniform laminar flow? The pressure gradient in the direction of flow is equal to the shear stress gradient in the normal direction. [6M]

(b) An oil of viscosity 0.10pa-s and density 900kg/m^3 is flowing through a 10cm diameter horizontal pipe. The maximum velocity is 2m/s. Find the mean velocity and the radius at which this occurs. Also evaluate the velocity at 4cm from the wall of the pipe. [6M]

(OR)

8 (a) Deduce an expression for the loss of head due to sudden enlargement of a pipe. [6M]

(b) In a laminar boundary layer over a plate the velocity distribution is given by $(u/Um) = (3/2)(y/\delta) - (1/2)(y^2/\delta^2)$. Estimate the displacement thickness, momentum thickness. [6M]

UNIT-V

9 (a) Describe the Rayleigh's method for dimensional analysis. [6M]

(b) Using Buckingham's π-theorem, Formulate the velocity through a circular orifice is given by $V=\sqrt{2gH}\,\Phi[D/H,\mu/\rho VH]$ where H is the head causing flow,D is the diameter of the orifice ,μ is the co-efficient of viscosity is the mass density and g is the acceleration due to gravity. [6M]

(OR)

10(a) Distinguish between Reynold's number, Froude's number and Mach number and derive expressions for any above two numbers. [6M]

(b) A geometrically similar model of spillway is to be laid to a scale of 1:50.Evaluate the velocity ratio, discharge ratio and acceleration ratio. [6M]

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17CE05-ENGINEERING GEOLOGY
(CE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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UNIT-I

1(a) Demonstrate the process of formation of deltas with figures. [6M]
(b) Interpret the types of plate boundaries with figures. [6M]

(OR)

2(a) Demonstrate parts of a sand dune and different types of sand dunes with the help of diagrams. [6M]
(b) Illustrate formation of soil and depict soil profile. [6M]

UNIT-II

3(a) Demonstrate the symmetry elementsof orthorhombic crystal system with diagrams. [6M]
(b) Present the general physical properties, chemistry and uses of FELDSPAR group. [6M]

(OR)

4(a) Report the significance of the following minerals in terms of their physical properties: i) Quartz ii) Gypsum [6M]
(b) List the minerals in Moh's scale of hardness and demonstrate how the hardness of a particular mineral is ascertained. [6M]

UNIT-III

5(a) Analyze and interpretstructures of metamorphic rocks. [6M]
(b) Illustrate the following with their essential features.
i) Limestone ii) Basalt. [6M]

(OR)

6(a) Analyze the following: i) Porphyritic texture ii) Stratification. [6M]
(b) Interpret the process of formation of clastic sedimentary rocks. [6M]

UNIT-IV

7(a) Differentiate between nonconformity and disconformity with figures and illustration. [6M]
(b) Analyze the following and appraise the main features of the following:
i) Plunging folds ii) Strike slip fault. [6M]

(OR)

8(a) Demonstrate how strike and dip of a fold are depicted in a geological map. [6M]
(b) Classify folds and appraise important types of folds with the help of diagrams. [6M]

UNIT-V

9(a) Evaluate the geological considerations at the tunnel site in a faulted area. [6M]
(b) Recommend suitable corrective measures to be taken at the dam site in a faulted terrain. [6M]

(OR)

10(a) Evaluate the importance of groundwater conditions at the tunnel site with examples. [6M]
(b) Justify the conditions to recommend magnetic studies in a terrain and briefly explain the method. [6M]

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17CE04-STRENGTH OF MATERIALS-I

(CE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

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UNIT-I

1(a) A flat steel plate is of trapezoidal form. The thickness of the plate is 15 mm and it tapers uniformly from a width of 60 mm to 10 mm in a length of 30 cm. If an axial force of 100 kN is applied at each end, determine the elongation of the plate. Take E = 2.04 X 10^5 N/mm^2. [6M]

(b) A railway track is laid so that there is no stress in the rails at 10^0C. Evaluate (a) the stress in the rails at 60^0C if there is no allowance for expansion, (b) the stress in the rails at 60^0C if there is an expansion allowance of 10 mm per rail, (c) the expansion allowance if the stress in the rail is to be zero when the temperature is 60^0C, (d) the maximum temperature to have no stress in the rails, if the expansion allowance is 13 mm per rails. Take α = 12 X 10^{-6} per 1^0C and E = 2 X 10^5 N/mm^2. The rails are 30 m long. [6M]

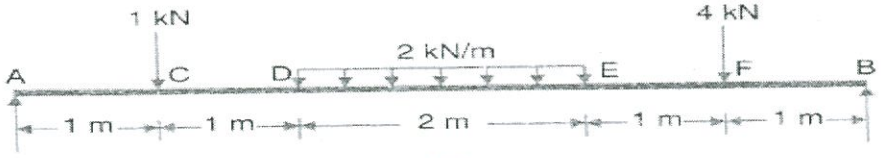
(OR)

2(a) A bar 40 mm diameter is subjected to a tensile force of 400 kN. The extension of the bar measured over a gauge length of 200 mm was 0.318 mm. The decrease in diameter was found to be 0.02 mm. Determine the values of Young's modulus of elasticity and modulus of rigidity of the material. [6M]

(b) Evaluate the strain energy in a bar 3 m long and 40 mm in diameter when it is subjected to a tensile load of 100 kN. Also determine the modulus of resilience of the material of the bar. Take E = 2.05 X 10^5 N/mm^2. [6M]

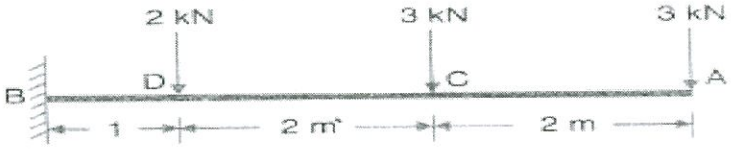
UNIT-II

3 A simply supported beam subjected to combination of loads as shown in fig. Construct the shear force and bending moment diagram indicating the principal values. [12M]



(OR)

4(a) Sketch the shear force and bending diagram for a cantilever beam shown in fig.



[6M]

(b) A simply supported beam of span 6 m is subjected to 3 kN/m over the entire span. Sketch the SFD and BMD of the beam indicating principal values. [6M]

UNIT-III

5. Formulate the flexure equation $\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$. [12M]

(OR)

6(a) Compare the weights of two beams of the same material and of equal strength, one being circular section and solid, and the other being of hollow circular section, the internal diameter being $3/4^{th}$ of the external diamete. [6M]

(b) The maximum shear stress in a beam of rectangular section is 1.5 $\tau_{average}$. Judge the statement. [6M]

UNIT-IV

7(a) Determine the power transmitted by a solid steel shaft of 50mm diameter at 120 rpm, if the permissible shear stress is not to exceed 62.5 N/mm^2. [6M]

(b) A closely coiled helical spring made out of 10 mm diameter steel rod has 10 complete coils, each of mean diameter 80 mm. Determine the stresses induced in the section of the rod, the deflection under the pull and the amount of energy stored in the spring during extension, if it is subjected to an axial pull of 200 N. Take shear modulus N = 0.84 x 10^5 N/mm^2. [6M]

(OR)

8(a) A shaft is transmitting 100 kW power at 180 r.p.m. If the allowable stress in the material is 60 N/mm^2, determine the suitable diameter for the shaft. The shaft is not to twist more than 1^0 in a length of 3 m. Take N = 0.8 x 10^5 N/mm^2. [6M]

(b) An open coiled helical spring is made of 10 mm diameter steel rod, the coils having 10 complete turns and a mean diameter of 80 mm, the angle of helix being 15^0. Determine the angle of rotation about axis of the coil and axial deflection under an axial torque of 6 N-m. Take N = 0.84 x 10^5 N/mm^2 and E = 2.1 x 10^5 N/mm^2. [6M]

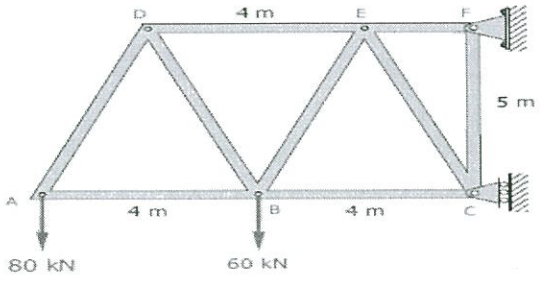
UNIT-V

9(a) A cylindrical shell is 3 m long, 1 m internal diameter and 15 mm metal thickness. Evaluate the maximum intensity of shear stress induced and also the changes in the dimensions of the shell if it is subjected to an internal pressure of 1.5 N/mm^2. Take E = 2.04 x 10^5 N/mm^2 and 1/m = 0.3. [6M]

(b) Determine the ratio of thickness to internal diameter of a tube subjected to internal pressure when the pressure is 5/8 of the value of the maximum permissible circumferential stress. [6M]

(OR)

10. Analyze the truss shown in fig.



[12M]

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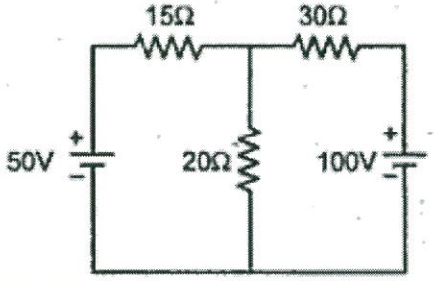
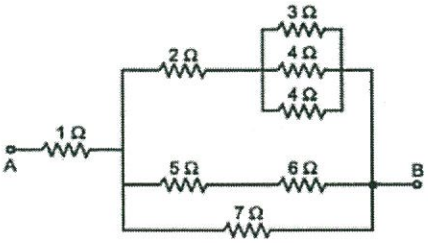
B.Tech. (III Semester) ~~Regular~~/ Supplementary Examinations

17EE51-FUNDAMENTALS OF ELECTRICAL ENGINEERING
(CE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain shortly about electrical circuit elements (R, L and C).	6M	CO1	L2
(b)	Apply Kirchhoff's laws to the circuit shown in figure and solve the currents in all the branches. 	6M	CO1	L3
	(OR)			
2(a)	Analyze the equations for equivalent delta of star connected resistances.	6M	CO1	L4
(b)	Calculate the equivalent resistance between the two points A and B. 	6M	CO1	L3
3(a)	Explain about Power triangle and power factor in ac circuits.	6M	CO1	L2
(b)	Determine the average value and RMS value of the sinusoidal wave form.	6M	CO1	L3
	(OR)			
4(a)	Define (i) Form factor (ii) Peak factor (iii) Instantaneous value(iv) Peak value (v) Peak to Peak value (vi) Frequency.	6M	CO1	L1
(b)	Solve for the a)Frequency b)Time Period c) Average and RMS values of voltage and currents for the two sinusoidal functions (i) $v(t)=325.22 \sin(314.28t)$ (ii) $i(t)=32.52 \sin(314.28t-30^{o})$.	6M	CO1	L3

5(a)	Demonstrate the emf equation of a single phase Transformer.	6M	CO2	L3
(b)	The following readings were obtained from O.C. and S.C. tests on 8 kVA, 400/ 120V, 50 Hz transformer. O.C. Test: (l.v. side) : 120 V; 4 A; 75 W. S.C. Test: (h.v.side) : 9.5 V; 20 A; 110W.Determine (i) The equivalent circuit (approximate) constants, (ii) Voltage regulation and efficiency for 0.8 lagging power factor load	6M	CO2	L3
	(OR)			
6(a)	Describe the constructional features of the both squirrel cage and slip-ring induction motors. Discuss the merits of one over the other.	6M	CO2	L2
(b)	Demonstrate the Torque-slip characteristics of Induction motor with a neat sketch.	6M	CO2	L3
7(a)	Explain Distribution Board System with neat sketch.	6M	CO3	L2
(b)	Explain about Electrical safety measures.	6M	CO3	L2
	(OR)			
8(a)	Differentiate between Industrial wiring and Residential wiring.	6M	CO3	L2
(b)	Explain about LED and LCD displays.	6M	CO3	L2
9(a)	Demonstrate different Lightning Schemes.	6M	CO4	L3
(b)	Explain (i) Cleat wiring (ii) Wood casing.	6M	CO4	L2
	(OR)			
10.	Explain clearly Laws of Illumination with necessary equations and diagrams.	12M	CO4	L2

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17CIO6-COMPUTER ARCHITECTURE
(CSE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	What is Register transfer language? Elaborate few RTL statement with their functioning.	6M	CO1	L1
(b)	Draw the block diagram of Von-Neumann Architecture and give its advantages.	6M	CO1	L2
	(OR)			
2(a)	Design a 4-bit Adder/Subtractor circuit which performs both addition and subtraction operations.	6M	CO1	L4
(b)	Design a digital circuit that performs four logic operations Exclusive NOR, Exclusive OR, NOR, NAND. Use two selection variables and show the logic diagram of one typical stage.	6M	CO1	L4
3(a)	List out the Data manipulation instructions with mnemonics.	6M	CO2	L1
(b)	What is the purpose of Program Control Instructions? List the typical Program Control Instructions with mnemonics.	6M	CO2	L1
	(OR)			
4.	Demonstrate Binary Addition and subtraction with signed magnitude data with a flowchart.	12M	CO2	L2
5(a)	Discuss about address sequencing capabilities in control memory in detail.	6M	CO3	L2
(b)	Distinguish between Hardwired control unit and Micro-programmed control unit.	6M	CO3	L2
	(OR)			
6(a)	What are the methods for designing a control unit? Give the general configuration of a micro-programmed control unit.	6M	CO3	L2
(b)	Give a format of microinstruction. How could an instruction code be mapped into micro-instruction address?	6M	CO3	L4
7(a)	Discuss about memory hierarchy in computer system.	6M	CO4	L2
(b)	Describe about associative memory with match logic in detail?	6M	CO4	L2
	(OR)			
8.	Demonstrate the different mapping techniques used in cache memory and give their advantages and disadvantages.	12M	CO4	L2
9(a)	With neat diagram, explain the strobe control data transfer method and state its disadvantages.	6M	CO5	L1
(b)	With neat diagram, explain the handshaking data transfer method and state its advantages.	6M	CO5	L2
	(OR)			
10(a)	Illustrate the concept of DMA controller in a computer.	6M	CO5	L2
(b)	Briefly explain about the techniques to handle a hardware priority interrupt.	6M	CO5	L2

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17C105-DATA STRUCTURES

Time : 3 hours (CSE & EEE) Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1 (a)	Explain the need of algorithm. Explain its notation with example.	6M	CO1	L3
(b)	Write a program to implement Single Linked List ADT.	6M	CO1	L2
	(OR)			
2 (a)	Explain briefly about different types of lists.	6M	CO1	L3
(b)	Write a program to implement Polynomial ADT.	6M	CO1	L2
3 (a)	Mention explain the applications of Queues.	6M	CO2	L2
(b)	Write an algorithm to evaluate postfix expression.	6M	CO2	L2
	(OR)			
4 (a)	Write a program to implement queue using arrays.	6M	CO2	L2
(b)	What are the applications of circular queue? Explain its concept.	6M	CO2	L2
5 (a)	Write an algorithm for Linear search and obtain its time complexity.	6M	CO3	L2
(b)	Write a program for Insertion sort. Trace the program for the following key sequence. 23 2 26 87 34 98 15 68 28 58 90.	6M	CO3	L3
	(OR)			
6.	Write an algorithm for Merge sort. Trace the algorithm with suitable example.	12M	CO3	L3
7 (a)	Explain about different types og Binary trees with example.	6M	CO4	L3
(b)	Write a routine to insert an element into BST.	6M	CO4	L2
	(OR)			
8 (a)	Explain how to construct an AVL tree with an example. Also explain various rotations used in AVL tree implementation.	6M	CO4	L2
(b)	Construct the BST for the following key sequence 34 12 67 58 22 27 20 45 50.	6M	CO4	L3
9 (a)	Define graph. Explain its concept.	6M	CO5	L3
(b)	Explain the concept of Hashing. Discuss in detail about various hashing techniques.	6M	CO5	L2
	(OR)			
10 (a)	What is BFS? Explain it with example.	6M	CO5	L2
(b)	Write short notes on Rehashing and Spanning Tree.	6M	CO5	L3

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17CI04-PYTHON PROGRAMMING

(CSE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Implement python script to calculate the distance between two points.	6M	CO1	L3
(b)	Distinguish variable and constant. List various keywords available in python.	6M	CO1	L2
	(OR)			
2(a)	Evaluate the following arithmetic expressions using the rules of operator precedence in python. (i) 5*4+7/2 (ii) 6//7*2-5 (iii) 20//4//2 (iv) 5-6+2**3e) 24//6*2 (v) 4*(2**3)-5/2	6M	CO1	L2
(b)	Implement python script to swap two integers using multiple assignment.	6M	CO1	L3
3(a)	Discuss the usage of break, continue and pass statements with examples.	6M	CO2	L2
(b)	Implement python script to print prime numbers between 100 and 200.	6M	CO2	L3
	(OR)			
4(a)	Implement python script to create a list of both positive and negative integers. Create a new list with only positive numbers.	6M	CO2	L3
(b)	Summarize various mathematical functions and constants available in python.	6M	CO2	L2
5(a)	How do we create and access a string in python and develop a python program to compare the given two strings?	6M	CO3	L2
(b)	Implement Python Script to check given string is palindrome or not.	6M	CO3	L3
	(OR)			
6(a)	Write a function that generate Fibonacci sequence using recursion.	6M	CO3	L3
(b)	Develop a program which makes use of function to display all such numbers which are divisible by 7 but are not a multiple of 5, between 1000 and 2000.	6M	CO3	L3
7(a)	Define Tuple. Give syntax for creating a tuple and accessing elements in tuple with suitable examples.	6M	CO4	L1
(b)	Develop a python script that creates two sets – Squares and Cubes in range 1-10.	6M	CO4	L3
	(OR)			
8(a)	Explain how to open file with WITH keyword.	6M	CO4	L2
(b)	Define a function that reads the contents of given file as argument.	6M	CO4	L3
9(a)	Describe the procedure of Bubble sort with example.	6M	CO5	L2
(b)	Create a function that takes list as argument and perform Selection sorting.	6M	CO5	L3
	(OR)			
10(a)	Demonstrate how to handle multiple exceptions in program.	6M	CO5	L3
(b)	Explain how to connect database in Python program.	6M	CO5	L2

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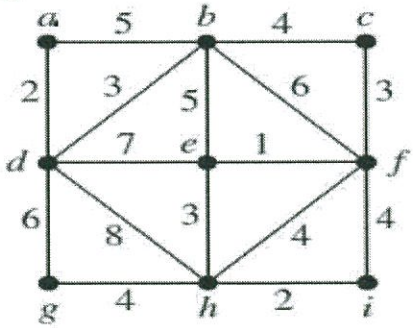
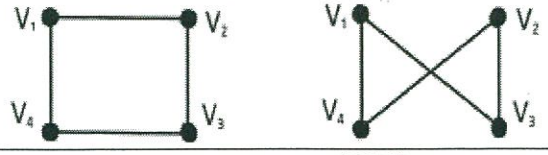
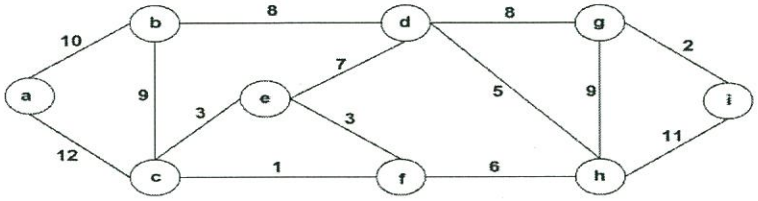
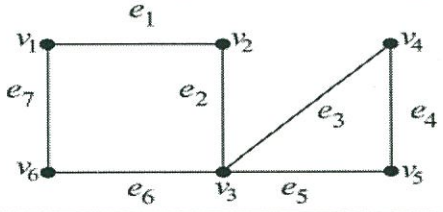
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17CI03-DISCRETE MATHEMATICAL STRUCTURES

Time : 3 hours (CSE) Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Show that the Compound proposition PV(P∧¬Q)V(∧(¬PV¬Q) is a tautology by using the truth table.	6M	CO1	L2
(b)	Obtain the disjunctive normal form of the following (P ∧ (P →Q)) ii. ¬(P V Q) ⇔ (P ∧ QS).	6M	CO1	L1
	(OR)			
2(a)	Identify the PCNF and PDNF of the compound proposition (¬P→Q) ∧ (Q⇄P).	6M	CO1	L3
(b)	Show that compound propositions are logically equivalent (P→Q) Λ[¬Q Λ (R V ¬Q)] ⇔¬(Q V P).	6M	CO1	L2
3(a)	Given set A={1,2,3,4} & R={(1,1),(1,2),(2,2),(2,4),(1,3),(3,3),(3,4),(1,4),(4,4)}. Show that R is a partial order on A and also Construct the Hasse diagram for R.	6M	CO2	L3
(b)	Solve the following (i) A^1 (ii) $A^1 \cap B^1$ (iii) $(A \cup B)^1$ (iv) $A \Delta B$. The given sets are U={1,2,3,4,5,6,7,8,9}, A={1,2,4,6,8} and B={1,2,4,5,9}.	6M	CO2	L3
	(OR)			
4(a)	Construct the Hasse diagram that representing the Partial Ordering on {(a, b)| a divides b} on {1, 2, 3, 4, 6, 8, 12}.	6M	CO2	L3
(b)	The Set A= {1, 2, 3, 4}, let R and S be the relations on A defined by R= {(1,2) (1,3) (2,4),(4,4)} and S= {(1,1),(1,2),(1,3),(2,3),(2,4)}. Find: i) ROS ii) SOR iii) R-S iv)S-R	6M	CO2	L3
5(a)	Using Prim's algorithm find a minimal spanning tree for the weighted graph given below: 	6M	CO3	L2

(b)	Show that the following graphs are Isomorphic. 	6M	CO3	L2
	(OR)			
6(a)	Identify the minimal spanning tree for the connected graph using Kruskal's algorithm. 	6M	CO3	L3
(b)	Determine whether the graph is Eulerian graph or not? 	6M	CO3	L5
7(a)	For Z_7 - {0} (i) Construct composition table with respect to x_7 (ii) Prove that G is an abelian group with respect to x_6 (iii) Identify the inverse of all the elements set.	6M	CO4	L3
(b)	Determine the coefficient of x^3y^6 in the expansion of $(2x-5y)^9$.	6M	CO4	L5
	(OR)			
8(a)	Determine the number of distinguishable permutations of the letters in the words: (i)STRUCTURES (ii) ENGINEERING	6M	CO4	L5
(b)	List the number of integers 1and250 which are divisible by 2 or 3or 5.	6M	CO4	L4
9(a)	Construct the generating function for the following sequences: (i) 1,0, 1,2,0,1,..... (ii) 1,0,3,-2,....	6M	CO5	L6
(b)	Solve the Recurrence Relation $\mathbf{2a_{n-3}=a_{n-2}+2a_{n-1}-a_n=0}$, $\mathbf{n\geq 0}$, with $a_0=0, a_1=1, a_2=2$.	6M	CO5	L6
	(OR)			
10(a)	Solve the recurrence relation using by the method of characteristic roots an-7an-1+16an-2– 12an-3=0 Where n ≥ 3 with a0 = 1, a1= 4, a2= 8	6M	CO5	L6
(b)	A sequence is defined by the recurrence relation $a_{n+1}= -3a_n + 7$ with $a_0=2$. Choose the value of a_2?	6M	CO5	L6

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations
17FE03-ENVIRONMENTAL SCIENCE
(CSE,EIE,IT&ME)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	"Environmental education is need of the hour". Justify this statement.	6M	CO1	L3
(b)	How water quality affects the human health? Name any four water borne diseases.	6M	CO1	L2
	(OR)			
2(a)	What are the major causes of displacement of people? Discuss in the light of some case studies.	6M	CO1	L2
(b)	Analyse the impacts of global population growth.	6M	CO1	L2
3(a)	Can you suggest some measures needed to be taken for conserving forest wealth.	6M	CO2	L1
(b)	List out the advantages and disadvantages of wind energy.	6M	CO2	L2
	(OR)			
4(a)	Describe the advantages and disadvantages of chemical fertilizers and pesticides.	6M	CO2	L2
(b)	Identify the environmental impacts of mining.	6M	CO2	L2
5(a)	Define an ecosystem. And classify the structure and functions of an ecosystem.	6M	CO3	L1
(b)	Explain the different types of food chains and food webs with examples.	6M	CO3	L2
	(OR)			
6(a)	Explain the criteria to select a biodiversity hotspot. Name the biodiversity hotspots in India.	6M	CO3	L2
(b)	What are the in-situ methods for conservation of biodiversity with examples?	6M	CO3	L1
7(a)	What are the sources and effects of water pollution? Explain the treatment methods.	6M	CO4	L1
(b)	What is an earthquake? Write the measures to be taken to mitigate an earthquake.	6M	CO4	L1
	(OR)			
8(a)	Define greenhouse effect. List out any five greenhouse gases.	6M	CO4	L1
(b)	Suggest the mitigation measures to be taken for the floods and landslides.	6M	CO4	L2
9(a)	Define consumerism. Summarize the ill effects of consumerism on environment.	6M	CO5	L2
(b)	List out the major objectives of Green Building.	6M	CO5	L1
	(OR)			
10(a)	Define EIA. List the major objectives of EIA.	6M	CO5	L1
(b)	When was Air (Prevention and Control of Pollution) Act, framed in India? Outline the important features of this Act.	6M	CO5	L1

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech.(II Semester) ~~Regular~~/Supplementary Examinations

17FE08-PROBABILITY AND STATISTICS

(CSE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	If $P(A)=\frac{1}{3}, P(B)=\frac{1}{4}$ and $P(A\cup B)=\frac{1}{2}$ then calculate $(i)P(A/B)(ii)P(B/\bar{A})(iii)P(\bar{A}/\bar{B})$.	6M	CO1	L3
(b)	State and prove Baye's theorem of probability.	6M	CO1	L2
	(OR)			
2(a)	A random sample of 200 adults are a classified by gender and their level of education attained Education / Male / Female Elementary / 38 / 45 Secondary / 28 / 50 College / 22 / 17 If a person is picked at random from this group, Determine the probability that, (i) The person is a male, given that the person has a secondary education. (ii) The person does not have a college degree, given that the person is a female.	6M	CO1	L5
(b)	The probability distribution of the number of imperfections X per 10 meters of synthetic fabrics given by x: 0 / 1 / 2 / 3 / 4 p(x): 0.41 / 0.37 / 0.16 / 0.05 / 0.01 Determine (i) E(X), Average number of imperfections per 10 meters of this fabric and (ii) $\sqrt{V(X)}$, Standard deviation of X.	6M	CO1	L3
3(a)	It is known that 60% of mice inoculated with a serum are protected from a certain disease. If 5 mice are inoculated, assess the probability that (i) none contracts the disease; (ii) fewer than 2 contract the disease; (iii) more than 3 contract the disease.	6M	CO2	L3
(b)	If 5% of the electric bulbs manufactured by a company are defective. Use Poisson distribution to estimate the probability that in a sample of 100 bulbs (i) none is defective (ii) 2 bulbs will be defective.	6M	CO2	L3
	(OR)			
4(a)	The mean and standard deviation of the marks obtained by 1000 students in an examination are respectively 34.5 and 16.5. Assuming the normality of the distribution, evaluate the number of students expected to obtain the marks (i) Between 30 and 60. (ii) Less than 50 (iii) Greater than 50.	6M	CO2	L5
(b)	Derive the mean and variance of Exponential distribution.	6M	CO2	L2
5.	A population consists of five numbers {2, 3, 6, 8, 11}. Consider all possible samples of size 2 which can be drawn without replacement from this population. Calculate (i) Population mean (ii) Population Standard deviation (iii) mean of the sampling distribution of means and (iv) Standard error of sample mean.	12M	CO3	L3
	(OR)			

6(a)	Measurements of the weights of a random sample of 200 ball bearings made by a certain machine during one week showed a mean of 0.824 cm and a standard deviation of 0.042 cm. Estimate 95% and 98% confidence limits for the mean weight of all the ball bearings.	6M	CO3	L3
(b)	A random sample of 12 graduates of a certain secretarial school typed an average of 79.3 words per minute with a standard deviation of 7.8 words per minute. Assuming normality of the data, develop a 95% confidence interval for the average number of words typed by all graduates of this school.	6M	CO3	L3
7(a)	At a certain college, it is estimated that 25% of the students ride bicycles to class. Does this seem to be a valid estimate if, in a random sample of 90 college students, 28 are found to ride bicycles to class? Use a 0.05 level of significance.	6M	CO4	L4
(b)	A college conducts both day and night classes intended to be identical. A sample of 100 day students yields examination results as $\bar{x_1} = 72.4$ and $\sigma_1 = 14.8$. A sample of 200 night students yields examination results as $\bar{x_2} = 73.9$ and $\sigma_2 = 17.9$. Are the two means statistically equal at 5% level?	6M	CO4	L4
	(OR)			
8(a)	The sales data in number of an item in 6 shops before and after a special promotional campaign are given: Shops : A B C D E F Before campaign 53 28 31 48 50 42 After campaign 58 29 30 52 56 45 Can the campaign be judged to be a success at 5% level of significance?	6M	CO4	L4
(b)	In an experiment to study the dependence of hypertension on smoking habits, the following data were taken on 180 individuals: Non-Smokers | Moderate Smokers | Heavy Smokers Hypertension: 21 | 36 | 30 No Hypertension: 48 | 26 | 19 Test the hypothesis that the presence or absence of hypertension is independent of smoking habits. Use 0.05 level of significance.	6M	CO4	L4
9(a)	Calculate Karl Pearson's coefficient of correlation from the following data: X: 10 12 18 24 23 27 Y: 13 18 12 25 30 10	6M	CO5	L3
(b)	Determine the rank correlation coefficient for the following data of ranks of 10 students in two subjects. Statistics: 1 2 3 4 5 6 7 8 9 10 Mathematics: 2 4 1 5 3 9 7 10 6 8	6M	CO5	L3
	(OR)			
10(a)	The regression equations of two variables X and Y are as follows. 3X +2Y-26=0 and 6X+Y-31=0. Estimate (i)Mean values of X andY(ii) Two regression coefficients (iii) Coefficient of correlation between X and Y.	6M	CO5	L5
(b)	From the following data develop the two regression lines. X Y Average 7.6 14.8 Standard deviation 3.6 2.5 Correlation coefficient between X and Y is 0.99.Estimate (i) The value of Y at X = 12. ii)The value of X at Y = 10.	6M	CO5	L5

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17EC08-ANALOG INTEGRATED CIRCUITS
(ECE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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UNIT-I

1(a) Summarize the operation of basic current circuit. [6M]
(b) What are the advantages of IC technology? [6M]

(OR)

2(a) Define integrated circuit. What is difference between linear IC and digital IC? [6M]
(b) List the DC parameters of differential amplifier with proper derivations. [6M]

UNIT-II

3(a) Draw and summarize about the instrumentation amplifier and obtain Output voltage expression, write its applications. [6M]
(b) Explain importance of slew rate of An op – amp. An op-amp has a slew rate of 1V/μs. What is the maximum frequency of an output sinusoidal of peak value 20 V at which the distortion sets in due to the slew rate limitation? [6M]

(OR)

4(a) Discuss about V-I and I-V converter in detail. [6M]
(b) Illustrate the half wave and full wave rectifiers by using Op-Amp. [6M]

UNIT-III

5(a) Create a circuit which gives square wave output for any input signal. [6M]
(b) Develop the transfer function of first order Butter worth high pass filter and draw its frequency response. [6M]

(OR)

6(a) Design a wide band-reject filter with f_L = 2KHz, f_H =400Hz and a pass band gain is 4. [6M]
(b) Build the transfer function of second order Butter worth low pass filter and draw its frequency response. [6M]

UNIT-IV

7(a) Make use of 555 Timer to model Monostable Multivibrator and calculate its pulse width. [6M]
(b) Design Astable Multivibrator to generate the output signal with frequency of 1 KHz and duty cycle of 75%. [6M]

(OR)

8(a) Draw and discuss about block diagram of Voltage Controlled Oscillator and derive expression for free running frequency. [6M]
(b) Build a low voltage regulator using IC 723. [6M]

UNIT-V

9(a) Measure the output voltage produced by a DAC whose output range is 0-10V and whose input binary number is (i) 10 (ii) 0110 (iii) 10111100 (iv)1000 [6M]
(b) Explain the working of counter type ADC with relevant diagrams. [6M]

(OR)

10(a) Evaluate the specifications of DAC and ADC and explain. [6M]
(b) Compare and contrast Flash, dual slope, Successive Approximation type ADCs. [6M]

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24 SEP 2021

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17EC07-PULSE AND SWITCHING CIRCUITS

(ECE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	A 10V step is switched on to a 50kΩ resistor in series with a 500pf capacitor. Apply the concept of rise time Calculate the rise time of the capacitor voltage, and the time required for the capacitor to be completely charged.	6M	CO4	L3
(b)	Prove that RC low pass circuit will behave as an integrator. Apply the condition to be satisfied and plot the waveforms for step and square wave input.	6M	CO4	L2
	(OR)			
2(a)	The square wave is applied to an RC differentiator and Obtain the output waveforms for the various time periods (i) T=RC (ii) T=0.2 RC (iii) T=10RC.	6M	CO4	L2
(b)	Derive the expression for the output of high pass RC circuit excited by a step input, and plot the output waveforms for various time constants. Justify with comment.	6M	CO4	L2
3(a)	Model the necessary slicing circuit and output wave form for the expected square wave between -2V to -5V when a sinusoidal input is given of voltage 10V.	6M	CO2	L3
(b)	Choose the negative peak clipping below -5V and make use of the concept of shunt clipper circuits and draw the required circuit diagram. Also draw the transfer characteristics.	6M	CO2	L3
	(OR)			
4(a)	Design a diode clamper to restore a dc level of +10 V to an input signal of peak to peak value 15 V. Assume the drop across the diode is 0.7 V and the signal frequency is 2 kHz.	6M	CO2	L3
(b)	A 100V peak square wave with an average value of 0V and a period of 20ms is to be negatively clamped at 25V. Plan the input and output waveforms and necessary circuit diagram.	6M	CO2	L3
5(a)	For a common emitter circuit, V_{cc} = 10V, R_C =1.5K Ω and I_b=0.1mA. Determine the value of h_{FE}(min) for getting saturation.	6M	CO3	L2
(b)	Generalize the terms pertaining to transistor switching characteristics. (i) Rise time (ii) Delay time (iii) Turn-ON time (iv) Storage time (v) Fall time (vi) Turn-OFF time	6M	CO3	L2
	(OR)			
6(a)	With the help of neat circuit diagram, explain the working principle of bistable multivibrator with necessary wave forms at both bases and collectors.	6M	CO3	L2
(b)	Design a fixed bias Bistable multivibrator to meet the fallowing specifications. V_{cc}=15V, V_{BB}=5V, I_c(sat)=10mA, $V_{CE(sat)}$=0.4V, $V_{BE(sat)}$=0.8V, h_{FE}(min)=50.	6M	CO3	L3
7(a)	Design a Astable multivibrator that generates 5 kHz square wave and also derive the necessary period of oscillation.	6M	CO1	L3
(b)	Apply the concept of Monostable Multivibrator and obtain a voltage to frequency converter with relevant expression.	6M	CO1	L3
	(OR)			
8(a)	Identify the values of UTP and LTP of emitter coupled bistable multivibrator with h_{FE}=50,Vcc=12V, R_s=1KΩ, R_1=2 KΩ, R_2 =10KΩ, R_{C1}=5KΩ, R_{C2}=1KΩ and R_e=4KΩ.	6M	CO1	L3
(b)	Construct the circuit of fixed bias binary which shows the symmetrical triggering at collectors and examine the working principle of the triggering circuit.	6M	CO1	L3
9(a)	Classify the different types of errors that occur through the time base generators.	6M	CO4	L2
(b)	Outline how the pedestal is added in sampling gate output. Adopt the cancellation of pedestal in a sampling gate with suitable circuit diagram.	6M	CO4	L3
	(OR)			
10(a)	With neat circuit and waveforms inference how UJT can be used as Relaxation oscillator and derive the frequency of oscillation.	6M	CO4	L2
(b)	Draw the four diode sampling gate and illustrate its operation	6M	CO4	L2

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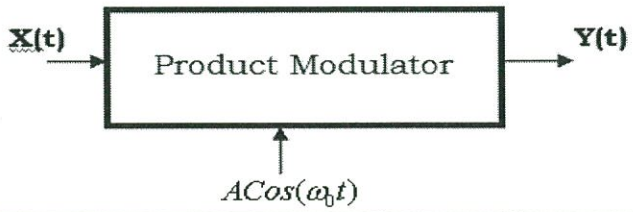
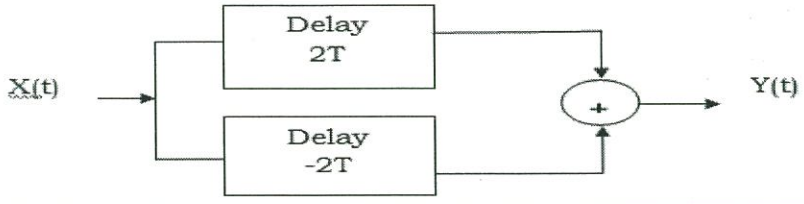
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17EC06-RANDOM VARIABLES AND STOCHASTIC PROCESSES
(ECE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Contrast the properties of Moment Generating Function.	6M	CO1	L2
(b)	A random variable X has a probability density $f_X(x) = \begin{cases} \frac{\pi}{16}\cos\left(\frac{\pi x}{8}\right), & -4 < x < 4 \\ 0, & elsewhere \end{cases}$ Find (i) Mean value (ii) Second moment (iii) Variance.	6M	CO3	L3
	(OR)			
2(a)	Describe the properties of probability density Function.	6M	CO1	L2
(b)	A random variable has a probability density $f_X(x) = \begin{cases} \frac{5}{4}(1-x^4), & 0 < x \le 1 \\ 0, & elsewhere \end{cases}$ Calculate (i) E[X] (ii) E[4X+2] (iii) E[X^2].	6M	CO3	L3
3(a)	Discuss about the two dimensional Gaussian random variables density function and summarize its properties	6M	CO1	L2
(b)	Differentiate whether two given random variables are statistically independent or not if their joint probability density function is given as $f_{XY}(x,y) = \frac{5}{16}x^2 y \quad , 0 < x < 2 \;\&\; 0 < y < 2$ $= 0 \quad , \quad otherwise$	6M	CO2	L2
	(OR)			
4(a)	Discuss about Joint Central Moments with necessary mathematical Expressions.	6M	CO1	L2
(b)	Given $f_{XY}(xy) = \frac{(x+y)^2}{40}, \quad -1 < x < 1, -3 < y < 3$ $= 0 \ , \quad elsewhere$ Determine variances of X & Y	6M	CO3	L3
5(a)	Interpret about ergodic random processes.	6M	CO1	L2
(b)	Two random process X(t) & Y(t) are defined as $X(t) = A\cos(\omega_0 t) + B\sin(\omega_0 t)$ and $Y(t) = B\cos(\omega_0 t) - A\sin(\omega_0 t)$, where A, B are uncorrelated, zero mean random variables with same variances and ω_0 is constant. Verify whether X(t),Y(t) are Jointly wide sense stationary or not.	6M	CO2	L2
	(OR)			

6(a)	Interpret the concepts of covariance with relevance to random processes.	6M	CO1	L2
(b)	Verify the Sine wave process X(t) = B sin (θt), where B is uniform random variable on (-1,1) is wide sense stationary or not.	6M	CO2	L2
7(a)	Choose relevant expressions to verify the following statements for any given random process X(t). (i) $S_{xy}(\omega)= S_{yx}(-\omega)= S^*_{yx}(\omega)$ (ii)$S_{xy}(\omega)=0$ when X(t) and Y(t) are orthogonal.	6M	CO2	L2
(b)	If X(t) is WSS process, Develop the power spectrum of $Y(t)=A_0+B_0X(t)$ in terms of the power spectrum of X(t), if A_0, B_0 are real constants.	6M	CO3	L3
	(OR)			
8(a)	Choose necessary expressions to verify the following for a given random process X(t). (i) $S_{\dot{X}\dot{X}}(\omega)=\omega^2 S_{XX}(\omega)$ (ii) $S_{XX}(-\omega)=S_{XX}(\omega)$ where $\dot{X}(t)=\frac{d}{dt}(X(t))$	6M	CO2	L2
(b)	A random process W(t) = AX(t)+BY(t), A , B are real constants and X(t), Y(t) are jointly WSS, then Determine (i) The power spectrum $S_{WW}(\omega)$ of W(t) (ii) The power spectrum $S_{WW}(\omega)$ of W(t) if X(t) & Y(t) are uncorrelated.	6M	CO3	L3
9(a)	Explain the following (i) Response of the LTI system (ii) Transfer function of the system.	6M	CO4	L2
(b)	A random process Y(t) is obtained from the system as shown in figure, then express the output PSD in terms of input PSD, where A, $\omega_0$are constants. 	6M	CO4	L3
	(OR)			
10(a)	Discuss the concepts of noise with necessary expressions.	6M	CO1	L2
(b)	The power density spectrum of a random process X(t) is given by $S_{XX}(\omega)=\frac{16}{16+\omega^2}$. Analyze whether it is valid density or not. If the random process is transmitted through a system as shown in figure, find output Auto PSD 	6M	CO2	L3

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R17

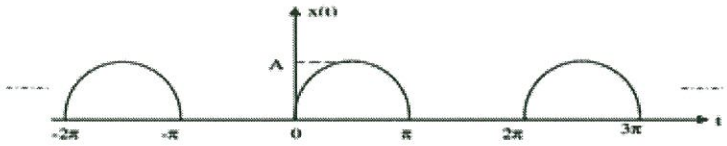
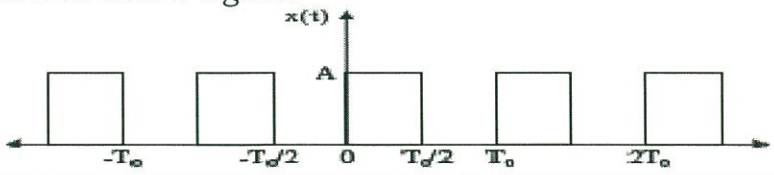
LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17EC05-SIGNALS AND SYSTEMS
(ECE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain the following classes of signals with examples (i) Even and odd signals (ii) Energy and Power signals.	6M	CO1	L2
(b)	Analyze the system response for the input $x(t) = u(t)$ and impulse response $h(t) = u(t)$.	6M	CO4	L4
	(OR)			
2(a)	Identify whether the following signals are energy or power signals i) $u(t)$ ii) $Acos(\omega_0 t)$.	6M	CO3	L3
(b)	Compute the convolution of two discrete sequences x(n)={1,2,3,4} and h(n)={1,1,1,1}.	6M	CO4	L3
3(a)	Make use of the condition for orthoganality of two signals, prove $cos(mw_0 t)$ and $cos(nw_0 t)$ are orthogonal for $m \neq n$ over a period $\frac{2\pi}{w_0}$.	6M	CO2	L3
(b)	Compute the Fourier series expansion of the half wave rectified sine wave shown below. 	6M	CO4	L3
	(OR)			
4(a)	Examine whether the signals $cos(mw_0 t)$ and $sin(nw_0 t)$ are orthogonal or not over a period $\frac{2\pi}{w_0}$.	6M	CO3	L4
(b)	Compute the Fourier series expansion for the signal x(t) shown in below figure. 	6M	CO4	L3
5(a)	Analyze the following properties of Fourier transform with mathematical proofs (i) Convolution in time domain (ii) Time Shifting property.	6M	CO1	L4

(b)	Apply the sampling theorem of baseband signal to identify the nyquist rates and nyquist interval of (i) $x(t) = cos(100\pi t)$ (ii) $x(t) = cos^2(100\pi t)$.	6M	CO4	L3
	(OR)			
6(a)	Compute the Fourier transform of the function $x(t) = \begin{cases} 1 & \lvert t\rvert \leq \frac{\tau}{2} \\ 0 & otherwise \end{cases}$	6M	CO1	L3
(b)	Compare impulse, natural and flat-top sampling methods.	6M	CO4	L2
7.	Classify systems based on their characteristics and explain each class of system with examples.	12M	CO2	L4
	(OR)			
8(a)	Summarize the properties of auto correlation and cross correlation functions	6M	CO5	L2
(b)	Show the following are dynamic and time-variant systems i) $y(t) = x^2(2t)$ ii) $y(n) = x(-3n)$	6M	CO5	L2
9(a)	Compute the Laplace transform of the following functions. i) $x(t) = cos(3t)u(t)$ ii) $x(t) = e^{-5t}u(t)$	6M	CO4	L3
(b)	Solve the following differential equation using Laplace transform $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = u(t)$	6M	CO4	L3
	(OR)			
10(a)	Explain Region of convergence and list its properties for Laplace transform.	6M	CO4	L2
(b)	Solve the inverse Laplace transform of $e^{-s}\left(\frac{s-2}{s^2-4s+3}\right)$	6M	CO4	L3

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17CI01-COMPUTER PROGRAMMING

(ECE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

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UNIT-I

1(a)	Define identifier. Explain various rules to define the identifier.	[6M]
(b)	Construct a C program to display Fibonacci series up to given range.	[6M]
	(OR)	
2(a)	Explain bitwise operators in C with suitable examples.	[6M]
(b)	Develop a C program to find whether the given number is strong or not.	[6M]
	UNIT-II	
3(a)	Design a C program to find the transpose of a 3x3 matrix.	[6M]
(b)	Develop a C program to find the sum and average for list of elements given in an Array.	[6M]
	(OR)	
4(a)	Develop a C program to read a string and convert uppercase characters to lowercase characters and vice-versa.	[6M]
(b)	Design an algorithm to search the existence of given element inside the array using linear search.	[6M]
	UNIT-III	
5(a)	What is a storage class? List out various storage classes used in C Language with their advantages.	[6M]
(b)	Develop a C program to find GCD of two numbers using functions.	[6M]
	(OR)	
6(a)	Define a pointer to a pointer. How it is declared? Demonstrate with suitable example.	[6M]
(b)	Distinguish between malloc() and calloc() with examples.	[6M]
	UNIT-IV	
7(a)	Compare and contrast structure and array with suitable examples.	[6M]
(b)	Is it possible to compare members of structure objects? -Justify your answer with example.	[6M]
	(OR)	
8(a)	Write a C program to create a structure for STUDENT with Student_No, Name, Course and DOB using nested structures. Read one student details and display them.	[6M]
(b)	Explain how members of a union are accessed using a code snippet.	[6M]
	UNIT-V	
9(a)	Develop a C program to read and display contents of an existing file.	[6M]
(b)	Compare and contrast fwrite() with fread() with examples.	[6M]
	(OR)	
10(a)	What is a file? Explain different modes in which a file can be opened in a C program.	[6M]
(b)	Differentiate between fscanf() and fprintf() with suitable examples.	[6M]

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17EE05-POWER GENERATION AND UTILIZATION

(EEE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Give a general layout of a hydro-electric power plant and explain the functions of different components present in it. Clearly explain the principle of a hydro-electric plant.	6M	CO3	L2
(b)	Write short notes on the following: (i) hydrological cycle (ii) spillway (iii) catchment area (iv) hydrograph.	6M	CO3	L1
	(OR)			
2(a)	Explain the properties of coal used in a thermal power plant.	6M	C01	L2
(b)	A thermal power plant spends Rs.25 Lakh in one year towards coal consumption. The coal has a heating value of 5000Kal/Kg and costs Rs.500/ton. If the thermal efficiency is 35% and electrical efficiency is 90%, find the average load on the power plant.	6M	CO3	L3
3(a)	Explain with a neat sketch the working of a nuclear power station with pressurized heavy water reactor.	6M	CO3	L2
(b)	Explain the role of shielding and its methods used in a nuclear reactor.	6M	CO3	L2
	(OR)			
4(a)	List and justify the methods of improving the efficiency of a gas turbine power plant.	6M	CO3	L2
(b)	Describe the construction and principle of operation of a horizontal axis wind turbine with a neat diagram and labeling. Explain the function of each component present in it.	6M	CO3	L2
5(a)	What are load and diversity factors? How do they influence the cost of generation of electrical energy?	6M	CO2	L2
(b)	A generating plant works on a maximum demand of 600MW. The annual load factor being 60% and capacity factor is 30%. Find the reserve capacity of the plant.	6M	CO2	L3
	(OR)			
6(a)	What do you understand by tariff? Explain various types of tariffs.	6M	CO2	L2
(b)	A consumer has an annual consumption of 70,000 Kwh. The charge is Rs.100 per Kw of maximum demand plus 5 Paisa per Kwh. Find the annual bill and overall cost per Kwh if the load factor is 40%.	6M	CO2	L3

7(a)	What are the various types of starters used for fluorescent tubes? Describe the construction and principle of operation of thermal type starter.	6M	CO4	L2
(b)	Explain the following: (i) Specular reflection principle of street lighting. (ii) Why local lighting is required in factory lighting? (iii) What is meant by glare?	6M	CO4	L2
	(OR)			
8(a)	Describe the various types of lighting schemes.	6M	CO4	L2
(b)	Two lamp posts are 16m apart and are fitted with 100CP each at a height of 6m above ground. Calculate the illumination on the ground (i) under each lamp and (ii) midway between the lamps.	6M	CO4	L3
9(a)	Give the classification of various electrical heating methods along with a brief account of their working principles.	6M	CO4	L2
(b)	A slab of insulating material 150 sq cm in area and 1 cm thick is to be heated by dielectric heating. The power required is 400 W at a frequency of 30megacycles. The material has a relative permittivity of 5 and power factor of 0.05. Determine voltage necessary for heating and the current that flows in the material.	6M	CO4	L4
	(OR)			
10(a)	Explain resistance welding and its applications.	6M	CO4	L2
(b)	Briefly discuss the method of dielectric heating used in the electric heating.	6M	CO4	L2

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

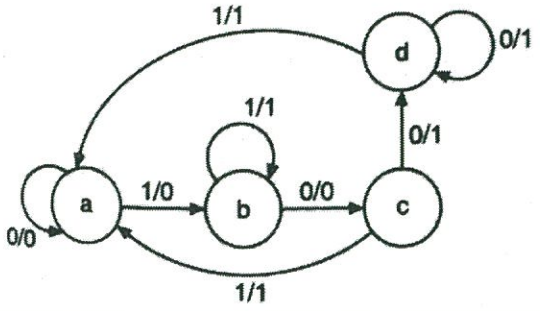
17EE04-DIGITAL LOGIC CIRCUIT DESIGN

(EEE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Determine the 1's and 2's complement of the following binary numbers. (i) 11100101 (ii) 0111000 (iii) 1010101 (iv) 011001	6M	CO1	L1
(b)	What is BCD code? How the BCD code can be represented for decimal numbers 0 to 15?	6M	CO1	L2
	(OR)			
2(a)	Convert the following numbers into decimal & Octal systems. (i) $(10101)_2$ (ii) $(110100)_2$	6M	CO1	L3
(b)	Develop the hamming code for the word 01011011 with even parity.	6M	CO1	L3
3(a)	State and Verify De Morgan's theorems.	6M	CO2	L1
(b)	Simplify the following function using K-map and realize it using basic gates. $Y = \sum m(4,5,8,9,11,12,13,15)$	6M	CO2	L3
	(OR)			
4(a)	Describe the function of NAND, NOR & EX-OR Gates with their truth tables.	6M	CO2	L2
(b)	Determine the canonical forms of the boolean function f = AB + BC + AC	6M	CO2	L3
5(a)	Develop the combinational circuit of Half adder.	6M	CO3	L2
(b)	Implement the logic circuit of 2 to 4 line Decoder.	6M	CO3	L3
	(OR)			
6(a)	Convert the 4-bit binary code into Gray code and develop the logic circuit.	6M	CO3	L3
(b)	Implement the logic function using 4:1 MUX F(a,b,c) = Σm(1,3,5,6) Choose 'a' and 'b' as select lines.	6M	CO4	L3
7(a)	Distinguish between combinational and sequential logic circuits.	6M	CO3	L2
(b)	Elaborate the operation of clocked SR Flip-flop and develop its characteristic equation.	6M	CO3	L3
	(OR)			
8(a)	Describe the operation of 2-bit ripple up-counter using negative edge-triggered JK flip-flops.	6M	CO3	L2

(b)	Design a logic circuit to convert JK FF into D-FF.	6M	CO3	L3
9(a)	Discuss the classification of Finite state machine.	6M	CO3	L2
(b)	Obtain a reduced state table and reduced state diagram for the sequential machine whose state diagram is shown in Fig.  	6M	CO3	L3
	(OR)			
10(a)	Summarize the components of ASM chart.	6M	CO3	L1
(b)	Draw the ASM chart and state table for a 2-bit up-down counter having mode control input, M=1 for Up counting M=0 for Down counting The circuit should generate the output '1' whenever the count becomes minimum or maximum.	6M	CO3	L3

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B.Tech. III Semester ~~Regular~~/Supplementary Examinations

17EE03-NETWORK THEORY-I
(EEE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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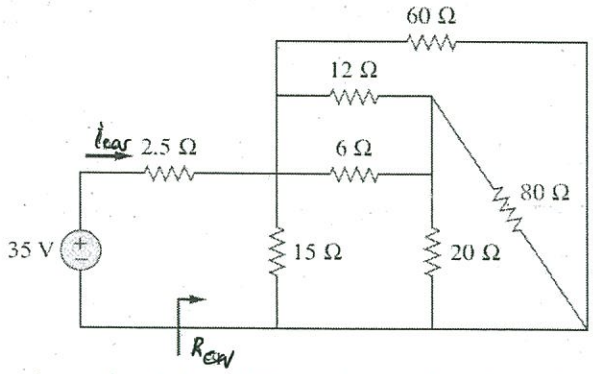
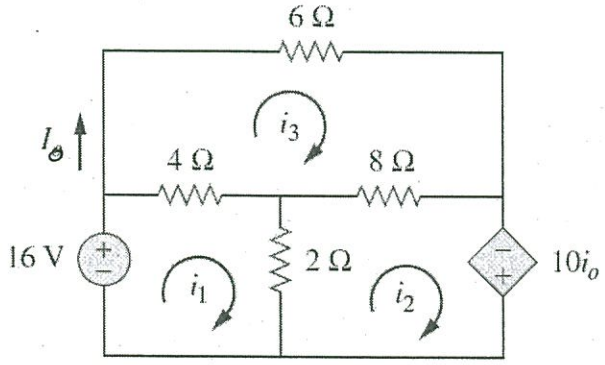
UNIT-I

1(a) Compute the equivalent resistance across A and B terminal in the given circuit.



[6M]

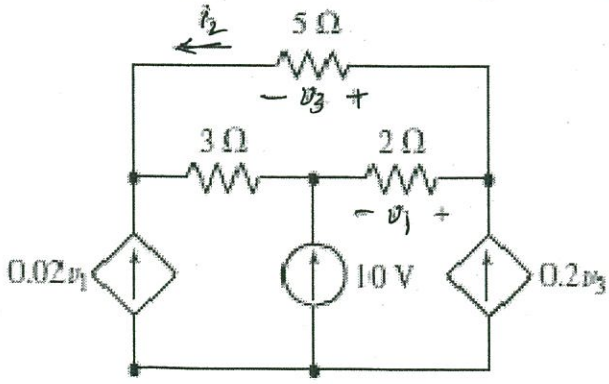
(b) Evaluate power absorbed by 8Ω resistor in the given circuit.



[6M]

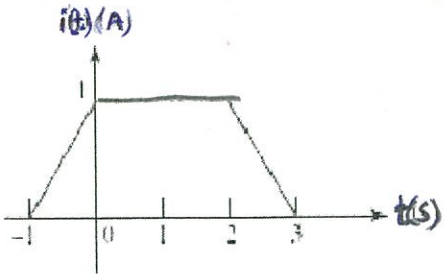
(OR)

2(a) Compute i_2 and v_3 in the given circuit using nodal analysis.



[6M]

(b) Given the waveform of the current in a 3 H inductor as shown in the given Fig , determine the inductor voltage and sketch it.



[6M]

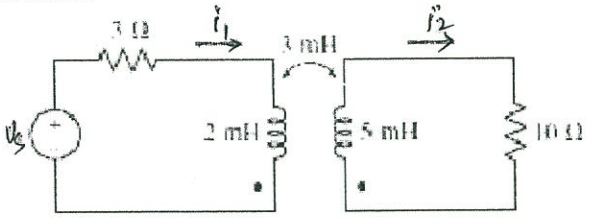
UNIT-II

3(a) When one coil of a magnetically coupled pair has a current 5.0A the resulting fluxes φ_{11} and φ_{12} are 0.2mWb and 0.4 mWb, respectively. If the turns are N1 =500 and N2 = 1500, find L_1, L_2,M, and the coefficient of coupling k. [6M]

(b) Define Magnetic circuit, Magnetic flux, Flux density, Field Intensity, Reluctance, Self Inductance, Mutual Inductance and Coefficient of coupling. [6M]

(OR)

4(a) Explain the dot convention and write the loop equations in the given coupled circuit.

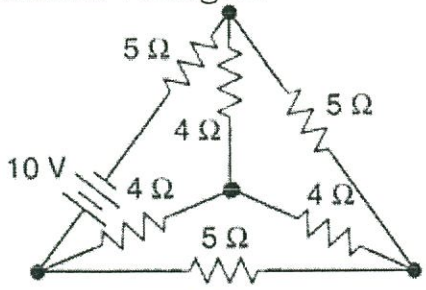


[6M]

(b) Derive the relation between self and mutual inductance. [6M]

UNIT-III

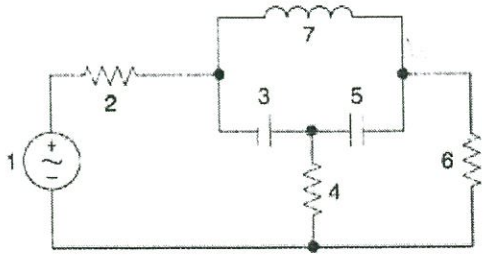
5. For the given resistive network, write a tie-set schedule and equilibrium equations on the current basis. Obtain values of branch current and branch voltages.



[12M]

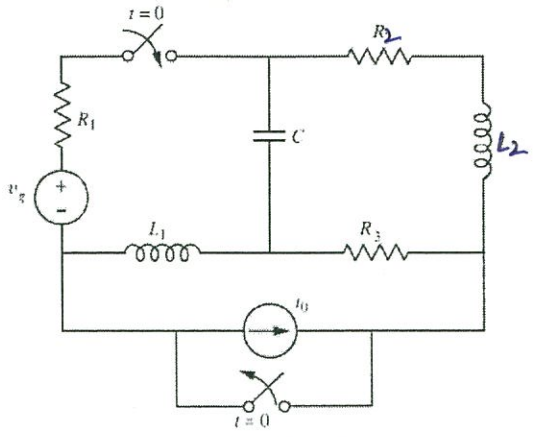
(OR)

6(a) Compute the number of possible trees to the given circuit



[6M]

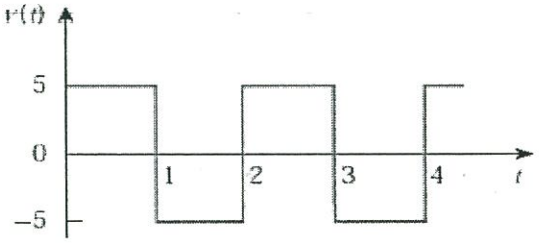
(b) Draw the dual network to the given circuit



[6M]

UNIT-IV

7(a) Calculate the RMS value of the current wave form shown below.



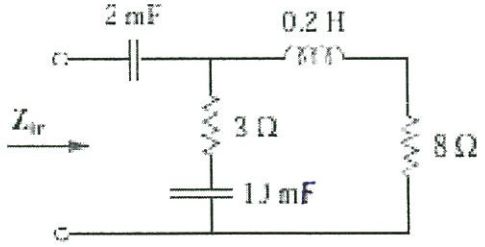
[6M]

(b) Draw the current locus diagram of series RL circuit [6M]

(OR)

8(a) Derive the relation between resonance frequency, Band Width and Quality factor. [6M]

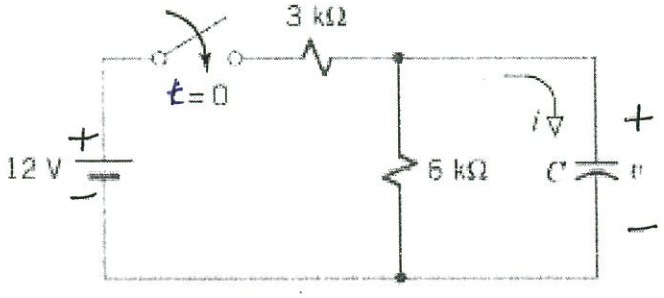
(b) Compute the input impedance and power factor of the source if circuit is connected across a source of 100sin(50ωt)V.



[6M]

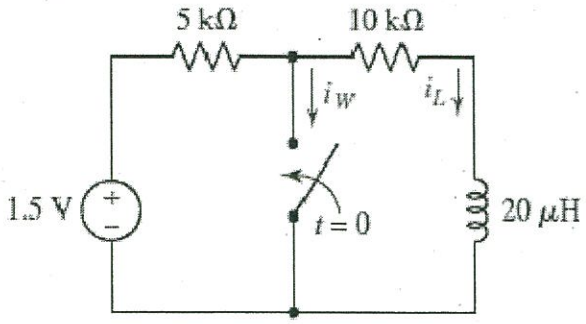
UNIT-V

9(a) In the given circuit switch is open for a longer period and closed at t=0. Derive the expression for v(t) for t>0. Assume initial charge on the capacitor is equal to 0V.



[6M]

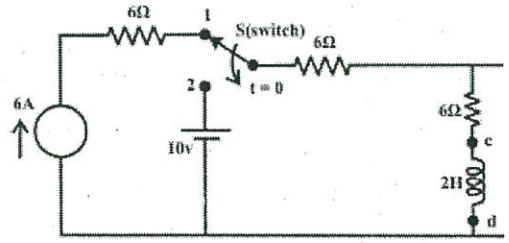
(b) Assuming switch has been open for a longer period and closed at t=0. Derive the expression for i_L for t>0.



[6M]

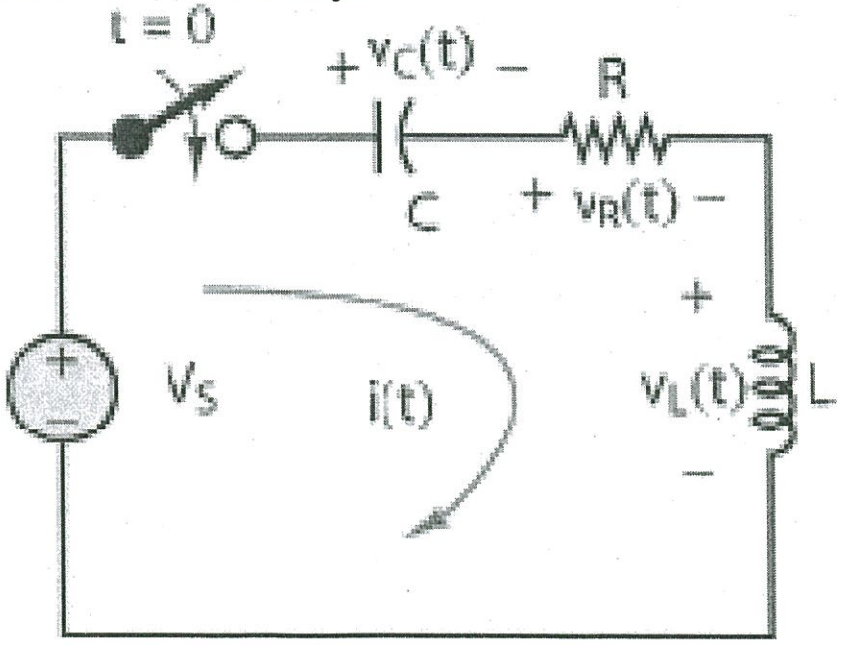
(OR)

10(a) In the given circuit switch is in position 1 for a longer period and moved to position 2 at t-=0. Compute current passing through the inductor at t=0- and at t=5ms in the given circuit.



[6M]

(b) Derive the expression for i(t) in the given circuit for t>0. assume that there is no charge on the capacitor and no current passing through the inductor initially.



R = 5,000 Ω L = 1 H C = 1 μF

V_S = 25 V

[6M]

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17EE02-ELECTRIC AND MAGNETIC FIELDS
(EEE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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UNIT-I

1 (a) Illustrate divergence theorem and strokes theorem with necessary equations. [6M]

(b) Determine the electric field intensity at the point (0,0,5) due to charge Q_1=0.35 μC at the point (0,4,0) and charge Q_2=-0.55 μC at point (3,0,0). [6M]

(OR)

2 Develop the concept of coordinates systems and transform the following:
i) Cartesian coordinates to Spherical coordinates
ii) Spherical coordinates to Cartesian coordinates. [12M]

UNIT-II

3(a) Illustrate the effect of "polarization in dielectrics" with neat diagrams. [6M]

(b) For the $D=(2y^2+z)\,a_x+4xy\,a_y+x\,a_z\ C/m^2$, determine
(i) The volume charge density at (−1,0,3)
(ii) The flux through the cube defined by $0 \le x \le 1,\ 0 \le y \le 1,\ 0 \le z \le 1$
(iii) The total charge enclosed by the cube. [6M]

(OR)

4(a) Discuss the boundary conditions for dielectric and dielectric interfaces with neat diagrams. [6M]

(b) Parallel plate capacitor with 20cm x 20cm and d=4cm is charged to a potential of 2kv with air as a dielectric.
(i) Find the energy stored in capacitor.
(ii)If capacitor is disconnected from source and a dielectric slab is inserted into capacitor with relative permittivity of 5, then calculate the energy stored in capacitor. [6M]

UNIT-III

5(a) State ampere's circuital law and justify that the current density, J is equal to$(\nabla \times H)$. [6M]

(b) The current in 6m long solenoid is 50A. If the number of turns is 900, then find the magnetic field intensity. [6M]

(OR)

6(a) Derive the necessary equation for magnetic field Intensity due to solenoid current with a neat sketch. [6M]

(b) Toroid of circular cross section whose center is at the origin and axis is same as the Z axis has 1000 turns with ρ_0=10cm, a=1cm. If the toroid carries a 100mA current, find $|H|$ at (3, -4, 0). [6M]

UNIT-IV

7(a) Deduce an expression for "force between two current elements" with the help of Biot-savart law. [6M]

(b) A point charge Q=-3C has velocity (2 a_x+6 a_y-1.1 a_z) m/s. Determine the magnitude of the force exerted on charge if,

(i) E = -12 a_x + 8 a_y -2 a_z V/m

(ii) B = -6 a_x + 9 a_y + 5 a_z T [6M]

(OR)

8(a) Derive an expression for self-inductance of a solenoid with a neat sketch. [6M]

(b) Determine the inductance of solenoid has a 10cm length, 1000 turns and cross sectional radius of 1cm. Assume the relative permeability is 1500. [6M]

UNIT-V

9(a) Deduce the detailed mathematical modelling of displacement current and justify the following equation:

$$\nabla \times H = \frac{\partial D}{\partial t} + J$$ [6M]

(b) Length of bar is 4cm and placed along x-axis and it can slide freely over two conducting rails along y-axis. Calculate the induced emf if the bar is stationed at y=6cm and $B = 2\ cos\, 10^5 t\ a_z\ wb/m^2$. [6M]

(OR)

10(a) Illustrate the Maxwell's equations in both integral and differential form for time varying electromagnetic fields with a neat diagram. [6M]

(b) A rod with length 8cm is moving along y-axis. If $B = 2a_z\ wb/m^2$, $v = \frac{1}{2} a_x\ m/sec$, find the induced emf in the rod. [6M]

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (II Semester) ~~Regular~~/Supplementary Examinations

17EC04-DIGITAL ELECTRONIC CIRCUITS

EIE 3-4

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Translate the following to Decimal and then to octal (i) $(12F0)_{16}$ (ii) $(10111010)_2$ (iii) $(654)_7$	6M	CO1	L2
(b)	Subtract the following binary numbers by using 1's complement and 2's complement (i) 110010-100010 (ii)101010-110011.	6M	CO1	L2
	(OR)			
2(a)	Simplify the following Boolean expressions using Boolean-algebra (i) ABC+AB'C+A'BC'+ CA (ii) XY+ XZ' + Z + WXYZ + WXY'Z	6M	CO1	L2
(b)	Represent the following functions in terms of Minterms i) XZ + X'Y + YZ'.	6M	CO1	L2
3(a)	Express the following function as a sum of minterms and as a product of maxterms F(A,B,C,D)=B'D+A'D+BD.	6M	CO2	L2
(b)	Draw the logic diagram to implement the following Boolean function Y=(A'+B')(C+D').	6M	CO3	L3
	(OR)			
4(a)	Convert each of the following expression into sum of products and product of sums (i) (Ab+C)(B+C'd) Ii)X'+X(X+Y')(Y+Z')	6M	CO2	L2
(b)	Implement the following boolean function with AND and NOT gates F=XY+X'Y'+Y'Z	6M	CO3	L3
5(a)	Design 4bit-BCD adder.	6M	CO4	L3
(b)	Explain the operation of 3X8 decoder with truth table, logic diagram and equations.	6M	CO4	L3
	(OR)			
6(a)	Implement the following Boolean function using PLA F(A,B,C)=$\sum$(0,1,2,4).	6M	CO4	L3
(b)	Explain the operation of 8X1 De-multiplexer.	6M	CO4	L3
7(a)	Show that the characteristic equation for the complement output of a *JK* flip-flop is $Q'(I+I) = J'Q' + KQ$	6M	CO4	L3
(b)	Explain the operation of SR flip flop with NAND gates.	6M	CO4	L3
	(OR)			
8(a)	Explain the operation of 4 bit shift registers.	6M	CO4	L3
(b)	Explain the operation of Synchronous BCD counter.	6M	CO4	L3
9(a)	Draw the diagram of mealy type state machine for serial adder and explain is operation.	6M	CO4	L3
(b)	What are the capabilities and limitations of finite state machines? explain.	6M	CO4	L1
	(OR)			
10(a)	What are the symbols in ASM chart? Explain each symbol.	6M	CO4	L1
(b)	Design an ASM chart to for the sequence detector 101.	6M	CO4	L3

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B.Tech. (II Semester) ~~Regular~~/Supplementary Examinations

17EC03-ANALOG ELECTRONIC CIRCUITS

Time : 3 hours EIE 127 Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define the h-parameter of the Transistor. Draw a h-parameter network representation of a transistor.	6M	CO1	L1, L2
(b)	If a Transistor has a value of β=50 and Collector current of 10mA,determine the value of Emitter Current and Calculate the value of α of the Transistor.	6M	CO1	L5
	(OR)			
2(a)	Draw the small signal model of FET for low frequency region and compare them with the BJT model.	6M	CO1	L2
(b)	Derive the expression for voltage gain, input and output impedances of CD FET amplifier circuits.	6M	CO1	L3
3(a)	With a neat sketch explain about the cascade amplifiers.	6M	CO1	L2
(b)	Draw the biasing circuit of Darlington emitter follower circuit and derive expressions for voltage gain and current gain.	6M	CO1	L2, L3
	(OR)			
4.	Define Hybrid-π model. Draw and derive the expressions for different elements of the Hybrid –π model. (i)Determination of Trans Conductance (ii) Determination of input conductance (iii) Determination of feedback conductance (iv) Determination of output conductance.	12M	CO1	L3
5(a)	What is Class B amplifier ,Derive the expression for efficiency	6M	CO2	L3
(b)	If the ideal push-pull amplifier operates at maximum dissipation ,show that its efficiency is 50%.	6M	CO2	L4
	(OR)			
6(a)	Derive the equation for 3dB bandwidth of double tuned amplifier.	6M	CO2	L3
(b)	What is staggering? State the advantages of stagger tuned amplifier.	6M	CO2	L1, L2
7(a)	Discuss quantitatively about the effect of negative feedback on (i) Gain (ii) Bandwidth.	6M	CO4	L3
(b)	Show that for a current series feedback amplifier the input and output resistances are increased by a factor if (1+Aβ) with feedback.	6M	CO4	L3
	(OR)			
8(a)	Draw the block diagrams of four types of negative feedback amplifier circuits and explain the advantages and disadvantages with necessary derivations.	6M	CO4	L2
(b)	Explain with the help of mathematical expressions. How the negative feedback in amplifiers increases amplifier bandwidth and reduces distortion in amplifiers?	6M	CO4	L4
9(a)	Explain the why RC oscillators are not used at high frequencies.	6M	CO3	L4
(b)	Discuss about frequency and amplitude stability of oscillators.	6M	CO3	L2
	(OR)			
10(a)	Derive the expression for frequency of oscillation of BJT RC phase-shift oscillator with necessary explanation.	6M	CO3	L3
(b)	Mention the features and advantages of the crystal oscillator.	6M	CO3	L1

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B.Tech. (III Semester) ~~Regular~~ / Supplementary Examinations

17EI02-TRANSDUCERS
(EIE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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UNIT-I

1(a) List the types of errors in a measurement system? Justify with suitable example. [6M]
(b) Define the following Dynamic characteristics
i) Dynamic error ii) Speed of response iii) fidelity [6M]

(OR)

2(a) Compare active and passive transducers with suitable examples. [6M]
(b) Estimate the output of the first order transducer for a given unit step input. Determine the transfer function of first order instrument. [6M]

UNIT-II

3(a) Classify the strain gauges, Describe the working of strain gauges with neat sketches and derive the equation for gauge factor. [6M]
(b) Identify the following characteristics of thermistor.
i) Resistance-temperature ii) voltage –current iii) Current-time [6M]

(OR)

4(a) Illustrate principle, operation of light dependent resistor and mention its applications. [6M]
(b) Build the wheat stone bridge and discriminate the principle and operation of deflection measurement. [6M]

UNIT-III

5(a) Construct a differential arrangement of a capacitive transducer and describe the principle and operation with mathematical derivation. [6M]
(b) Extend LVDT? Describe the working and construction of LVDT with suitable diagram. [6M]

(OR)

6(a) Discriminate the principle, working and applications of Hall effect Transducer. [6M]
(b) Compare and contrast magneto elastic and electromagnetic sensors. [6M]

UNIT-IV

7(a) Demonstrate the sensitivity and linearity of AC bridges. [6M]
(b) Apprise the carrier amplifier and coherent detection. [6M]

(OR)

8(a) Build a Block diagram and discriminate the operation of Digital to Resolver converter. [6M]
(b) Justify the electrostatic shielding and Driven shields for capacitive sensor with suitable diagrams. [6M]

UNIT-V

9(a) Define piezoelectric effect? Describe the principle and operation of piezoelectric Transducer. [6M]
(b) Outline the principle, operation and applications of pyroelectric sensors. [6M]

(OR)

10(a) Summarize the following Devices.
i) Electrometer amplifier ii) charge amplifier [6M]
(b) Develop the temperature compensation circuit for thermocouple. [6M]

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17EE53-ELECTRICAL TECHNOLOGY

(EIE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No.	Questions	Marks	CO	BL
1(a)	Describe the concept that is involved with simple loop generator.	6M	CO1	L1
(b)	The resistance of the field circuit of shunt wound D.C generatorerator is 200 ohms when the output of the D.C generator is 100 KW, the terminal voltage is 500 V and the generated e.m.f is 525V. Calculate. (i) Armature resistance (ii) The value of the generated e.m.f when the output is 60 KW with a terminal Voltage 520V.	6M	CO1	L3
	(OR)			
2(a)	Sketch the constructional diagram of D.C. generator and summarize each part of it.	6M	CO1	L1
(b)	A 4 pole lap wound D.C. shunt generator has a useful flux per pole of 0.07wb. The armature winding consists of 220-turns each of 0.004 ohms resistance. Calculate the terminal voltage when running at 900 R.P.M. if the armature current is 50A.	6M	CO1	L3
3(a)	Discuss the performance of Three-point starter with the help of neat sketch.	6M	CO2	L2
(b)	A shunt machine connected to 250V mains has an armature resistance (including brushes) of 0.12Ω and the resistance of field circuit is 100Ω. Find the ratio of the speed as a generator to the speed as a motor, the line current in each case being 80A.	6M	CO2	L1
	(OR)			
4(a)	List the Advantages and Disadvantages of Swinburne's test.	6M	CO2	L1
(b)	A 6 pole DC motor has wave connected armature with 87 slots each slot containing 6 conductors. The flux/pole is 20m wb. And the armature has a resistance of 0.13 ohm. Calculate the speed when the motor is connected to 240V Supply and taking armature current of 80 A, also calculate the toque in Newton meters developed by the armature.	6M	CO2	L3
5(a)	Derive an expression to find E.M.F. of a transformer.	6M	CO1	L2

(b)	A 50-kVA, 4400/220-V transformer has R_1 = 3.45 Ω, R_2= 0.009 Ω. The value of reactances are X_1 = 5.2 Ω and X_2 = 0.015 Ω. Calculate for the transformer (i) equivalent resistance as referred to primary (ii) equivalent resistance as referred to secondary.	6M	CO1	L2
	(OR)			
6(a)	Describe step by step procedure for obtaining equivalent circuit of transformer. Draw the related circuits in each step along with necessary equations.	6M	CO2	L2
(b)	A 2200/200-V transformer draws a no-load primary current of 0.6 A and absorbs 400 watts. Find the magnetizing and iron loss currents.	6M	CO2	L1
7(a)	Determine the condition for maximum starting torque of an induction motor.	6M	CO3	L2
(b)	A 3-phase induction motor having a 6-pole, star-connected stator winding runs on 240-V, 50-Hz supply. The rotor resistance and standstill reactance are 0.12 ohm and 0.85 ohm per phase. The ratio of stator to rotor turns is 1.8. Full load slip is 4%. Calculate the developed torque at full load, maximum torque and speed at maximum torque.	6M	CO3	L3
	(OR)			
8(a)	Describe the slip – torque characteristics and their variation with respect to the value of 's'.	6M	CO3	L2
(b)	A 1100-V, 50-Hz delta-connected induction motor has a star-connected slip-ring rotor with a phase transformation ratio of 3.8. The rotor resistance and standstill leakage reactance are 0.012 ohm and 0.25 ohm per phase respectively. Neglecting stator impedance and magnetising current determine (i) the rotor current at start with slip-rings shorted (ii) the rotor power factor at start with slip-rings shorted.	6M	CO3	L2
9(a)	Derive the equations of distribution factor and coil span factor as per the definitions.	6M	CO4	L2
(b)	Calculate the distribution factor for a 36-slots, 4-pole, and single-layer three-phase Winding.	6M	CO4	L3
	(OR)			
10(a)	Describe synchronous impedance method for obtaining voltage regulation of an alternator. Draw the necessary circuits in each step.	6M	CO4	L2
(b)	Find the no-load phase and line voltage of a star-connected 3-phase, 6-pole alternator which runs at 1200 rpm, having flux per pole of 0.1 Wb sinusoidally distributed. Its stator has 54 slots having double layer winding. Each coil has 8 turns and the coil is chorded by 1 slot.	6M	CO4	L1

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17CI09-DATA BASE MANAGEMENT SYSTEMS
(IT)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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UNIT-I

1(a)	How would you compare Super Key, Candidate Key & Primary Key?	[6M]
(b)	Construct ER Diagram for any department of Engineering College.	[6M]
	(OR)	
2(a)	How would you explain cardinality & degree of relationships with neat diagrams?	[6M]
(b)	Enlist the advantages of DBMS over File System.	[6M]
	UNIT-II	
3(a)	How would you classify relational algebra operations?	[6M]
(b)	What is the general syntax of SELECT statement? Write queries using ORDER BY & GROUP BY.	[6M]
	(OR)	
4.	How would you apply DDL, DML & TCL Languages on a single relation?	[12M]
	UNIT-III	
5(a)	How would you use normalization as a tool for creating redundant database?	[6M]
(b)	How would you apply 1NF, 2NF, 3NF on Student Relation = {Id, Name, Age, Avg, PhoneNo, ServiceProvider, Mail_Id, DeptNo, DeptName, HOD }	[6M]
	(OR)	
6(a)	Define Fifth Normal Form. What conclusions can you draw from it?	[6M]
(b)	How would you explain Dependency Preservation Property of Decomposition with an example?	[6M]
	UNIT-IV	
7(a)	Why do you think ARIES Algorithm recover abnormally terminated transactions? What is the role of UNDO and REDO operations in it?	[6M]
(b)	How would time stamping protocols help in concurrency control?	[6M]
	(OR)	
8(a)	Compare & contrast Conflict Serializability & View Serializability.	[6M]
(b)	How would you apply Two Phase Locking Protocol (2PL) for executing Concurrent Transactions?	[6M]
	UNIT-V	
9(a)	Why do you think Hashing plays key role in Indexing? How would you classify Hashing Algorithms?	[6M]
(b)	How would you compare different file organizations?	[6M]
	(OR)	
10(a)	Construct 5-way & 7-way B+ Trees for : {3, 7, 9, 23, 45, 1, 5, 14, 25, 24, 13, 11, 8, 19, 4, 31, 35, 56}.	[6M]
(b)	Add these: 2, 6 & 12 and Delete these: 4, 5, 7, 3 & 14 for above trees.	[6M]

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B.Tech. (II Semester) ~~Regular~~/Supplementary Examinations

17CI02-DIGITAL LOGIC DESIGN

(IT) I

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Perform the subtraction using 1's complement and 2's complement methods. (i) 11010 – 10000 (ii) 11010 – 1101 (iii) 100 - 110000	6M	CO1	L3
(b)	How do you perform BCD addition? Perform BCD addition for $(256)_{10} + (764)_{10}$.	6M	CO1	L2
	(OR)			
2(a)	The Hamming code 010110110 is received at the receiving end. Correct the received data if there is any error.	6M	CO1	L4
(b)	Convert the numbers as directed. (i) $(645.65625)_{10} = (\ )_2$ (iii) $(ABC.555)_{16} = (\ )_8$ (ii) $(CAB.25)_{16} = (\ )_{10}$ (iv) $(2493)_{10} = (\ )_{Gray\ code}$	6M	CO1	L3
3.	List out and explain the Boolean postulates used to formulate various algebraic structures with proof.	12M	CO2	L1
	(OR)			
4(a)	Reduce the following Boolean expression to 3 literals. ((CD)'+A)'+ A+CD+AB.	6M	CO2	L4
(b)	Express the following function in sum of minterms and product of maxterms F(A,B,C,D) = B'D+A'D+BD.	6M	CO2	L2
5(a)	Design a 4-bit binary to gray code converter and implement using only NAND gates.	6M	CO3	L3
(b)	Implement a full adder with two 4x1 multiplexers.	6M	CO3	L3
	(OR)			
6(a)	Implement the following functions on decoder logic Y1= $\sum$(0,1,3,6,7), Y2= $\sum$ (0,2,4,7), Y3= $\sum$ (1,3,6,7).	6M	CO3	L3
(b)	Realize a full subtractor using MUX.	6M	CO3	L3
7.	Explain different types of Shift registers. What are the different operations it can perform? Also discuss the Applications of Shift registers.	12M	CO4	L1
	(OR)			
8(a)	Draw the logic diagram for a 4-bit binary ripple down counter using positive edge triggeredflip-flops.	6M	CO4	L2
(b)	Construct Characteristic and Excitation equations for T Flip-Flop.	6M	CO4	L3
9.	Describe General architecture of Complex Programmable Logic Devices (CPLD)with neat sketch.	12M	CO5	L2
	(OR)			
10.	A combinational circuit is defined by the functions, F1=$\sum$ m(0,3,5,7), F2=$\sum$ m(4,5,7). Implement the circuit with a PLA having 3 inputs, 3 product terms and two outputs.	12M	CO5	L4

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17IT01-OPERATING SYSTEM PRINCIPLES
(IT)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Discuss the operating system operations.	6M	CO1	L2
(b)	Summarize the services of an operating system.	6M	CO1	L2
	(OR)			
2(a)	Illustrate the concept of Virtual Machine with a neat diagram.	6M	CO1	L3
(b)	Demonstrate the role of System Boot in an Operating system.	6M	CO1	L3
3.	Following is the snapshot of a CPU Process | Burst Time | Priority P1 | 10 | 0 P2 | 29 | 1 P3 | 03 | 2 P4 | 07 | 3 Draw the gantt chart and calculate the turnaround time , waiting time , average waiting time of the above processes using FCFS (First come First Serve) ,SJF (Shortest Job First) ,SRTF (Shortest Remaining time first) and RR (Round Robin with time quantum 10) scheduling algorithms.	12M	CO2	L3
	(OR)			
4(a)	Illustrate process control block with neat sketch.	6M	CO2	L3
(b)	Demonstrate Inter Process Communication using Shared Memory Systems.	6M	CO2	L3
5(a)	Outline the implementation of semaphore.	6M	CO3	L4
(b)	Use monitors to solve dining philosopher problem.	6M	CO3	L3
	(OR)			
6(a)	Illustrate the Banker's algorithm for deadlock avoidance.	6M	CO3	L3
(b)	Solve reader writer problem using semaphore.	6M	CO3	L3
7(a)	Consider the following page reference strings: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Calculate the page faults that occur for the following replacement algorithms? Assume three frames of allocation. (i) FIFO replacement (ii) Optimal replacement.	6M	CO4	L3
(b)	Describe the process of paging hardware with TLB.	6M	CO4	L2
	(OR)			
8(a)	What is the copy –on-write feature and under what circumstances is its use beneficial?	6M	CO4	L1
(b)	Discuss Belady's anomaly with an example.	6M	CO4	L2
9(a)	Summarize the file access methods.	6M	CO5	L2
(b)	Describe the virtual file systems.	6M	CO5	L2
	(OR)			
10(a)	How are files protected in the disk?	6M	CO5	L1
(b)	Discuss about Two-level directory and general graph directory.	6M	CO5	L2

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17C107-OOPS THROUGH JAVA

(IT)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	What are the drawbacks of procedural languages? Explain the need of object oriented programming with suitable program.	6M	CO1	L2
(b)	Give the program structure of Java.	6M	CO1	L3
	(OR)			
2(a)	Define java byte code. Why java generates byte code?	6M	CO1	L1
(b)	Give the characteristics of OOPs in detail.	6M	CO1	L2
3.	What is inheritance? Explain in detail inheritance in java with examples.	12M	CO2	L2
	(OR)			
4(a)	Write a java program to illustrate "Constructor Overloading".	6M	CO2	L2
(b)	How to create packages and use them in java?	6M	CO2	L1
5(a)	Write a Java program that prints numbers from 1 to 10 line by line after every 5 seconds.	6M	CO3	L1
(b)	What is thread synchronization? Discuss with an example.	6M	CO3	L6
	(OR)			
6.	What is an exception? Explain exception handling in java with examples.	12M	CO3	L2
7(a)	Write an applet program that has different shapes in it.	6M	CO4	L1
(b)	Explain the different stages in the life cycle of an Applet.	6M	CO4	L2
	(OR)			
8(a)	Explain delegation event model in detail.	6M	CO4	L2
(b)	Write a program to handle mouse events and mouse motion events.	6M	CO4	L1
9.	What is the significance of Layout managers? Discuss briefly various layout managers.	12M	CO5	L6
	(OR)			
10(a)	Construct an application to explain the use of JTabbedPane.	6M	CO5	L6
(b)	Write a note on split Pane.	6M	CO5	L1

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17ME04-MECHANICS OF SOLIDS
(ME)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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UNIT-I

1(a) A rod is 2000mm long at a temperature of 10^0C. Determine the expansion of the rod, when the temperature is raised to 80^0C. If this expansion is prevented, evaluate the stresses induced in the material of the rod. Take $E=2x10^5N/mm^2$ and linear expansion of the material $\alpha=0.000012$ per degree centigrade. Also state the nature of stress set up. [6M]

(b) A composite tube consists of a steel tube 150mm internal diameter and 10mm thickness and an outer brass tube 170mm internal diameter and 10mm thickness. The two tubes are of the 150mm length. The compound tube carries an axial load of 1000kN. Determine (i) Stress in the tubes (ii) Load carried by each tube and (iii) Amount of change in length. Take $E_s=2x10^5N/mm^2$ and $E_b=1x10^5N/mm^2$. [6M]

(OR)

2(a) Derive an expression for modulus of elasticity in terms of bulk modulus and Poisson's ratio. [6M]

(b) A bar of cross section 30mm x 30mm and 250mm long is subjected to a pull of 90kN in the direction of its length. The extension of the bar was found to be 0.125mm, while the decrease in each lateral dimension is found to be 0.00375mm. Determine the elastic constants and Poisson's ratio of the bar. [6M]

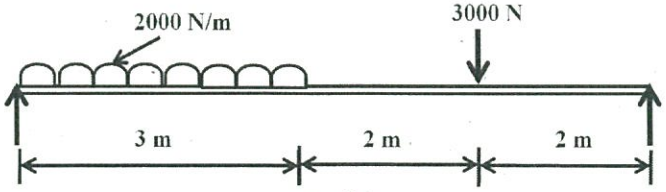
UNIT-II

3(a) Derive the relationship between load, shear force and bending moment. [6M]

(b) A cantilever beam of length 2m carries a point load of 1kN at its free end and another load of 2kN at a distance of 1m from the free end. Draw the shear force and bending moment diagrams for the cantilever beam. [6M]

(OR)

4. Draw the shear force and bending moment diagrams for the simply supported beam as shown in figure.



[12M]

UNIT-III

5 (a) A cantilever of length 2 meter fails when a load of 2000N is applied at the free end. If the section of the beam is 40mm x 60mm, find the stress at the failure. [6M]

(b) A rectangular beam 200mm deep and 300mm wide is simply supported over a span of 8m. What uniformly distributed load per meter the beam may carry, if the bending stress is not to exceed 120N/mm^2. [6M]

(OR)

6 (a) Derive the torsion equation $T/J = \tau/r = (G\,\theta) / \ell$. [6M]

(b) A hollow shaft of external diameter 120mm transmits 300kW power at 200r.p.m. Evaluate the maximum internal diameter if the maximum stress in the shaft is not to exceed 60N/mm^2. [6M]

UNIT-IV

7 (a) The principal tensile stresses at a point across two mutually perpendicular planes are 120N/mm^2 and 60N/mm^2. Determine the normal, tangential and resultant stresses on a plane inclined at 30^0 to the axis of the minor principal stress. [6M]

(b) At a point in a stressed body the principal stresses are 100N/mm^2 (tensile), 60N/mm^2 (compressive) together with a complimentary shear stress of 50N/mm^2. Determine the normal stress and the shear stress on a plane inclined at 45° to the axis of major principal stress. [6M]

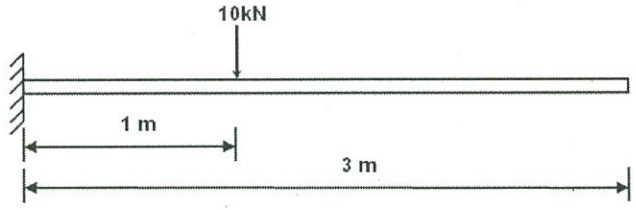
(OR)

8 (a) Prove that the maximum shear stress in a circular section of a beam is 4/3 times the average shear stress. [6M]

(b) A rectangular beam 100mm wide is subjected to a maximum shear force of 100kN. Estimate the depth of the beam if the maximum shear stress is 6N/mm^2. [6M]

UNIT-V

9 (a) Compute the maximum slope and maximum deflection of the cantilever shown in figure. Take E=2.1x10^{5}N/mm^2 and I=2x10^{8}mm^4.



[6M]

(b) A simply supported beam of length 4 meters carries a uniformly distributed load of 15kN/m throughout its length. Determine the maximum deflection and slope in the beam. Take flexural rigidity EI=25000kN - m^2. [6M]

(OR)

10(a) A cylinder of internal diameter 0.5m contains air at a pressure of 7N/mm^2. If the maximum permissible stress induced in the material is 80N/mm^2, estimate the thickness of the cylinder. [6M]

(b) A thick cylinder of internal diameter 160mm is subjected to an internal fluid pressure of 8N/mm^2. Compute the thickness of metal necessary for the cylinder, if the maximum hoop stress in the section is not to exceed 35N/mm^2. [6M]

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H.T.No										

23 SEP 2021

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17ME03-THERMODYNAMICS
(ME)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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Note: Steam Tables are permitted.

UNIT-I

1(a) Show that heat and work are path functions of a thermodynamic cycle and also discuss the similarities, dissimilarities of heat and work. [6M]

(b) An engine cylinder has a piston of area 0.12 m^3 and contains gas at a pressure of 1.5 MPa. The gas expands according to the process which is represented by a straight line on p-v plane. The final pressure is 0.15 MPa. Calculate the work done by the gas on the piston if the stroke is 0.3 m. [6M]

(OR)

2 (a) List the practical examples of (i) Reversible process, (ii) Irreversible process, (iii) Homogeneous system (iv) Heterogeneous system v) Microscopic and Macroscopic approaches vi) Closed and Open Systems (Two examples for each case) [6M]

(b) Discuss a constant volume gas thermometer with neat sketch. [6M]

UNIT-II

3 (a) Establish an equation for first law of thermodynamics applied to a closed system operating in a cycle with the help of Joule's experiment. [6M]

(b) A mass of air has an initial pressure of 1.3 MN/m^2, volume 0.014m^3 and temperature of 135 ^0C. It is expanded until its final pressure is 275 KN/m^2 and its volume becomes 0.056 m^3. Determine i) mass of air ii) Final temperature iii) law of expansion iv) work transfer [6M]

(OR)

4(a) Formulate the steady flow energy equation (SFEE) for one stream entering and leaving the device. Deduce the final expressions of SFEE for nozzle, turbine and compressor. [6M]

(b) A blower handles 1 kg/s at 20^0C and consumes a power of 15 kW. The inlet and outlet velocities of air are 100 m/s and 150 m/s respectively. Find the exit air temperature, assuming adiabatic conditions. [6M]

UNIT-III

5(a) When does Clausius inequality of cycle become reversible, irreversible and impossible? Explain it with one example. [6M]

(b) A heat engine is supplied with 1130 kW of heat at constant temperature of 292^{0}C and rejects heat at 5^{0}C. The following results were obtained. Determine whether the results report a reversible cycle or irreversible or impossible.
(i) Heat rejected is 834 kW
(ii) If heat rejected is 556 kW
(iii) If heat rejected is 278 kW [6M]

(OR)

6(a) Why does entropy remains constant in reversible adiabatic process? [6M]

(b) Determine the change in entropy of universe if a copper block of 1 kg at 150^{0}C is placed in sea water at 25^{0}C. Take the heat capacity of Cu block is 0.393 kJ/kgK [6M]

UNIT-IV

7(a) State and express the mass fraction, mole fraction, Amagat's law of additive volumes, Dalton's law of additive pressures and gas constant of mixtures. [6M]

(b) Half kg Helium and half kg Nitrogen are mixed in a mixing chamber at 293 K and 100 kPa of total pressure. Calculate (i) Mole fraction of components (ii) Volume fraction of components (iii) Volume of the mixture (iv) Partial Pressures of the components. [6M]

(OR)

8(a) Why water is treated as the pure substance? Discuss it on using various p-V-T plane surfaces. [6M]

(b) Calculate the volume, enthalpy and internal energy of 2 kg of steam at 10 bar pressure in each of the following states (i) Dryness fraction of 0.85 (ii) Dry and saturated steam. [6M]

UNIT-V

9(a) Carnot cycle is not practicable for steam power plant? State reasons. Explain the Rankine cycle with neat diagram. [6M]

(b) In an air standard Brayton cycle the pressure ratio is 7 and the maximum temperature of the cycle is 800 °C. The compression begins at 0.1Mpa, 35°C. Find (i) the heat supplied per kg of air, (ii) the net work done per kg of air, (iii) the cycle efficiency. [6M]

(OR)

10(a) Deduce the expression for efficiency of Diesel Cycle with neat diagram and represent on p-v and t-s planes. Compare the final expression with Otto Cycle. [6M]

(b) In a Bell-Coleman cycle 550 kg of air is circulated per hour. The air is drawn from the cold chamber at 3 ^{0}C at atmospheric pressure and compressed isentropically to 5 bar absolute. It is then cooled to 20 ^{0}C at the same pressure. Air is then led to expander, where it is expanded isentropically down to atmospheric pressure and is discharged to cold chamber. Find (i) Heat extracted from the cold chamber (ii) Heat rejected to cooling water/hr (iii) COP of the system. [6M]

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

17EC50-BASIC ELECTRONICS ENGINEERING
(ME)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain the operation of a PN Junction diode. How does a barrier voltage appear across a PN junction?	6M	CO1	L2
(b)	At room temperature of 300K the Fermi level is 0.25eV below the conduction band in an N Type semiconductor. When the temperature is increased to 400K, Calculate the position of the Fermi Level.	6M	CO2	L3
	(OR)			
2(a)	Tabulate the differences between P type semiconductor and N type semiconductor materials.	6M	CO1	L1
(b)	A Zener voltage regulator has variable load R_L requiring load current to vary 10mA to 85mA. It is given that V_Z = 10V, I_{Zmin} = 15mA, I_{Zmax} = 100mA and the series resistance R_S = 40Ω. Calculate the range of DC variation permissible.	6M	CO2	L3
3(a)	Explain the operation of NPN transistor with schematic diagram.	6M	CO3	L2
(b)	A sinusoidal voltage of 40V and frequency 50Hz is applied to a half wave rectifier. R_L = 200Ω, V_γ = 0, R_F = 20Ω, R_r = ∞. Find V_{dc},I_{dc},I_{max},I_{rms}, and efficiency.	6M	CO2	L1
	(OR)			
4.	Explain the LC filter with suitable diagram.	12M	CO2	L2
5(a)	What do you understand by transistor biasing? Give its importance.	6M	CO3	L1
(b)	A Silicon transistor uses potential divider method of biasing, V_{CC} = 12V, R_1 = R_2 = 10kΩ, R_E = 3kΩ, R_C = 4kΩ. Determine operating point of the circuit.	6M	CO3	L3
	(OR)			
6(a)	In a common emitter circuit an N-P-N transistor having a value of β = 50 is used with V_{CC} = 10V and R_C = 2kΩ. If a 100kΩ resistor is connected between collector and base and V_{BE} = 0, determine (i) the position of Quiescent point and (ii) stability factor S.	6M	CO3	L3
(b)	Discuss stability factor and obtain an expression for a fixed bias circuit.	6M	CO3	L2
7(a)	Determine the following Boolean expression with XOR and AND gates: $F = A\bar{B}C\bar{D} + \bar{A}BC\bar{D} + A\bar{B}\bar{C}D + \bar{A}B\bar{C}D$.	6M	CO4	L3
(b)	Simplify the logic function F(A, B, C, D) = ∑m(0, 1, 2, 5, 6, 8)+d (3,4,7,14) using K maps.	6M	CO4	L4
	(OR)			
8(a)	Perform the subtraction with the following binary numbers using 1's complement and 2's complement. (i) 11010 – 1101 (ii) 10010 - 10011	6M	CO4	L3
(b)	Illustrate how a NAND gate can be used to realize the following gates: (i) NOT gate (ii) NOR gate.	6M	CO4	L4
9(a)	Show that a full subtractor can be constructed with two half subtractors and an OR gate.	6M	CO4 CO5	L3
(b)	Explain the following in context with practical op-amp. (i) CMRR (ii) Slew rate	6M	CO5	L2
	(OR)			
10(a)	Explain race around condition of J-K flip flop. Show how this can be avoided.	6M	CO5	L4
(b)	Interpret the working of an Op-amp as an Integrator.	6M	CO5	L2

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