



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram-521 230 :: NTR Dist. :: A.P
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada

B.Tech. (VI Semester) (R20) Semester End Examinations (Supplementary) – April 2026

TIME TABLE

R20

Time : 02.00 PM to 05.00 PM

A.Y. : 2025-26

Branch	02-04-2026 (Thursday)	04-04-2026 (Saturday)	06-04-2026 (Monday)	07-04-2026 (Tuesday)	08-04-2026 (Wednesday)
				Open Elective-II	Program Elective-II
AI & DS	20CS20-Pattern Recognition	20AD07-Deep Learning	20CS19-Big Data Analytics	20ME83-Operations Research Techniques 20CE82-Disaster Management	20IT01-Software Engineering
ASE	20AE14-Elements of Heat Transfer	20AE15-Flight Dynamics	20AE16-Air Breathing Propulsion	20EC82-Elements of Communication Systems	20AE17-Introduction to Computational Fluid Dynamics 20AE19 - Airport Design
CE	20CE18-Highway Engineering	20CE19-Design of Steel Structures	20CE20-Estimation and Quantity Surveying	20IT84 - Cyber Security and Digital Forensics 20ME81-Renewable Energy Sources	20CE22-Construction Management
CSE	20CS17-Information Security	20CS18-Compiler Design	20CS19-Big Data Analytics	20CE82-Disaster Management 20ME81-Renewable Energy Sources	20CS21-Information Retrieval Systems
CSE (AI & ML)	20CS20-Pattern Recognition	20AD07-Deep Learning	20CS19-Big Data Analytics	20CE82-Disaster Management	20CS25- Software Project Management
ECE	20EC15-Microprocessors and Microcontrollers	20EC16-VLSI Design	20EC17-Microwave Engineering	20ME83-Operations Research Techniques	20EC18 - Image Processing 20EC19-Satellite Communications
EEE	20EE18-Power Systems-III	20EE19-Solid State Drives	20EE20-Basic Micro Processors and Micro Controllers	20AD83 - Introduction to Machine Learning 20IT84 - Cyber Security and Digital Forensics 20AD82-Introduction to Data Science	20EE21 - Intelligent Control Systems 20EE22-Classical and Meta heuristic Optimization Techniques
IT	20CS17-Information Security	20CS18-Compiler Design	20CS19-Big Data Analytics	20CE82-Disaster Management	20IT03 - Digital Image Processing 20IT04-Data Science
ME	20ME17-Heat Transfer	20ME18-CAD / CAM	20ME19-Design of Machine Elements-II	20AD81 - Introduction to Artificial Intelligence 20IT84 - Cyber Security and Digital Forensics 20EE84 - Electric Vehicles	20ME21-Modern Machining Processes

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

Date: 17 MAR 2026

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. Vice-Principal, Deans & HoDs
3. Canteen, PD, Security & Hostels

2. T&P cell, Transport in-charge & Librarian
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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L.B.Reddy Nagar :: Mylavaram – 521 230:: NTR Dist.: A.P.

B.Tech. (VI Semester) Regular/Supplementary Examinations

**20CS20-PATTERN RECOGNITION
(AI & DS & CSE (AI & ML))**

Time : 3 hours

Max. Marks: 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define following terms in pattern recognition (i) Feature Extraction (ii) Over-Fitting (iii) Missing Features (iv) Segmentation.	7M	CO1	L1
(b)	Explain about pattern recognition system with neat block diagram.	7M	CO1	L2
(OR)				
2(a)	Describe how minimum error-rate classification is used in real-world applications.	7M	CO1	L2
(b)	A medical test is used to diagnose a disease. The probability of having the disease is 0.01, and the test correctly identifies the disease 95% of the time. However, 2% of healthy individuals also test positive. What is the probability that a person actually has the disease given that they tested positive?	7M	CO1	L3
3.	Explain the concept of normal density functions in pattern recognition. Discuss both univariate and multivariate density functions, providing their mathematical representations. How do these density functions contribute to classification in pattern recognition? Illustrate with an example.	14M	CO2	L2
(OR)				
4(a)	What is the probability density function (PDF) of a univariate normal distribution? Explain its parameters.	7M	CO2	L1
(b)	In the case of equal covariance matrices for all classes, how is the decision boundary derived?	7M	CO2	L1
5(a)	What is the goal of parameter estimation in statistical modeling?	7M	CO3	L1
(b)	Explain the limitations of MLE in practical applications.	7M	CO3	L2
(OR)				
6(a)	Define Bayesian estimation, and how does it differ from MLE.	7M	CO3	L2
(b)	What is Maximum Likelihood Estimation (MLE)? Define the concept.	7M	CO3	L1
7(a)	What is unsupervised learning, and how does it differ from supervised learning?	7M	CO4	L1
(b)	How is the maximum likelihood estimation (MLE) used to estimate parameters in a mixture model?	7M	CO4	L2
(OR)				
8(a)	What is a normal mixture model? Provide an example.	7M	CO4	L1
(b)	You are given the data points: P1= (2,3), P2= (3,3), P3= (8,8), P4= (9,8) Initial centroids: C1= (2,3), C2= (9,8) Compute the Euclidean distance from each point to each centroid. Assign each point to the nearest cluster.	7M	CO4	L3
9(a)	What is a discrete-time Markov process? Define the Markov property.	7M	CO5	L1
(b)	Describe the role of the observation probability matrix in a discrete HMM.	7M	CO5	L2
(OR)				
10(a)	What are the three basic problems of HMMs as defined in pattern recognition?	7M	CO5	L1
(b)	A simple Markov process has the following state transition matrix: A= [0.6 0.3 0.4 0.7] if the initial state is S1, what is the probability that the process is in S2 at time t=2?	7M	CO5	L3

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

20AE14-ELEMENTS OF HEAT TRANSFER

(ASE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain the physical significance of thermal conductivity, convective heat transfer coefficient, thermal diffusivity, thermal resistance, thermal conductance and thermal contact resistance.	7M	CO1	L2
(b)	An insulated pipe of 50 mm outside diameter ($\epsilon=0.8$) is laid in a room at 30 °C. If the surface temperature is 250 °C and the convective heat transfer coefficient is 10 W/m ² K. Calculate the heat loss per unit length of the pipe by considering convection and radiation.	7M	CO1	L3
(OR)				
2.	Formulate the general 3-dimensional heat conduction equation for Cartesian coordinate system.	14M	CO1	L3
3(a)	Deduce the expression for conduction equation in plane wall with uniform internal heat generation.	7M	CO2	L3
(b)	A steam pipe, 10cm I.D and 11 cm O.D, is covered with an insulating substance ($k=1$ W/mK). The steam temperature and the ambient temperature are 200°C and 20°C respectively. If the convective heat transfer coefficient between the insulation and the air is 8 W/m ² K, find the critical radius of the insulation.	7M	CO2	L3
(OR)				
4(a)	Differentiate between efficiency and effectiveness of a fin.	7M	CO2	L2
(b)	A plane wall 10 cm thick generates heat at the rate of 4x10 ⁴ W/m ³ when an electric current is passed through it. The convective heat transfer coefficient between each face of the wall and the ambient air is 50W/m ² K. Determine (i) the surface temperature and (ii) the maximum temperature in the wall.	7M	CO2	L3
5(a)	State the Buckingham's Π theorem.	4 M	CO3	L1
(b)	A thin 80 cm long and 8 cm wide horizontal plate is maintained at a temperature of 130 °C in a large tank full of water at 70 °C. Estimate the rate of heat input into the plate necessary to maintain the temperature of 130 °C.	10 M	CO3	L3
(OR)				
6(a)	How many thermal resistances are involved when a fluid is flowing in a hollow tube covered with two layers of insulation? List those resistances.	7M	CO3	L1

20AE14-ELEMENTS OF HEAT TRANSFER

(b)	Calculate the convective heat loss from a radiator 0.5 m wide and 1 m high maintained at a temperature of 84° C in a room at 20° C. Treat the radiator as a vertical plate.	7M	CO3	L3
7(a)	Derive the expression for the radiation heat transfer between two black isothermal surfaces.	7M	CO4	L3
(b)	Distinguish between the terms radiosity and irradiation.	7M	CO4	L2
(OR)				
8(a)	Describe the laws of radiation heat transfer.	7M	CO4	L2
(b)	A thin plate receives radiation on one side from a source at 650°C and radiates on the other face to a surface at 150°C. Determine the temperature of the intervening plate. Take shape factor =1. Also calculate the heat flow with and without the intervening sheet.	7M	CO4	L3
9(a)	What is overall heat transfer coefficient? When Correction factor is to be considered in the design of heat exchangers?	7M	CO5	L1
(b)	The flow rates of hot and cold water streams running through a parallel flow heat exchanger are 0.2 kg/s and 0.5kg/s respectively. The inlet temperature on hot and cold sides are 75 °C and 20 °C respectively. The exit temperature of hot water is 45 °C. If the individual heat transfer coefficients on both sides are 650W/m ² °C, calculate the area of heat exchanger.	7M	CO5	L3
(OR)				
10(a)	Why is radiation heat transfer in forced-air-cooled systems disregarded?	7M	CO5	L1
(b)	Power is supplied to the component from a 15 V source and the variations in the electric current and in the junction and the case temperatures with time are observed. When things are stabilized the current is observed to be 0.1 amp and the temperatures to be 80 °C and 55 °C at the junction and the case respectively. Calculate the junction-to-case resistance of this component.	7M	CO5	L3

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

Answered
24/26

**20CE18-HIGHWAY ENGINEERING
(CE)**

Time : 3 hours

Max. Marks: 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain briefly the modified classification of road system in India as per the Third Twenty Year Road Development Plan, 1981-2001.	7M	CO1	L2
(b)	Outline the main features of various road patterns commonly in use.	7M	CO1	L2
(OR)				
2(a)	Illustrate the highway cross sectional elements.	7M	CO1	L2
(b)	Describe Engineering surveys required for a highway alignment.	7M	CO1	L2
3(a)	Describe the PIEV theory in detail.	7M	CO2	L3
(b)	State the IRC specifications for width of carriage way for various classes of roads.	7M	CO2	L3
(OR)				
4(a)	Derive an expression for finding the extra widening required on horizontal curve.	7M	CO2	L3
(b)	Calculate the stopping sight distance for a design speed of 100kmph. Take the total reaction time 2.5sec and the coefficient of friction is 0.35.	7M	CO2	L3
5(a)	List out the various tests are conducted on coarse aggregate that are used in highway construction.	4M	CO3	L1
(b)	Explain the test conducted on coarse aggregate that are used to determine Aggregate Impact Value.	10M	CO3	L2
(OR)				
6(a)	Explain the core cutter method test conducted on given soil sample to determine field density.	7M	CO3	L2
(b)	Enumerate the construction steps for Water Bound Macadam roads.	7M	CO3	L2
7(a)	Discuss briefly the following design parameters: (i) Radius of relative stiffness (ii) Equivalent radius of resisting section.	7M	CO4	L2
(b)	Calculate ESWL of a dual wheel assembly carrying 2050 kg load on each tyre. For a pavement thickness of 15 cm, if centre to centre spacing between tyre is 30 cm and clear distance between tyre is 12cm.	7M	CO4	L3
(OR)				
8(a)	Draw a sketch of flexible pavement cross section and show the component parts.	4M	CO4	L2
(b)	Explain CBR method of flexible pavement design as per IRC guidelines.	10M	CO4	L2
9(a)	Differentiate the characteristics of On-street parking and Off-street parking.	7M	CO5	L2
(b)	Discuss in detail the significance of Vehicular characteristics in traffic engineering.	7M	CO5	L2
(OR)				
10(a)	Discuss about Passenger Car Unit (PCU). Write PCU values for different types of vehicles.	7M	CO5	L2
(b)	Explain the following parameters (i) AADT, (ii) ADT (iii) Design hourly traffic volume.	7M	CO5	L2

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

**20CS17-INFORMATION SECURITY
(CSE & IT)**

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Differentiate Threat and Attack.	4M	CO1	L2
(b)	Illustrate Data Encryption Standard (DES) in detail.	10M	CO1	L2
(OR)				
2(a)	List security mechanisms required to provide various types of security services.	7M	CO1	L2
(b)	If given the plaintext "HELLO" and a Caesar shift of 3, what would the ciphertext be using a substitution cipher?	7M	CO1	L2
3.	Summarize the process involved in SHA-512.	14M	CO2	L2
(OR)				
4(a)	Elaborate RSA algorithm with an example.	7M	CO2	L2
(b)	Explain the process of generating a message digest from a given input using a hashing algorithm.	7M	CO2	L2
5(a)	Can you describe how PGP ensures the confidentiality of email messages.	7M	CO3	L2
(b)	Discuss S/MIME protocol in detail.	7M	CO3	L3
(OR)				
6(a)	With a neat sketch explaining the IP security architecture.	7M	CO3	L3
(b)	Illustrate security associations in IP security.	7M	CO3	L2
7(a)	Differentiate SSL and TLS.	7M	CO4	L3
(b)	With a neat sketch explaining SSL handshake protocol.	7M	CO4	L2
(OR)				
8(a)	If a customer initiates a payment using SET, how would you apply the authorization steps to complete the transaction?	7M	CO4	L3
(b)	Discuss SSL session and SSL connection.	7M	CO4	L2
9(a)	Explain Honeypot, Access control matrix.	7M	CO5	L2
(b)	Describe how a Trojan horse works and how it differs from viruses and worms.	7M	CO5	L2
(OR)				
10(a)	Differentiate statistical anomaly detection and rule-based detection.	7M	CO5	L2
(b)	Interpret the generations of anti-virus software.	7M	CO5	L2

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

20EC15-MICROPROCESSORS AND MICRO CONTROLLERS

(ECE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No.	Questions	Marks	CO	BL
1(a)	Draw the architecture of 8086 microprocessor, mention the functional blocks present and advantage of dividing the architecture in to two functional blocks.	7M	CO1	L2
(b)	Outline the interrupt vector table of 8086 microprocessor.	7M	CO3	L2
(OR)				
2(a)	Summarize the addressing modes used by the instructions of 8086 with suitable examples.	7M	CO2	L2
(b)	Develop an 8086 Assembler Language Program to exchange 12bytes of data from the memory location 2200H to 3100H.	7M	CO2	L3
3(a)	Identify the features of 8051 microcontroller.	7M	CO1	L2
(b)	Interpret the alternate functions of port-3 of 8051 microcontroller.	7M	CO3	L2
(OR)				
4(a)	Outline the addressing modes of 8051 microcontroller.	7M	CO2	L2
(b)	Mention the function of bits present in PSW register of 8051 microcontroller.	7M	CO1	L3
5(a)	Mention the register format of Current Program Status Register of ARM Processor.	7M	CO1	L2
(b)	Summarize the conditional instructions of ARM processor.	7M	CO2	L2
(OR)				
6(a)	Illustrate the addressing modes of ARM processor.	7M	CO2	L2
(b)	Identify the branch instructions present in ARM processor.	7M	CO2	L2
7(a)	Develop an assembler program to add two 16 bit variables using ARM instructions.	7M	CO2	L3
(b)	Write a program to perform left shift by one bit of given binary data using Arm instructions.	7M	CO2	L3
(OR)				
8(a)	Write a program to multiply two 16-bit numbers using ARM instructions.	7M	CO2	L3
(b)	Develop an assembler program to convert packed bcd number to unpacked BCD no. using ARM instructions.	7M	CO2	L3
9(a)	Construct a circuit using LPC2148 to interace 8-LEDs and develop an Embedded C program to blinkall the LEDs.	7M	CO4	L3
(b)	Design a DAC interfacing circuit with ARM microcontroller using LPC 2148 and develop an Embedded C program to generate a triangular wave of 1ms delay with Cclk = 60MHz.	7M	CO4	L3
(OR)				
10(a)	Construct a circuit to interface a relay to ARM controller-(LPC2148) and develop a program to operate the relay with constant delay is created between relay switches ON and OFF.	7M	CO4	L3
(b)	Design an interfacing circuit of a stepper motor with ARM micontroller-LPC 2148 and develop Embedded C Program to rotate counter clock wise continuously.	7M	CO4	L3

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B.Tech. (VI Semester) Regular/Supplementary Examinations

20EE18-POWER SYSTEMS-III

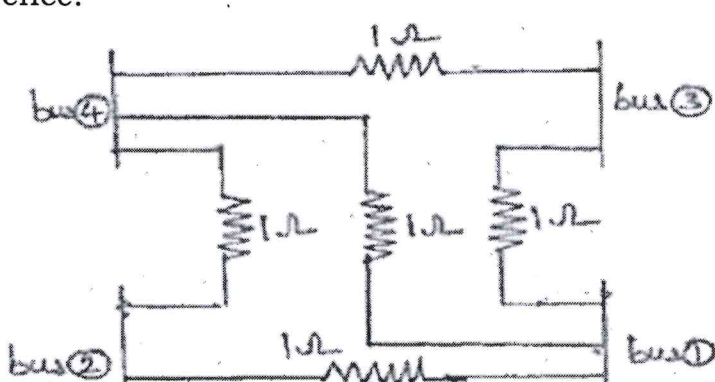
(EEE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

All questions carry equal marks				
Q.No	Questions	Marks	CO	BL
1(a)	Describe the formation of Ybus Matrix by Direct Inspection method for a given power system network.	7M	CO1	L1
(b)	A four-bus system has the following line reactances (resistances are neglected) Line (bus to bus) Reactance (p.u) 1-2 j0.5 2-3 j1.0 3-4 j1.0 1-4 j0.5 Find Bus admittance matrix.	7M	CO1	L3
(OR)				
2(a)	Discuss the significance of network matrices in power system analysis.	4M	CO1	L2
(b)	Find Z_{bus} matrix for the following network taking bus 4 as reference. 	10M	CO1	L3
3(a)	With the help of a neat flow chart, describe the Fast-Decoupled Load flow method of load flow solution when the system contains voltage-controlled busses in addition to swing bus and load bus.	7M	CO1	L2
(b)	Derive the load flow equations.	7M	CO1	L3
(OR)				
4(a)	Draw and explain the step-by-step procedure of load flow solution for the Gauss- seidel method when PV buses are present.	7M	CO1	L2
(b)	Compare NR method and fast decoupled load flow method.	7M	CO1	L2

20EE18-POWER SYSTEMS-III

5(a)	The fuel cost curve of two generators are given as under $C_1 = 800 + 45P_{G1} + 0.01P_{G1}^2$; $C_2 = 200 + 43P_{G2} + .003P_{G2}^2$ If the load supplied is 700MW, find the optimal dispatch with and without considering generator limits where the limits have been expressed as $50MW \leq P_{G1} \leq 200MW$; $50MW \leq P_{G2} \leq 600MW$	7M	CO2	L3
(b)	Illustrate the following terms with reference to thermal plants: (i) Heat rate curve (ii) incremental fuel rate curve (iii) input-output curve.	7M	CO2	L2
(OR)				
6(a)	Describe the unit commitment problem in power system.	7M	CO2	L2
(b)	Describe the short-term Hydro-thermal scheduling of power.	7M	CO2	L2
7.	Develop the complete block diagram of single area power system.	14M	CO3	L3
(OR)				
8(a)	Prove that the steady error in frequency $\Delta f(s)$ is reduced to zero with PI controller in single area power system.	7M	CO3	L3
(b)	A 100 MVA 50 Hz turbo alternator is running at rated speed. The load suddenly increases by 50 MW. Due to delay in governor action there is delay of 0.5 sec in opening of steam valve. Assuming inertia constant H of 5MW-sec per KVA of generator capacity, find the frequency deviation.	7M	CO3	L3
9(a)	Derive the swing equation from the dynamic model of synchronous generator.	7M	CO4	L3
(b)	Derive critical clearing angle expression for the case of fault occurring at one end of a single line.	7M	CO4	L3
(OR)				
10(a)	Distinguish between voltage stability and angle stability.	7M	CO4	L2
(b)	Discuss the methods to improve transient stability studies.	7M	CO4	L2

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

BOS app
2/4/26

20ME17-HEAT TRANSFER

(ME)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Formulate the general 3-dimensional heat conduction equation in Cartesian coordinate system.	7M	CO1	L2
(b)	A furnace wall consists of an inside layer of silica brick 10 cm thick ($k = 6.28 \text{ kJ/m hr}^\circ\text{C}$) and magnesite brick thickness 5cm ($k = 20.35 \text{ kJ/m hr}^\circ\text{C}$) on the outside. The inside surface of the silica brick wall is maintained at 750°C while the outside surface of magnesite is at 125°C . What is the rate of heat loss per unit area of the wall? Also calculate the temperature at the interface.	7M	CO1	L3
(OR)				
2(a)	Distinguish the Conduction, Convection and Radiation mechanisms with suitable examples.	7M	CO1	L2
(b)	A stainless-steel plate 2 cm thick is maintained at a temperature of 550°C at one face and 50°C on the other. The thermal conductivity of stainless steel at 300°C is 19.1 W/m K . Compute the heat transferred through the material per unit area.	7M	CO1	L3
(OR)				
3(a)	Develop the expression for temperature distribution for a long rectangular fin.	7M	CO2	L2
(b)	An Aluminium sphere weighing 5.5 kg and initially at a temperature of 290°C is suddenly immersed in a fluid at 15°C . The convective heat transfer coefficient is $59 \text{ W/m}^2 \text{ K}$. Estimate the time required to cool the Aluminium to 95°C .	7M	CO2	L3
(OR)				
4(a)	In a quenching process a copper plate of 3 cm thick is heated up to 350°C and then suddenly it is dipped into water bath and cooled to 25°C . Calculate the time required for the plate to reach the temperature of 50°C . The value of $h = 28 \text{ W/m}^2 \text{ K}$. The plate dimensions are length 40 cm width 30 cm. $C_p = 380 \text{ J/kg K}$, $\rho = 8800 \text{ kg/m}^3$ $k = 385 \text{ W/mK}$.	7M	CO2	L3
(b)	Under what circumstances lumped capacity analysis is used in transient heat transfer? State the assumptions for lumped capacity analysis.	7M	CO2	L2
(OR)				
5(a)	State and mention the significance of given non-dimensional numbers. (i) Reynolds Number (ii) Grashoff number (iii) Biot Number.	7M	CO3	L1
(b)	What is the boundary layer theory and explain the characteristics of boundary layer formation over a flat plate.	7M	CO3	L2
(OR)				

20ME17-HEAT TRANSFER

6(a)	Using dimensional analysis establish a relation between Nusselt, Grashof and Prandtl number.	7M	CO3	L2
(b)	An air stream at 0°C is flowing along a heated plate at 90°C at a speed of 75m/s. The plate is 45cm long and 60cm width. Assume the transition of boundary layer to take place at $Re = 5 \times 10^5$. Calculate the average values of friction coefficient and heat transfer coefficient for the full length of the plate. Hence calculate the rate of energy dissipation from the plate.	7M	CO3	L3
7(a)	Explain the regimes of the Pool Boiling curve with neat sketch.	7M	CO4	L2
(b)	Water at atmospheric pressure is to be boiled in a polished copper pan. The diameter of the pan is 350 mm and is kept at 115°C. Calculate: (i) Heat flux, (ii) Power of the burner, (iii) Rate of evaporation in kg/hr, (iv) Critical heat flux for these conditions.	7M	CO4	L3
(OR)				
8(a)	Describe the various laws of a black body radiation.	7M	CO4	L1
(b)	Calculate the following for an industrial furnace in the form of a black body and emitting radiation at 2500 °C. (i) Monochromatic emissive power at 1.2μm length. (ii) Wavelength at which emission power is maximum. (iii) Maximum emissive power iv) Total emissive power.	7M	CO4	L3
9(a)	Formulate an expression for LMTD of a parallel flow heat exchanger.	7M	CO5	L2
(b)	A hot gas at the rate of 16.2 kg/s at 648°C ($C_p = 3.52$ kJ/KgK) is used to heat 20.2 kg/sec of the incoming fluid at 100° C ($C_p = 4.2$ kJ/kg K) in a heat exchanger. If the overall heat transfer coefficient is 0.92 KW/m ² K for surface area of 43.8m ² , find the fluid outlet temperatures for counter flow arrangement.	7M	CO5	L3
(OR)				
10(a)	Classify the heat exchangers and distinguish the importance of recuperative and regenerative heat exchangers.	7M	CO5	L2
(b)	Hot oil with a capacity rate of 2500 W/K flows through a double pipe heat exchanger. It enters at 360 °C and leaves at 300 °C. Cold fluid enters at 30 °C and leaves at 200 °C. If the overall heat transfer coefficient is 800 W/m ² K, Determine the heat exchanger area required for (i) parallel flow and (ii) counter flow.	7M	CO5	L3

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

20AD07-DEEP LEARNING
(AI&DS and CSE(AI&ML))

9. 22

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain the concept of identity and inverse matrices with examples.	7M	CO1	L2
(b)	Illustrate multiplying matrices and vectors with a suitable example and mention its applications in deep learning.	7M	CO1	L3
(OR)				
2(a)	Discuss the concept of matrix transpose and symmetry.	4M	CO1	L2
(b)	Define a scalar, vector, matrix, and tensor with suitable examples. Explain how these components are used in deep learning.	10M	CO1	L2
3(a)	Determine the concept of cost functions and how they differ from loss functions. Give examples.	7M	CO2	L2
(b)	Describe the process and importance of training deep neural networks.	7M	CO2	L2
(OR)				
4(a)	What are activation functions? Explain their role in neural networks with examples.	7M	CO2	L2
(b)	Describe the concept of a neural network model and how it is built using layers and parameters.	7M	CO2	L2
5(a)	Explain the different types of layers used in CNNs, such as convolutional, pooling, and fully connected layers, along with their roles.	7M	CO3	L2
(b)	Illustrate the importance of strides, padding and pooling operation in CNN.	7M	CO3	L3
(OR)				
6(a)	Describe the concept and types of pooling operations used in CNNs.	7M	CO3	L2
(b)	Summarize the LeNet-5 architecture with appropriate parameters at each layer.	7M	CO3	L2
7(a)	Demonstrate how Long Short-Term Memory (LSTM) solves the vanishing gradient problem	7M	CO4	L4
(b)	Write short notes on the working of a Gated Recurrent Unit (GRU).	7M	CO4	L2
(OR)				
8(a)	Differentiate between one-hot encoding and word embeddings in representing text.	7M	CO4	L4
(b)	Illustrate the architecture of Recurrent Neural Network (RNN) and Bidirectional Recurrent Neural Network.	7M	CO4	L2
9(a)	Write a short note on regularization techniques in deep learning and their importance in preventing overfitting.	7M	CO5	L2
(b)	Discuss the applications of autoencoders in deep learning tasks.	7M	CO5	L2
(OR)				
10(a)	Discuss the role of Data Augmentation in regularizing deep neural networks.	7M	CO5	L2
(b)	Explain how an autoencoder can be implemented using a neural network with encoder-decoder structure?	7M	CO5	L3

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

20AE15-FLIGHT DYNAMICS

(ASE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Illustrate Drag polar.	7M	CO1	L2
(b)	An aeroplane has a wing loading of 3000N/m ² , and its drag polar equation is $C_D = 0.015 + 0.06 C_L^2$, calculate its maximum Lift/Drag ratio and the Lift/Drag ratio at a speed of 150m/s.	7M	CO1	L3
(OR)				
2.	A jet engine airplane has a weight of 75,000 N and wing area of 22m ² . If the engine output at 9 km (density is 0.44 kg/m ³) altitude be 9000 N. Drag polar $C_D = 0.018 + 0.065 C_L^2$. Maximum lift coefficient is 1.5. Calculate the maximum and minimum speeds in level flight.	14M	CO1	L3
3(a)	Derive the expression for endurance equation for jet powered aircraft.	7M	CO2	L3
(b)	Illustrate V-n diagram with neat sketch.	7M	CO2	L3
(OR)				
4(a)	An aircraft has a steady rate of climb of 300 m/s at sea level and 150m/s at 1500 m altitude. Calculate the time taken (in sec) for this aircraft to climb from 500 m altitude to 2500 m altitude.	7M	CO2	L3
(b)	Illustrate Hodograph of climbing airplane at a given altitude.	7M	CO2	L2
5(a)	Describe (i) static equilibrium (ii) unstable equilibrium and (iii) neutral equilibrium.	4M	CO3	L2
(b)	Describe the criteria for longitudinal static stability of an airplane.	10M	CO3	L2
(OR)				
6.	Illustrate the concept of static longitudinal control with two methods of achieving steady level equilibrium flight at any other angle of attack.	14M	CO3	L3
7(a)	Describe the criterion for directional static stability.	7M	CO3	L2
(b)	Derive the expression for coefficient of yawing moment produced by the rudder.	7M	CO3	L3
(OR)				
8(a)	Illustrate the requirements of Rudder design.	7M	CO3	L2
(b)	Demonstrate the effects of Wing Sweep, Wing Dihedral, Vertical Tail, Propeller on lateral and directional static stability of an Aircraft.	7M	CO3	L2
9(a)	Explain the Routh's criteria in dynamic stability.	7M	CO4	L2
(b)	The longitudinal motion of an airplane is described by the following characteristics equation $\lambda^4 - 4.19 \lambda^3 + 12.5 \lambda^2 + 0.63 \lambda + 0.51 = 0$. Find out the roots of the equation.	7M	CO4	L3
(OR)				
10.	Consider the motion referred to an orthogonal axis set (oxyz) with the origin 'o' coincident with the center of gravity of the aircraft. The components of velocity and force along the axes ox, oy and oz are denoted (U, V, W) and (X, Y, Z), respectively. The components of angular velocity and moment about the same axes are denoted (p, q, r) and (L', M, N) respectively. Derive the expression for The Y-force equation of an aircraft	14M	CO4	L3

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

20CE19-DESIGN OF STEEL STRUCTURES

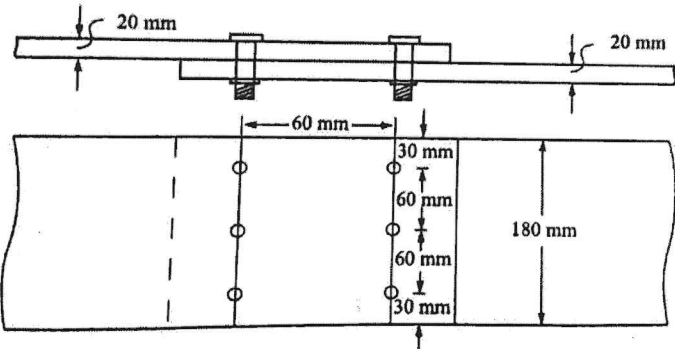
(CE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Draw the neat sketches for different types of welds.	7M	CO1	L2
(b)	Design a single bolted double cover butt joint to connect boiler plates of thickness 16mm for maximum efficiency. Use M16 bolts of grade 4.6 and Fe410 grade.	7M	CO2	L3
(OR)				
2(a)	A tie member of a roof truss consists of 2 ISA 9060, 10mm. The angles are connected on the either side of 12mm gusset plates and the member is subjected to a factored pull of 350kN. Design the welded connection. Assume welding is to be made in the workshop.	7M	CO2	L3
(b)	Determine the efficiency of a lap joint as shown in figure. Use M20 bolts grade 4.6 and Fe410 plates are used. 	7M	CO2	L3
3.	Design a splice to connect a 300mm x 20mm plate with a 300mm x 10mm plate. The design load is 500kN. Use 20mm bolts.	14M	CO2	L4
(OR)				
4.	A column as 4m long and supports a factored load of 6000kN. It is effectively held at both ends and restrained in direction at one of the ends. Design the column using beam section and plates.	14M	CO2	L4
5.	A simply supported beam spanning 6m carrying a UDL of 40Kn/m including its self weight. Floor construction retains it against lateral buckling. Design the beam with Fe 410 grade steel.	14M	CO3	L4
(OR)				
6.	Design a laterally un supported simply supported beam of span 5m. The UDL on the beam is made up of 20kN/m imposed load and 20kN/m dead load. Assume Fe 410 grade steel.	14M	CO3	L4

20CE19-DESIGN OF STEEL STRUCTURES

7.	A column ISHB 350@666.2 N/m carries an axial compressive factored axial load of 2000kN. Design a suitable gusset base. The base rests on M25 grade concrete pedestal. Use 24mm dia bolts.	14M	CO3	L4
(OR)				
8.	Design a batten system for the column 8m long to carry a factored axial load of 900kN. The column is restrained in position but not in direction at both ends. Assume that two channels are kept back to back.	14M	CO3	L4
9(a)	Determine the design loads on the purlins of an industrial building near Zone-5, given Class of building = 50 years life, terrain category-2, maximum dimension = 40m, width of building= 15m, height at eave level = 8m, topography <3°, permeability-medium, span of truss = 15m, pitch- 1/5, sheeting-AC sheets, spacing of purlins = 1.35m, spacing of truss = 4m.	7M	CO4	L3
(b)	List out the IS specifications for AC sheets and GI sheets.	7M	CO4	L3
(OR)				
10(a)	Draw neat sketches for different types of trusses and mention their economical span length.	7M	CO4	L2
(b)	Discuss the procedural steps for calculation of wind loads on an industrial truss member.	7M	CO4	L2

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

20CS18-COMPILER DESIGN

(CSE & IT)

Time : 3 hours

Max. Marks: 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain in detail about the boots trapping technique.	7M	CO1	L2
(b)	Explain in detail about the language preprocessing system.	7M	CO1	L2
(OR)				
2(a)	Give the general format of LEX program.	7M	CO1	L2
(b)	Construct the Lex program to recognize white spaces, identifiers, if-then, else.	7M	CO1	L4
(OR)				
3(a)	Explain in detail about Left recursion and left factoring with an example.	7M	CO2	L2
(b)	Write down the algorithm for constructing the predictive parsing table.	7M	CO2	L2
(OR)				
4(a)	Explain the role of a Parser phase in the compilation process.	7M	CO2	L2
(b)	Construct leftmost derivation and rightmost derivation for the following grammar $E \rightarrow E+E \mid E-E \mid E^*E \mid a \mid b$.	7M	CO2	L3
(OR)				
5.	Construct the LALR parsing table for the following given grammar $S \rightarrow CC \quad C \rightarrow aC \mid d$ And parse the input string aadd.	7M	CO3	L4
(OR)				
6(a)	Explain in detail about handle pruning with an example.	7M	CO3	L2
(b)	Explain the stack implementation of shift reduce parsing method with an example.	7M	CO3	L3
(OR)				
7(a)	Illustrate the syntax Directed Translation (SDT) scheme to construct syntax trees.	7M	CO4	L3
(b)	Explain about S-Attribute and L-Attribute in detail with an example.	7M	CO4	L2
(OR)				
8(a)	Explain in detail about common sub expression elimination and constant folding techniques.	7M	CO4	L2
(b)	Explain the loop optimization technique with an example.	7M	CO4	L2
(OR)				
9(a)	Explain in detail about different storage allocation strategies.	7M	CO5	L2
(b)	Explain in detail about the parameter passing techniques.	7M	CO5	L3
(OR)				
10(a)	Explain in detail about static single assignment with an example.	7M	CO5	L2
(b)	What is code optimization? explain the advantages of code optimization.	7M	CO5	L2

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

20EC16-VLSI DESIGN

(ECE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Plot CMOS Inverter transfer characteristics and mark the different regions of operation.	4M	CO1	L2
(b)	Derive the pull-up to pull-down ratio for an NMOS inverter driven through another inverter.	10M	CO1	L3
(OR)				
2.	With neat sketch, explain the CMOS p-well fabrication process.	14M	CO1	L2
3(a)	Develop the Layout diagram for 2 input CMOS NAND gate.	7M	CO2	L3
(b)	Explain about CMOS lambda based design rules for transistors and contact cuts.	7M	CO2	L2
(OR)				
4(a)	Calculate the delay for the nMOS Inverter pair.	7M	CO2	L3
(b)	Determine the scaling factors for Gate area, Gate Capacitance, Power dissipation per unit area and Gate delay	7M	CO2	L3
5(a)	Design D Flip-flop using transmission gate.	7M	CO3	L3
(b)	Model the static complementary gate that computes $[(A+B)C]'$.	7M	CO3	L3
(OR)				
6(a)	Discuss switch logic using pass transistors and transmission gates.	7M	CO3	L2
(b)	Illustrate the operation of Array Multiplier.	7M	CO3	L4
7(a)	Elaborate the significance of current mirror and explain n-channel current mirror circuit.	7M	CO3	L4
(b)	Calculate noise in telescopic op-amp.	7M	CO3	L3
(OR)				
8(a)	Model two stage op-amp with single-ended output.	7M	CO3	L3
(b)	Build Bootstrap reference circuit and explain its V-I characteristics.	7M	CO3	L3
9(a)	Outline the two different modes of scan operation.	7M	CO4	L4
(b)	Illustrate combinational logic testing using D-Algorithm.	7M	CO4	L4
(OR)				
10(a)	Describe BILBO test technique with suitable diagrams	7M	CO4	L2
(b)	Differentiate Defect, Fault and Error and give some examples of manufacturing defects.	7M	CO4	L2

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

**20EE19-SOLID STATE DRIVES
(EEE)**

Time : 3 hours

Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Illustrate different types of braking in detail.	7M	CO1	L3
(b)	A 220 volts, 1500 rpm, 15 Amps separately excited dc motor has an armature resistance of 18Ω . It is fed from a single phase fully controlled bridge rectifier with an ac source voltage of 230 volts, at 50Hz. Assuming continuous load current, compute the motor speed at firing angle of 30 degrees and torque of 8 NM.	7M	CO1	L3
(OR)				
2(a)	Analyze the speed torque characteristics of separately excited dc motor fed by a single-phase semi converter..	7M	CO1	L3
(b)	Illustrate three-phase, fully controlled rectifier fed separately excited DC motor drive.	7M	CO1	L3
3.	Illustrate the speed control scheme of induction motor drive with stator voltage control and list the advantages and applications of this method.	14M	CO2	L2
(OR)				
4(a)	Describe the variable frequency operation of induction Motor drives.	7M	CO2	L2
(b)	Compare VSI(Voltage Source Inverter) and CSI (Current Source Inverter) fed induction motor drive.	7M	CO2	L2
5.	Illustrate the closed loop speed control of static Scherbius drive and also explain modes of operation of static Scherbius drive.	14M	CO3	L3
(OR)				
6(a)	Analyze the static Kramer drive and obtain the torque expression.	7M	CO3	L3
(b)	A 3Φ , 440 V, 50 Hz, star connected 970 rpm, 6 pole IM has the following parameters referred to the stator. $R_1=0.2\Omega$, $R_2=0.15\Omega$, $R_0=53\Omega$, $X_1=X_2=0.4\Omega$, stator to rotor turns ratio=3.5, the motor is controlled by the static Kramer drive. The drive is designed for a speed range of 30% below the synchronous speed. The maximum value of firing angle is 170° . Calculate (i) Turns ratio of the transformer (ii) Torque for a speed of 750 rpm and $\alpha=140^\circ$.	7M	CO3	L3
7(a)	Illustrate the Variable frequency control of synchronous motor drive.	7M	CO2	L2
(b)	Compare Self-control and Separate Control methods of synchronous motor drive.	7M	CO2	L2
(OR)				
8(a)	Discuss the self-controlled synchronous motor drive by cyclo converter with a neat diagram.	7M	CO2	L2
(b)	Draw the block diagram of closed loop control of synchronous motor drive.	7M	CO2	L2
9(a)	Analyze the trapezoidal operation of Brushless DC motor drive.	7M	CO4	L3
(b)	Compare BLDC motor and Brushed DC motor.	7M	CO4	L3
(OR)				
10(a)	Analyze the operation of Sinusoidal BLDC Motor Drive.	7M	CO4	L3
(b)	Illustrate the operation of current control of BLDC motor drive.	7M	CO4	L3

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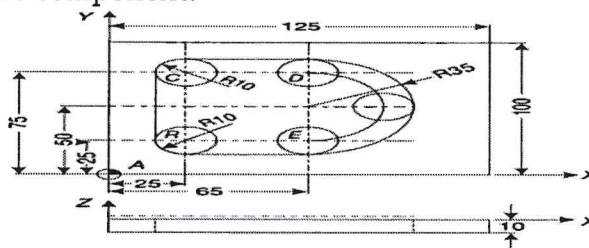
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.: A.P.
B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

**20ME18-CAD/CAM
(ME)**

9.22 ✓
Max. Marks : 70

Time : 3 hours

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Illustrate the application of Computers in Design process.	7M	CO1	L2
(b)	Define CAD and list out its benefits.	7M	CO1	L2
(OR)				
2(a)	Illustrate the working principle of Raster-scan graphics system with neat diagram.	7M	CO1	L2
(b)	A triangle ABC having vertices A (1, 1), B (1, 7) and C (5, 4) is scaled by 3 units in X-direction and then rotated by 30° in anticlockwise direction. Construct the transformation matrix.	7M	CO1	L3
3(a)	Categorize various types of Geometric modelling techniques with their capabilities.	7M	CO2	L2
(b)	Derive the parametric equation for Hermite cubic spline curve.	7M	CO2	L3
(OR)				
4(a)	Classify the different types of analytic surfaces.	7M	CO2	L2
(b)	Illustrate Constructive Solid Geometry method in solid modelling with an example.	7M	CO2	L2
5(a)	What is numerical control? Illustrate various elements of NC with a neat diagram.	7M	CO3	L2
(b)	Distinguish between NC and CNC with their advantages and limitations.	7M	CO3	L2
(OR)				
6.	The component to be machined is shown in Fig. It is assumed that the pocket is through and hence only outside is to be machined as a finish cut of the pocket. The tool to be used is a 20 mm diameter slot drill. The setting is done with point A as reference (0, 0, 0) and the reference axes are along X and Y directions. Build NC part program for machining the component. 	14M	CO3	L3
7(a)	What is meant by parts classification and coding? Classify various types of parts classification & coding structures.	7M	CO4	L2
(b)	Discuss about OPTIZ coding system with an example.	7M	CO4	L2
(OR)				
8(a)	What are various types of layouts used in FMS design? Discuss briefly about their applications.	7M	CO4	L2
(b)	Illustrate the working of a retrieval CAPP system.	7M	CO4	L2
9(a)	Distinguish between on-line and off-line inspection methods.	7M	CO5	L2
(b)	What is a CMM? Classify various types of CMM with neat sketches.	7M	CO5	L2
(OR)				
10(a)	List out key components in Computer Integrated Manufacturing (CIM).	7M	CO5	L2
(b)	What is lean Manufacturing? List out important elements.	7M	CO5	L2

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

20CS19-BIG DATA ANALYTICS

(AI&DS,CSE,CSE(AI&ML) and IT)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Describe applications of Big data.	7M	CO1	L2
(b)	Explain the following tools in Hadoop Eco system. (i) HBase (ii) HDFS (iii) ZooKeeper (iv) Sqoop.	7M	CO1	L2
(OR)				
2(a)	Demonstrate analyzing data with Hadoop.	7M	CO1	L2
(b)	Summarize need of Hadoop Streaming.	7M	CO1	L2
(OR)				
3(a)	Explain architecture of Hadoop with neat sketch.	7M	CO2	L2
(b)	Summarize Hadoop file system interfaces.	7M	CO2	L2
(OR)				
4(a)	Demonstrate Serailization in Hadoop.	7M	CO2	L2
(b)	Make use of HDFS commands to perform the following operations. (i) Upload files from the Local file system to HDFS. (ii) List files in HDFS directory. (iii) Copy files from HDFS to the Local file system. (iv) Delete unnecessary files from HDFS.	7M	CO2	L2
(OR)				
5.	Apply Map Reduce approach to Perform analysis on weather mining.	14M	CO3	L3
(OR)				
6(a)	Explain shuffle and Sort phases in Map Reduce with an example.	7M	CO3	L2
(b)	Explain features of Map Reduce.	7M	CO3	L2
(OR)				
7(a)	Utilize Sqoop tool to perform importing of data into HDFS and data export back to a relational database.	10M	CO4	L3
(b)	Create an employee table into Hive environment Using HiveQL.	4M	CO4	L3
(OR)				
8(a)	Describe architectures of Hive and it's components.	7M	CO4	L2
(b)	Explain User define functions in Hive.	7M	CO4	L2
(OR)				
9(a)	Explain any 7 data processing operators in Pig Latin with an example.	7M	CO5	L2
(b)	Explain features of HBase.	7M	CO5	L2
(OR)				
10(a)	Summarize execution modes of Pig with an example.	7M	CO5	L2
(b)	Compare HBase with RDBMS.	7M	CO5	L2

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B.Tech. (VI Semester) Regular/Supplementary Examinations

Revised
6/4/26

20AE16-AIR BREATHING PROPULSION

(ASE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Derive the thrust equation for a twin spool turbofan engine with unmixed streams when the hot nozzle is choked and the cold nozzle is unchoked.	10M	CO1	L3
(b)	Describe the performance characteristics of a turbojet engine.	4M	CO1	L3
(OR)				
2.	The following data is given for a turbojet engine: Isentropic efficiencies of intake and turbine: 92% Polytropic efficiency of the compressor : 85% Isentropic efficiency of the nozzle : 95% Combustion Chamber efficiency : 99% Pressure loss in the combustion chamber : 3% Overall pressure ratio : 9 Mechanical transmission efficiency : 97% Turbine inlet temperature : 1027°C If the aircraft is flying at 9 km altitude with $M = 0.85$, determine the total thrust produced per unit mass flow of air.	14M	CO1	L3
3(a)	Elaborate the starting problem associated with supersonic inlets.	10M	CO2	L3
(b)	Explain the term isentropic efficiency of an inlet with neat sketches.	4M	CO2	L2
(OR)				
4(a)	Define the term ram efficiency of an intake with necessary sketches and hence obtain an expression for the same.	4M	CO2	L2
(b)	Discuss the various flow patterns for an intake with respect to the incoming stream-tube with h-s diagrams.	10M	CO2	L3
5(a)	Compare and contrast the performance of centrifugal and axial flow compressors.	7M	CO3	L3
(b)	Derive an expression for the degree of reaction of an axial flow compressor in terms of the flow angles.	7M	CO3	L3
(OR)				
6.	Prove that the velocity triangles are symmetrical for an axial flow compressor with 50% degree of reaction by deriving all relations used.	14M	CO3	L3
7(a)	Describe any two types of combustion chambers in detail.	7M	CO4	L2
(b)	Discuss any two issues associated with combustion chamber design.	7M	CO4	L3
(OR)				
8(a)	What are the prime requirements of the aviation fuel? Elucidate.	4M	CO4	L1
(b)	With the help of a block diagram of the combustion chamber, derive an expression for the mass flow rate of fuel required per unit mass flow rate of fuel.	10M	CO4	L3
9(a)	Derive an expression for the maximum blade efficiency of an axial flow impulse stage in terms of the air angle at the nozzle exit.	7M	CO5	L3
(b)	With a neat sketch, discuss the working of a radial flow turbine.	7M	CO5	L2
(OR)				
10(a)	Explain the performance characteristics of an axial flow turbine.	7M	CO5	L3
(b)	Why is blade cooling required? Explain any two methods of blade cooling employed.	7M	CO5	L2

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B.Tech. (VI Semester) **Regular**/Supplementary Examinations

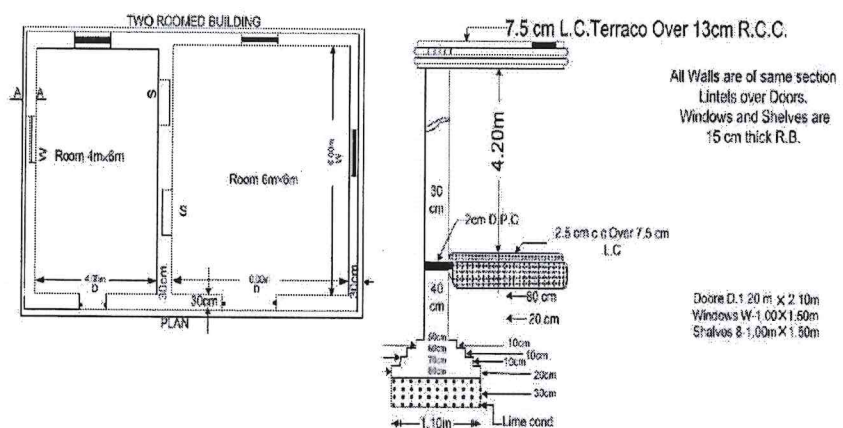
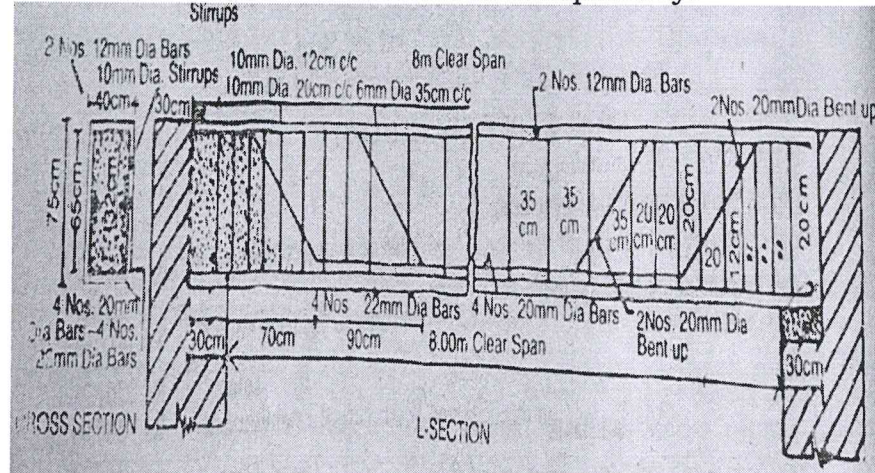
**20CE20-ESTIMATION AND QUANTITY SURVEYING
(CE)**

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Determine the quantity of brickwork in a semi circular arch of 2.00m span, thickness of the arch is 30 cm and the breadth of the wall is 40 cm.	7M	CO1	L3
(b)	Describe the following main items of work. (i) R.C.C. and R.B. work (ii) Flooring and Roofing.	7M	CO1	L2
(OR)				
2.	Estimate the following quantites of the following items of a residential building from the given plan and section shown below. (i) Earthwork in excavation in foundation (ii) Lime concrete in foundation (ii) 1st class brickwork in cement mortar 1:6 in foundation and plinth 	14M	CO1	L3
3.	Prepare a detailed estimate of a R.C.C. beam of 8 m clear span and 75 cm x 40 cm in section from the given drawings below. Steel in detail in R.C.C. work shall be calculated separately. 	14M	CO2	L3

(OR)

20CE20-ESTIMATION AND QUANTITY SURVEYING

4.	Determine the quantities of cutting and filling for a portion of road from chainage 0 to chainage 6 from the following data. Formation width of the road is 10 m. Side slopes are 2:1 in banking and 1.5:1 in cutting. Length of chain is 30 m.	14M	CO2	L3																								
	<table><tr><td>Chainage</td><td>R.L. of Ground</td><td>Formation level</td></tr><tr><td>0</td><td>123.90</td><td>123.20</td></tr><tr><td>1</td><td>125.00</td><td>123.60</td></tr><tr><td>2</td><td>124.60</td><td>124.00</td></tr><tr><td>3</td><td>122.90</td><td>123.60</td></tr><tr><td>4</td><td>121.60</td><td>123.20</td></tr><tr><td>5</td><td>121.00</td><td>122.80</td></tr><tr><td>6</td><td>120.40</td><td>122.40</td></tr></table>				Chainage	R.L. of Ground	Formation level	0	123.90	123.20	1	125.00	123.60	2	124.60	124.00	3	122.90	123.60	4	121.60	123.20	5	121.00	122.80	6	120.40	122.40
Chainage	R.L. of Ground				Formation level																							
0	123.90				123.20																							
1	125.00				123.60																							
2	124.60				124.00																							
3	122.90				123.60																							
4	121.60				123.20																							
5	121.00	122.80																										
6	120.40	122.40																										
5(a)	Describe the detailed specifications of plastering with cement mortar.	7M	CO3	L2																								
(b)	Classify the specifications of building construction.	7M	CO3	L2																								
(OR)																												
6.	Determine the quantity of earthwork of a portion of a channel with the following data- bed width = 3 m; free board = 44 cm; slope of digging = 1:1; side slopes of banking = 1.5:1; Top width of both banks = 1.5 m.	14M	CO3	L3																								
	<table><tr><td>Rd</td><td>R.L. of Ground</td><td>Formation level</td></tr><tr><td>0</td><td>225.24</td><td>224.00</td></tr><tr><td>30</td><td>224.80</td><td>223.94</td></tr><tr><td>60</td><td>224.43</td><td>223.88</td></tr><tr><td>90</td><td>224.12</td><td>223.88</td></tr><tr><td>120</td><td>224.50</td><td>223.76</td></tr><tr><td>150</td><td>224.98</td><td>223.70</td></tr></table>				Rd	R.L. of Ground	Formation level	0	225.24	224.00	30	224.80	223.94	60	224.43	223.88	90	224.12	223.88	120	224.50	223.76	150	224.98	223.70			
Rd	R.L. of Ground				Formation level																							
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60	224.43				223.88																							
90	224.12				223.88																							
120	224.50	223.76																										
150	224.98	223.70																										
7(a)	Determine the materials required for 10 cu m of concrete for 1:3:6 proportion.	7M	CO4	L3																								
(b)	Describe the plinth area estimate in building constructions.	7M	CO4	L2																								
(OR)																												
8(a)	Analyze the rate of 2.5 cm thick cc floor 1:2:4 per sq m.	7M	CO4	L3																								
(b)	Describe in detail about the approximate estimate in P.W.D. works.	7M	CO4	L2																								
9(a)	A leasehold property is to produce a net annual income of Rs. 12,000 for the next 30 years. The owner expects a return of 8% on his capital and also sets apart a sinking fund instalment to accumulate at 6% annually to replace the capital. Determine the value of the property.	7M	CO5	L3																								
(b)	Calculate the value of year's purchase for an old building if its future life is 20 years and the rate of interest is 6% on capital and 5% for sinking fund.	7M	CO5	L3																								
(OR)																												
10(a)	The total cost of a new building is Rs. 1,50,000. Determine the depreciated cost of the building after 20 years by straight line method if the scrap value is Rs. 15,000 assuming the life of the building is 80 years.	7M	CO5	L3																								
(b)	An old building has been purchased by a person at a cost of Rs. 30,000/- excluding the cost of the land. Calculate the amount of annual sinking fund at 4% interest assuming the future life of the building as 20 years and the scrap value of the building as 10% of the cost of purchase.	7M	CO5	L3																								

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)**

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

B.Tech. (VI Semester) Supplementary Examinations

20EC17-MICROWAVE ENGINEERING

(ECE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Discuss about the applications of microwaves.	7M	CO1	L2
(b)	A Rectangular wave guide is filled by dielectric material of $\epsilon_r=9$ and has dimensions of 7×3.5 cm, it operates in the dominant TE mode. Determine cutoff frequency, phase velocity in guide at 2GHz.	7M	CO1	L2
(OR)				
2(a)	Discuss about the microwave frequency bands.	4 M	CO4	L1
(b)	Examine the dominant mode and degenerate modes of cylindrical waveguide.	10 M	CO4	L3
3(a)	Illustrate the structure and operation of reflex klystron using Applegate diagram.	7M	CO1	L3
(b)	Classify the O- type microwave devices.	7M	CO1	L2
(OR)				
4(a)	Discuss the principle of velocity modulation using two cavity klystron amplifier.	7M	CO1	L2
(b)	Derive the field expressions for TM_{mnp} mode in a circular cavity resonator.	7M	CO1	L2
5.	An X band pulsed cylindrical magnetron has the following operating parameters Anode voltage $V_0=26$ KV, Beam current $I_0=27$ A, Magnetic flux density $B_0=0.336$ WB/m ² , Radius of cathode cylinder $a=5$ cm, radius of vane edge to center $b=10$ cm Calculate: (i) The cyclotron angular frequency (ii) The cutoff voltage for a fixed B_0 (iii) The cutoff magnetic flux density for a fixed V_0 .	14M	CO3	L3
(OR)				
6(a)	Derive the Hull cutoff Magnetic equation in Cavity Magnetron.	7M	CO4	L2
(b)	Explain the characteristics of helix slow wave structure.	7M	CO2	L2
7(a)	Determine the conductivity of the Gunn diode Total electron density: $n=10^{18}$ cm ⁻³ Electron density at lower valley: $n_l=10^{10}$ cm ⁻³ Electron density at upper valley: $n_u=10^8$ cm ⁻³ Temperature: $T=300^\circ$ K.	7M	CO2	L2
(b)	Illustrate the constructional details and characteristics of the IMPATT diode.	7M	CO4	L3
(OR)				
8(a)	Discuss about the Negative Resistance region in microwave diodes.	7M	CO4	L2
(b)	Describe Two valley model theory used in Gunn diode.	7M	CO4	L3
9(a)	Develop the S-matrix for E-plane Tee by using the properties of S-parameters.	7M	CO2	L3
(b)	Discuss the principle of working of Isolator.	7M	CO1	L2
(OR)				
10(a)	Demonstrate each blocks of microwave bench setup used to measure the parameters of circulator	7M	CO1	L2
(b)	Illustrate the construction and working of Rotary vane attenuator.	7M	CO3	L3

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

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

**20EE20-BASIC MICRO PROCESSORS AND MICRO CONTROLLERS
(EEE)**

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	For following addressing modes of 8086, notify the example and discuss the purpose of each one. (i) Direct addressing mode (ii) Register addressing mode.	10M	CO2	L3
(b)	Write a program to multiply two numbers using 8086.	4M	CO2	L3
(OR)				
2(a)	Discuss about extra segment, stack segment, code segment and data segment of 8086.	7M	CO1	L2
(b)	How the status of carry flag and auxiliary flag will change? Justify your answer with suitable example.	7M	CO2	L3
(OR)				
3(a)	Analyze the concept 8086 memory read operation in minimum mode.	7M	CO3	L3
(b)	How the interrupt structure in 8086 formulated? Also discuss the function of interrupts.	7M	CO3	L3
(OR)				
4.	Sketch out the detailed pin diagram of 8086 computing processor and analyze the minimum and maximum mode operation.	14M	CO1	L3
(OR)				
5(a)	How peripherals are used for 8086 microprocessor? Specify the function of each peripheral to the serve purpose.	7M	CO3	L3
(b)	Regarding to direct memory access, justify your answer by analyzing the operation of DMA controller.	7M	CO3	L3
(OR)				
6(a)	Design the 8255 keyboard interfacing circuit and analyze the control action for each 'key press' from '0-9' and 'A-F' keys.	10M	CO4	L3
(b)	Mention the advantages of 8051 microcontroller.	4M	CO1	L2
(OR)				
7(a)	Sketch out the 8051 architecture and express the importance of ALU, ROM and RAM.	10M	CO1	L3
(b)	Asses the purpose of 8051 register addressing mode with help of example.	4M	CO2	L3
(OR)				
8(a)	With help of neat 8051 pin diagram, express the detailed function of all 40 pins.	10M	CO1	L2
(b)	Why jump instructions JZ, JNZ used?	4M	CO2	L3
(OR)				
9.	Design a detailed circuit of 8051 timer counter for the following operation. (i) Mode 0 (ii) Mode 1.	14M	CO3	L3
(OR)				
10(a)	Analyze the 8051 serial port operation in detail.	7M	CO3	L3
(b)	How the seven segments LED interfacing is possible in 8051? Illustrate the design of interface circuit.	7M	CO4	L3

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

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

20ME19-DEGINE OF MACHINE ELEMENTS-II

(ME)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL																
1(a)	A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure of 1.4 N/mm ² . The speed of the journal is 900 r.p.m. and the ratio of journal diameter to the diametral clearance is 1000. The bearing is lubricated with oil whose absolute viscosity at the operating temperature of 75°C may be taken as 0.011 kg/m-s. The room temperature is 35°C. Find: (i). The amount of artificial cooling required, and (ii). The mass of the lubricating oil required, if the difference between the outlet and inlet temperature of the oil is 10°C. Take specific heat of oil as 1850 J/ kg/ °C.	7M	CO1	L3																
(b)	A shaft rotating at constant speed is subjected to variable load. The bearings supporting the shaft are subjected to stationary equivalent radial load of 3 kN for 10 percent of time, 2 kN for 20 percent of time, 1 kN for 30 percent of time and no load for remaining time of cycle. If the total life expected for the bearing is 20 × 10 ⁶ revolutions at 95 per cent reliability, calculate dynamic load rating of the ball bearing.	7M	CO1	L3																
(OR)																				
2.	A ball bearing operates on the following work cycle: <table><tr><th>Element No.</th><th>Radial load (N)</th><th>Speed (R.P.M)</th><th>Element time (%)</th></tr><tr><td>1</td><td>3000</td><td>720</td><td>30</td></tr><tr><td>2</td><td>7000</td><td>1440</td><td>40</td></tr><tr><td>3</td><td>5000</td><td>900</td><td>30</td></tr></table> The dynamic load capacity of the bearing is 16600N. Calculate (i) the average speed of rotation, (ii) The equivalent radial load; and (iii) The bearing life.	Element No.	Radial load (N)	Speed (R.P.M)	Element time (%)	1	3000	720	30	2	7000	1440	40	3	5000	900	30	14M	CO1	L3
Element No.	Radial load (N)	Speed (R.P.M)	Element time (%)																	
1	3000	720	30																	
2	7000	1440	40																	
3	5000	900	30																	
3.	Design a connecting rod for an I.C. engine running at 1800 r.p.m. and developing a maximum pressure of 3.15 N/mm ² . The diameter of the piston is 100 mm; mass of the reciprocating parts per cylinder 2.25kg; length of connecting rod 380 mm; stroke of piston 190 mm and compression ratio 6:1. Take a factor of safety of 6 for the design. Take length to diameter ratio for big end bearing as 1.3 and small end bearing as 2 and the corresponding bearing pressures as 10 N/mm ² and 15 N/mm ² . The density of material of the rod may be taken as 8000 kg/m ³ and the allowable stress in the bolts as 60 N/mm ² and in cap as 80 N/mm ² . The rod is to be of I-section for which you can choose your own proportions.	14M	CO2	L4																
(OR)																				
4(a)	State the function of the following for an internal combustion engine piston: (i) Ribs; (ii) Piston rings; (iii) Piston skirt; and (iv) Piston pin.	7M	CO2	L2																
(b)	Explain the design procedure of a centre crankshaft when the crank is at the TDC position, and subjected to maximum bending moment and no torsional moment.	7M	CO2	L3																
5(a)	Discuss the different types of belts and their material used for power transmission.	4M	CO3	L2																

20ME19-DEGINE OF MACHINE ELEMENTS-II

(b)	An open belt 100 mm wide connects two pulleys mounted on parallel shafts with their centres 2.4 m apart. The diameter of the larger pulley is 450 mm and that of the smaller pulley 300 mm. The coefficient of friction between the belt and the pulley is 0.3 and the maximum stress in the belt is limited to 14 N/mm width. If the larger pulley rotates at 120 r.p.m., find the maximum power that can be transmitted.	10M	CO3	L3
(OR)				
6.	A compressor, requiring 90 kW, is to run at about 250 r.p.m. The drive is by V-belts from an electric motor running at 750 r.p.m. The diameter of the pulley on the compressor shaft must not be greater than 1 metre while the centre distance between the pulleys is limited to 1.75 metre. The belt speed should not exceed 1600 m / min. Determine the number of V-belts required to transmit the power if each belt has a cross-sectional area of 375 mm ² , density 1000 kg/ m ³ and an allowable tensile stress of 2.5 MPa. The groove angle of the pulleys is 35°. The coefficient of friction between the belt and the pulley is 0.25. Calculate also the length required of each belt.	14M	CO3	L4
7(a)	Explain the utility of the centre bolt and U-clamp in a leaf spring.	4M	CO4	L2
(b)	A helical spring is made from a wire of 6 mm diameter and has outside diameter of 75 mm. If the permissible shear stress is 350 MPa and modulus of rigidity 84 kN/mm ² , find the axial load which the spring can carry and the deflection per active turn.	10M	CO4	L3
(OR)				
8(a)	A helical compression spring made of oil tempered carbon steel, is subjected to a load which varies from 400 N to 1000 N. The spring index is 6 and the design factor of safety is 1.25. If the yield stress in shear is 770 MPa and endurance stress in shear is 350 MPa, find: (i) Size of the spring wire, (ii). Diameters of the spring, (iii). Number of turns of the spring, and (iv). Free length of the spring. The compression of the spring at the maximum load is 30 mm. The modulus of rigidity for the spring material may be taken as 80kN/mm ² .	10M	CO4	L3
(b)	What is nipping in a leaf spring? List the materials commonly used for the manufacture of the leaf spring.	4M	CO4	L2
9.	A pair of 20° full-depth involute tooth spur gears is to transmit 30 kW at a speed of 250 r.p.m. of the pinion. The velocity ratio is 1:4. The pinion is made of cast steel having an allowable static stress, $\sigma_o=100\text{MPa}$, while the gear is made of cast iron having allowable static stress, $\sigma_o = 55 \text{ MPa}$. The pinion has 20 teeth and its face width is 12.5 times the module. Determine the module, face width and pitch diameters of both the pinion and gear from the standpoint of strength only taking velocity factor into consideration. The tooth form factor is given by the expression $y = 0.154 - \frac{0.912}{\text{No.of teeth}}$ and velocity factor is given by $C_v = \frac{3}{3+v}$, where v is the peripheral speed of the gear in m/s.	14M	CO5	L4
(OR)				
10(a)	Explain the following terms used in helical gears : (i) Helix angle; (ii) normal pitch; and (iii) axial pitch.	4M	CO5	L2
(b)	A pair of helical gears with 30° helix angle is used to transmit 15 kW at 10,000 r.p.m. of the pinion. The velocity ratio is 4 : 1. Both the gears are to be made of hardened steel of static strength 100 N/mm ² . The gears are 20° stub and the pinion is to have 24 teeth. The face width may be taken as 14 times the module. Find the module and face width from the standpoint of strength.	10M	CO5	L4

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

B.Tech. (VI Semester) Supplementary Examinations

20CE82-DISASTER MANAGEMENT

((AI&DS),CSE,CSE(AI&ML) and IT)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Illustrate the disaster management cycle with a labeled diagram and describe its phases: mitigation, preparedness, response, and recovery.	7M	CO1	L1
(b)	Analyze the various types of disasters based on their origin (natural or man-made) and discuss their primary causes and impacts.	7M	CO1	L1
(OR)				
2(a)	Examine the causes and consequences of nuclear and chemical disasters, highlighting examples of past incidents and lessons learned.	7M	CO1	L1
(b)	Summarize the key provisions of the Disaster Management Act 2005 and assess its impact on disaster preparedness and response in India.	7M	CO1	L1
3(a)	Describe how cyclones affect habitation, agriculture, and livelihoods. Provide examples.	7M	CO2	L1
(b)	Explain the effects of malnutrition caused by disasters. How does it impact children and long-term societal development?	7M	CO2	L1
(OR)				
4(a)	Discuss the livelihood challenges faced by disaster-affected communities and propose strategies for recovery.	7M	CO2	L1
(b)	Evaluate the specific risks faced by livestock during natural disasters like cyclones and landslides. What measures can mitigate these risks?	7M	CO2	L1
5(a)	Explain the role of remote sensing in disaster monitoring and early warning systems. Provide specific examples.	7M	CO3	L1
(b)	Discuss the application of technology in post-disaster recovery of infrastructure. Provide case studies or examples.	7M	CO3	L1
(OR)				
6(a)	Explain how geospatial information can be used to assess drought impacts in agriculture.	7M	CO3	L1
(b)	Compare the effectiveness of remote sensing and multimedia tools in disaster management for various scenarios.	7M	CO3	L1
7(a)	Explain the significance of planning in disaster management and its role in reducing disaster impact.	7M	CO4	L1
(b)	Describe the steps involved in crisis intervention during disasters. Provide examples from real-world situations.	7M	CO4	L1
(OR)				
8(a)	Analyze the impact of river erosion disasters on affected communities and discuss suitable response measures.	7M	CO4	L1
(b)	What strategies can be employed to respond effectively to droughts and minimize agricultural and livelihood losses?	7M	CO4	L1
9(a)	How can community capacity be built to take effective action during disasters? Suggest practical strategies.	7M	CO5	L1
(b)	Discuss the role of voluntary agencies in community-based disaster recovery efforts.	7M	CO5	L1
(OR)				
10(a)	What are the essential elements of education and awareness programs aimed at disaster risk prevention?	7M	CO5	L1
(b)	Discuss a case study of a major disaster, highlighting the role of technology in mitigating its impacts.	7M	CO5	L1

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

20EC82-ELEMENTS OF COMMUNICATION SYSTEMS

(ASE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Discuss the linearity and non-linearity properties of systems with examples.	7M	CO1	L2
(b)	Determine the linearity and time-invariance properties of the following systems : (i) $y(t) = x(t^2)$ (ii) $y(t) = e^{2x(t)}$	7M	CO1	L3
(OR)				
2(a)	Explain the properties of time-variance and time-invariance systems with examples.	7M	CO1	L2
(b)	Determine the time-invariance and causality properties of the following systems: (i) $y(t) = 2x^2(t)$ (ii) $y(t) = 2x(t) + 4$.	7M	CO1	L3
3(a)	Summarize the definition, derivation and the importance of the impulse response of linear systems.	7M	CO2	L2
(b)	A system produces an output $y(t) = e^{-t} u(t)$ for an input $x(t) = e^{-2t} u(t)$. Determine the impulse response.	7M	CO2	L3
(OR)				
4(a)	Elucidate the concept of transmission of a signal through LTI system.	7M	CO2	L2
(b)	Consider a stable LTI system characterized by the differential equation $\frac{dy(t)}{dt} + 6y(t) = 4x(t)$. Find its impulse response.	7M	CO2	L3
5(a)	Illustrate white noise and colored noise in terms of their characteristics.	7M	CO1	L2
(b)	Paraphrase the following terms: (i) Noise figure (ii) Noise temperature	7M	CO1	L2
(OR)				
6(a)	Interpret narrowband noise and represent it in mathematical terms.	7M	CO3	L2
(b)	Demonstrate the power spectral density of in-phase and quadrature components of noise.	7M	CO3	L2
7(a)	Elucidate the transmission of an AM signal with a block diagram.	7M	CO4	L2
(b)	Discuss the working principle of a super heterodyne receiver.	7M	CO4	L2
(OR)				
8(a)	Describe the transmission of an FM signal using parameter variation method.	7M	CO4	L2
(b)	Interpret the limitations of a TRF receiver with an example.	7M	CO4	L2
9(a)	Discuss various types of losses in transmission lines.	7M	CO2	L2
(b)	Restate the following terms: (i) Characteristic impedance (ii) Standing waves	7M	CO2	L1
(OR)				
10(a)	Classify antennas based on the type of radiation and explain each with necessary figures.	7M	CO2	L1
(b)	Discuss the working principle of an antenna with a parabolic reflector.	7M	CO4	L2

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.:: A.P.
B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

20IT84-CYBER SECURITY AND DIGITAL FORENSICS

(CE,EEE&ME)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Describe the various categories of cybercriminals and their methods of operation within the realm of cybercrime.	7M	CO1	L2
(b)	Explain the intersection between cybercrime and information security, emphasizing the significance of this relationship.	7M	CO1	L2
(OR)				
2(a)	Explain how network and computer attacks play a role in the domain of cybercrime.	7M	CO1	L2
(b)	Describe the security measures implemented by cybercafés to reduce the risk factors associated with potential cybercrimes.	7M	CO1	L2
3(a)	Discuss the impact of keyloggers and spyware on digital security and privacy, and outline the methods for detecting and removing these threats from individuals' and businesses' systems.	7M	CO2	L2
(b)	Differentiate between viruses and worms in the context of cyber threats.	7M	CO2	L2
(OR)				
4(a)	Explain the role of ports in networking and how port scanning helps attackers identify potential entry points in a target system.	7M	CO2	L2
(b)	Summarize the importance of user inputs in SQL Injection attacks and elaborate on how attackers exploit vulnerabilities in input handling mechanisms to carry out these attacks.	7M	CO2	L2
5(a)	Describe wireless forensics in cyber investigations and its limitations.	7M	CO3	L2
(b)	Explain the foundational terminology and essential principles of network forensics.	7M	CO3	L2
(OR)				
6(a)	Discuss the process of collecting and preserving email evidence during a digital forensic investigation.	7M	CO3	L2
(b)	Summarize the concept of mobile forensics and its significance.	7M	CO3	L2
7(a)	Examine the procedure for gathering digital evidence in criminal investigations and Discuss the obstacles involved in its preservation.	7M	CO4	L3
(b)	Examine the role of bootloader components such as GRUB (Grand Unified Bootloader) and UEFI (Unified Extensible Firmware Interface) in the boot process of Linux and Windows operating systems, respectively.	7M	CO4	L3
(OR)				
8(a)	Illustrate the importance of browser artifacts in use of digital forensics.	7M	CO4	L3
(b)	Examine the tools and techniques used by forensic investigators to capture and preserve digital evidence.	7M	CO4	L3
9(a)	Analyze how forensic tools used for encryption and decryption provides support to cyber forensic analysts.	7M	CO5	L4
(b)	Infer how forensic tools affect digital evidence admissibility in cyber forensics, emphasizing integrity verification, hashing, and collaborative integrity maintenance.	7M	CO5	L4
(OR)				
10(a)	Outline the significance of forensic tools designed for data recovery in digital investigations.	7M	CO5	L4
(b)	Classify the importance of forensic tools in scrutinizing network-related evidence in the realm of cybercrime investigations.	7M	CO5	L4

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

**20ME83-OPERATIONS RESEARCH TECHNIQUES
(ECE)**

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL																																										
1(a)	State the advantages and limitations of Operations Research.	7M	CO1	L1																																										
(b)	Solve the following LP problem graphically to Maximize $Z = 2X_1 + X_2$ subjected to $x_1 + 2x_2 \leq 10, \quad x_1 + x_2 \leq 6, \quad x_1 - x_2 \leq 2, \quad x_1 - 2x_2 \leq 1$ $x_1, x_2 \geq 0$	7M	CO1	L3																																										
(OR)																																														
2(a)	Use Simplex method to solve the following LP problem Maximize, $Z = 4X_1 + 3X_2 + 6X_3$ Subject to $2x_1 + 3x_2 + 2x_3 \leq 440, \quad 4x_1 + 3x_3 \leq 470$ $2x_1 + 5x_2 \leq 430$ and $x_1, x_2, x_3 \geq 0$.	10M	CO1	L3																																										
(b)	Define the following and indicate their significance in LPP (i) Slack variables, (ii) Artificial variables	4M	CO1	L1																																										
(OR)																																														
3(a)	What do you mean by Balanced Transportation and Unbalanced Transportation?	7M	CO2	L1																																										
(b)	Find the basic feasible solution of the following transportation problem by Least cost cell method. <table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>Available</td></tr><tr><td>A</td><td>4</td><td>3</td><td>1</td><td>2</td><td>6</td><td>80</td></tr><tr><td>B</td><td>5</td><td>2</td><td>3</td><td>4</td><td>5</td><td>60</td></tr><tr><td>C</td><td>3</td><td>5</td><td>6</td><td>3</td><td>2</td><td>40</td></tr><tr><td>D</td><td>2</td><td>4</td><td>4</td><td>5</td><td>3</td><td>20</td></tr><tr><td>Required</td><td>60</td><td>60</td><td>30</td><td>40</td><td>10</td><td></td></tr></table>		1	2	3	4	5	Available	A	4	3	1	2	6	80	B	5	2	3	4	5	60	C	3	5	6	3	2	40	D	2	4	4	5	3	20	Required	60	60	30	40	10		7M	CO2	L4
	1	2	3	4	5	Available																																								
A	4	3	1	2	6	80																																								
B	5	2	3	4	5	60																																								
C	3	5	6	3	2	40																																								
D	2	4	4	5	3	20																																								
Required	60	60	30	40	10																																									
(OR)																																														
4(a)	Illustrate the procedure of travelling salesman problem.	7M	CO2	L2																																										
(b)	Solve the following Assignment problem. The matrix entries are processing cost in hundreds. <table><tr><td>Operator</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr><tr><td rowspan="5">JOB</td><td>1</td><td>11</td><td>17</td><td>8</td><td>16</td><td>20</td></tr><tr><td>2</td><td>9</td><td>7</td><td>12</td><td>6</td><td>15</td></tr><tr><td>3</td><td>13</td><td>16</td><td>15</td><td>12</td><td>16</td></tr><tr><td>4</td><td>21</td><td>24</td><td>17</td><td>28</td><td>26</td></tr><tr><td>5</td><td>14</td><td>10</td><td>12</td><td>11</td><td>13</td></tr></table>	Operator	A	B	C	D	E	JOB	1	11	17	8	16	20	2	9	7	12	6	15	3	13	16	15	12	16	4	21	24	17	28	26	5	14	10	12	11	13	7M	CO2	L3					
Operator	A	B	C	D	E																																									
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	3	13	16	15	12	16																																								
	4	21	24	17	28	26																																								
	5	14	10	12	11	13																																								
(OR)																																														
5(a)	Solve 3x3 game by the method of matrices. <table><tr><td colspan="2" rowspan="2"></td><td colspan="3">Player B</td></tr><tr><td></td><td></td><td></td></tr><tr><td rowspan="4">Player A</td><td></td><td>1</td><td>2</td><td>3</td></tr><tr><td>1</td><td>1</td><td>-1</td><td>-1</td></tr><tr><td>2</td><td>-1</td><td>-1</td><td>3</td></tr><tr><td>3</td><td>-1</td><td>2</td><td>-1</td></tr></table>			Player B						Player A		1	2	3	1	1	-1	-1	2	-1	-1	3	3	-1	2	-1	7M	CO3	L4																	
				Player B																																										
Player A		1	2	3																																										
	1	1	-1	-1																																										
	2	-1	-1	3																																										
	3	-1	2	-1																																										
(b)	Write the assumptions and major limitations of game theory.	7M	CO3	L1																																										
(OR)																																														

20ME83-OPERATIONS RESEARCH TECHNIQUES

6(a)	List the assumptions in sequencing problems.	7M	CO3	L1																																																		
(b)	A machine operator has to perform two operations, turning and threading on a number of different jobs. The time required to perform these operations (in minutes) for each job in mention below table. Minimize the time required to complete first turning and then threading. Also find the total processing time and ideal time for turning and threading operations. <table><tr><td>Job</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>Time for turning</td><td>3</td><td>12</td><td>5</td><td>2</td><td>9</td><td>11</td></tr><tr><td>Time for threading</td><td>8</td><td>10</td><td>9</td><td>6</td><td>3</td><td>1</td></tr></table>	Job	1	2	3	4	5	6	Time for turning	3	12	5	2	9	11	Time for threading	8	10	9	6	3	1	7M	CO3	L4																													
Job	1	2	3	4	5	6																																																
Time for turning	3	12	5	2	9	11																																																
Time for threading	8	10	9	6	3	1																																																
7.	A manufacturer is offered two machines A and B. A has cost price of Rs. 2,600, its running cost is Rs. 400 for each of the first 6 years and increases by Rs. 100 every subsequent year. Machine B, having the same capacity as A, costs Rs. 1,250, has running cost of Rs.500 for 5 years, increasing by Rs. 100 per year thereafter. If money is worth 10% per year, which machine should be purchased? Scrap value of both machines is negligibly small.	14M	CO4	L4																																																		
(OR)																																																						
8(a)	What are the different queue formations? Explain single channel and single service model with appropriate diagram.	7M	CO4	L1																																																		
(b)	A self-service store employs one cashier at its counter. An average of ten customers arrives every 6 minutes while the cashier can serve 12 customers in 6 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service rate, find (i) Average number of customers in the system (ii) Average number of customers in the queue or average queue length. (iii) Average time a customer spends in the system (iv) Average time a customer waits before being served.	7M	CO4	L3																																																		
9(a)	What are the causes of poor inventory?	7M	CO5	L1																																																		
(b)	A stockist has to supply 12,000 units of a product per year to his costumer. The demand is fixed and known and shortage cost is assumed is to be infinite. The inventory holding cost is Rs.0.2 per unit per month and ordering cost per order is Rs.350. Determine (i) The optimum lot size (ii) Optimum scheduling period (iii) Minimum total variable yearly cost.	7M	CO5	L3																																																		
(OR)																																																						
10.	An oil company has 8 units of money available for exploration of three sites. If the oil is present at a site the probability of finding it depending upon the amount of allocated for exploiting the site as given below find the optimal allocation of money. <table><tr><td colspan="10">Units of money allocated</td></tr><tr><td></td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>Site 1</td><td>0</td><td>0</td><td>4</td><td>8</td><td>12</td><td>20</td><td>28</td><td>36</td><td>40</td></tr><tr><td>Site 2</td><td>0</td><td>3</td><td>6</td><td>9</td><td>12</td><td>18</td><td>21</td><td>24</td><td>30</td></tr><tr><td>Site 3</td><td>0</td><td>2</td><td>2</td><td>4</td><td>6</td><td>10</td><td>16</td><td>18</td><td>20</td></tr></table>	Units of money allocated											0	1	2	3	4	5	6	7	8	Site 1	0	0	4	8	12	20	28	36	40	Site 2	0	3	6	9	12	18	21	24	30	Site 3	0	2	2	4	6	10	16	18	20	14M	CO5	L4
Units of money allocated																																																						
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Site 3	0	2	2	4	6	10	16	18	20																																													

H.T.No

07 APR 2026

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)**

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

B.Tech. (VI Semester) Supplementary Examinations

20AD83-INTRODUCTION TO MACHINE LEARNING

(EEE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	List and explain the Activities of Machine Learning.	7M	CO1	L2
(b)	Explain the main challenges in Machine Learning.	7M	CO1	L2
(OR)				
2(a)	Discuss the various types of Machine Learning.	7M	CO1	L2
(b)	Differentiate Machine Learning and Deep Learning.	7M	CO1	L2
3(a)	How to Evaluate Performance of a model in Machine Learning?	7M	CO2	L2
(b)	What is PCA? Explain about principal components.	7M	CO2	L2
(OR)				
4(a)	What are the Basics of Feature Engineering?	7M	CO2	L1
(b)	What do you meant by feature transformation and feature construction?	7M	CO2	L2
5(a)	What are the Assumptions in Regression Analysis?	7M	CO3	L1
(b)	What is regression? Explain types of regression.	7M	CO3	L2
(OR)				
6(a)	What do you mean by linear regression? Which applications are best modelled by linear Regression?	7M	CO3	L1
(b)	Can Logistic regression be used for classification or regression? Justify.	7M	CO3	L2
7(a)	Explain in detail about Support vector machines.	7M	CO4	L2
(b)	Explain the concept and working of Random Forest Model.	7M	CO4	L2
(OR)				
8(a)	What Are the Applications of Supervised Machine Learning in Modern Businesses?	7M	CO4	L2
(b)	Discuss the k-nearest neighbor learning classification and also discuss its remarks.	7M	CO4	L2
9(a)	Briefly explain Gradient Boosting Machines.	7M	CO5	L2
(b)	What is XGBoost and why is it popular?	7M	CO5	L2
(OR)				
10(a)	Explain the concept of bagging in ensemble learning.	7M	CO5	L2
(b)	What is AdaBoost and how does it work?	7M	CO5	L2

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

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

20AD81-INTRODUCTION TO ARTIFICIAL INTELLIGENCE

(ME)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Illustrate types of an agents in Artificial Intelligence.	10M	CO1	L2
(b)	Describe any three features of Environment.	4M	CO1	L2
(OR)				
2(a)	Discuss the concept of Rationality and Structure of an Agents.	7M	CO1	L2
(b)	Explain the historical development of AI, highlighting key milestones and breakthroughs in the field.	7M	CO1	L2
3(a)	Implement different steps used in Problem Formulation with an example.	7M	CO2	L3
(b)	Describe the Heuristic and blind search strategies.	7M	CO2	L2
(OR)				
4(a)	Differentiate between A* and AND-OR Algorithms.	7M	CO2	L2
(b)	Demonstrate the A* algorithm using suitable example.	7M	CO2	L3
5(a)	Implement DLS Search technique.	7M	CO3	L3
(b)	Develop bi-directional search algorithm with an example.	7M	CO3	L3
(OR)				
6(a)	Explain DFS Algorithm. Describe the rules and applications of DFS. Explain the step-by-step process of DFS for the following example.	7M	CO3	L2
(b)	Compare all Uninformed Search strategies.	7M	CO3	L2
7(a)	Demonstrate Minimax Algorithm with an example.	7M	CO4	L3
(b)	Demonstrate Alpha-Beta pruning with suitable Example.	7M	CO4	L3
(OR)				
8(a)	Examine the Issues in knowledge representation.	7M	CO4	L2
(b)	Discuss the approaches of Knowledge Representation.	7M	CO4	L2
9(a)	Explain the following concepts of Mental Events and Mental Objects.	7M	CO5	L2
(b)	Illustrate the different Categories and Objects in Artificial Intelligence.	7M	CO5	L3
(OR)				
10(a)	Discuss in detail about Propositional Logic.	7M	CO5	L2
(b)	Differentiate between Forward and Backward Reasoning.	7M	CO5	L2

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)**

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

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

20IT01-SOFTWARE ENGINEERING

(AI&DS)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Discuss briefly about Evolutionary process models with neat diagram.	7M	CO1	L3
(b)	Explain briefly about Component based Development model.	7M	CO1	L2
(OR)				
2(a)	Sketch RAD model in the context of Software Process.	7M	CO1	L2
(b)	Illustrate Umbrella activities present in Software Engineering.	7M	CO1	L2
3(a)	Discuss the salient features of Design process.	7M	CO2	L2
(b)	Illustrate the features of a good SRS document.	7M	CO2	L2
(OR)				
4(a)	What are the different steps in requirements engineering?	7M	CO2	L1
(b)	Distinguish between functional and non-functional requirements.	7M	CO2	L2
5(a)	Describe the Class diagram for Point-of-sale system.	7M	CO3	L3
(b)	Discuss the basic building blocks of UML.	7M	CO3	L2
(OR)				
6(a)	What are the nine diagrams of UML and give examples.	7M	CO3	L1
(b)	Illustrate the Swimlane diagram for Hospital Management.	7M	CO3	L2
7(a)	Outline a State-chart diagram for ATM.	7M	CO4	L3
(b)	Draw an Activity diagram for Cab booking system.	7M	CO4	L2
(OR)				
8(a)	Draw an Activity diagram for Library Management system.	7M	CO4	L2
(b)	Construct the Collaboration diagram for Railway Reservation System.	7M	CO4	L2
9(a)	Write short notes on internal and external views of testing.	7M	CO5	L2
(b)	What is the use of integration testing? Explain its types.	7M	CO5	L2
(OR)				
10(a)	Summarize Unit testing with merits and demerits.	7M	CO5	L2
(b)	Elaborate debugging techniques in Software Testing.	7M	CO5	L2

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

20CE22-CONSTRUCTION MANAGEMENT

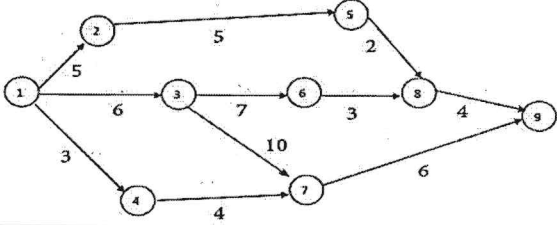
(CE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Describe the main objectives and applications of construction management.	7M	CO1	L2
(b)	Give an account as to how the construction sector in India is helping to overcome un-employment.	7M	CO1	L2
(OR)				
2(a)	Mention the qualities for appointing a construction manager for a large construction project.	7M	CO1	L1
(b)	Describe the phases in the life cycle of a construction project.	7M	CO1	L2
3(a)	Define scheduling. Mention the uses and advantages of scheduling.	10M	CO2	L2
(b)	State the advantages and disadvantages of a line organization.	4M	CO1	L1
(OR)				
4(a)	What is Gantt bar chart? Explain, with the help of a suitable example, the method of preparing a bar chart	7M	CO1	L1
(b)	Explain why planning is necessary. Describe various steps for planning a project.	7M	CO1	L2
5(a)	Describe the steps involved in classifying items using ABC analysis technique in inventory control.	7M	CO3	L2
(b)	Discuss the need for mechanization in construction projects.	7M	CO3	L2
(OR)				
6(a)	Discuss the importance of materials management.	7M	CO3	L2
(b)	Define labour productivity, with factors affecting job site productivity.	7M	CO3	L1
7.	The network for a project with estimated duration in days is shown below. Determine the slack of each event as well as the critical path. 	14M	CO2	L3
(OR)				
8(a)	What is slack? Enumerate the different types of slack.	7M	CO2	L1
(b)	Discuss the time estimates used in PERT. Explain with their significance.	7M	CO2	L2
9(a)	Describe in detail, the following terms (i) R.A Bill (ii) Nominal Muster roll.	10M	CO4	L2
(b)	What is a tender? Indicate the information provided in the tender notice.	4M	CO4	L1
(OR)				
10(a)	Discuss the importance of M-book and state the procedure for making entries in it.	10M	CO4	L2
(b)	Describe the term 'Muster roll'.	4M	CO4	L2

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

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

20CS21-INFORMATION RETRIEVAL SYSTEMS

(CSE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Describe the Functional Overview of Information Retrieval System.	7M	CO1	L2
(b)	What is a Browse capability? Explain about various Browse Capabilities.	7M	CO1	L1
(OR)				
2(a)	How the Information Retrieval System is related to Database Management System?	7M	CO1	L2
(b)	Summarize the similarities and differences between use of Fuzzy Searches and Term Masking.	7M	CO1	L2
3(a)	What is Stemming? Discuss the Porter Stemming Algorithm.	7M	CO2	L1
(b)	Discuss the usage of Cataloging and Indexing in Information Retrieval Systems.	7M	CO2	L2
(OR)				
4(a)	Discuss in detail about Signature File Data Structures in IRS.	7M	CO2	L2
(b)	What is Indexing? Discuss Full Item indexing, Public File Indexing and Private File Indexing with neat diagram.	7M	CO2	L1
5(a)	Describe the Concept Indexing with an example.	7M	CO3	L2
(b)	Discuss various techniques in Automatic Term Clustering.	7M	CO3	L2
(OR)				
6(a)	Discuss the role of Automatic Indexing in Natural languages.	7M	CO3	L2
(b)	What is Clustering? Explain in detail about Item Clustering.	7M	CO3	L1
7(a)	Why is Relevance Feedback required in User Search Techniques?	7M	CO4	L2
(b)	Describe the briefly the concept Cognition and Perception.	7M	CO4	L2
(OR)				
8(a)	What is a Similarity Measure? Why Normalization factor is required for Similarity Measures?	7M	CO4	L1
(b)	Describe the need of Information Visualization.	7M	CO4	L2
9(a)	How Finite State Automata is used for Hardware and Software searchers?	7M	CO5	L2
(b)	Differentiate hardware versus software text search algorithms.	7M	CO5	L2
(OR)				
10(a)	Describe the Boyer-Moore Text Search algorithm with an example.	7M	CO5	L2
(b)	Discuss the importance of Measures used in Information System Evaluation.	7M	CO5	L2

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

20EC19-SATELLITE COMMUNICATIONS

(ECE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Describe the general structure of satellite communication system.	7M	CO1	L2
(b)	Interpret the different frequency allocations used for satellite services.	7M	CO1	L2
(OR)				
2(a)	List the different types of launch vehicles and discuss the same with example.	7M	CO2	L2
(b)	Compare LEO, MEO, GEO.	7M	CO2	L2
3(a)	Give the concepts of the Geo-stationary and non-geo-stationary satellites.	7M	CO2	L2
(b)	Discuss the Orbital elements with the help of neat sketch.	7M	CO2	L2
(OR)				
4(a)	Discuss about the (i) Orbital Perturbations (ii) Station keeping.	7M	CO2	L2
(b)	Find the (i) orbital time period (ii) eccentricity for a satellite whose apogee height is 8000 km and perigee height is 3000km. Assume radius of earth 6378km.	7M	CO3	L3
5(a)	Explain about attitude control of a satellite systems.	7M	CO2	L2
(b)	Describe the functions of telemetry, tracking and command (TT&C) control and monitoring in a space segment.	7M	CO2	L2
(OR)				
6(a)	Obtain the relation between C/N and G/T ratio of an earth station.	7M	CO2	L3
(b)	Discuss the functions of single conversion bent-pipe transponder.	7M	CO2	L2
7(a)	Distinguish between pre-assigned FDMA and demand assigned FDMA.	7M	CO4	L2
(b)	Interpret the design requirements for the Earth station.	7M	CO1	L2
(OR)				
8(a)	Describe the frame structure of a TDMA system with reference burst and traffic burst.	7M	CO4	L2
(b)	Summarize the operation of pre-assigned FDMA With the help of block diagram.	7M	CO4	L2
9(a)	Draw the functional block diagram and operation of DBSTV.	7M	CO1	L2
(b)	Explain the working principle of GPS .	7M	CO1	L2
(OR)				
10(a)	Discuss the working of MSAT with diagram.	7M	CO2	L2
(b)	Summarize the concept of VSAT.	7M	CO2	L2

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

20EC18-IMAGE PROCESSING

(ECE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Differentiate between Binary, Gray Scale and Color images.	7M	CO1	L2
(b)	Discuss about the following relationships between two given pixels. (i) Neighborhood (ii) Adjacency (iii).Distance measures.	7M	CO1	L2
(OR)				
2(a)	Interpret the concepts of image sampling and quantization with neat diagram.	7M	CO1	L2
(b)	Discuss about 2D Discrete Cosine Transformation along with its properties.	7M	CO1	L3
3(a)	Examine the role of Log and Power Law transformations for image enhancement process with necessary example.	7M	CO2	L3
(b)	Illustrate the manner in which linear filters are used image smoothing in spatial domain enhancement.	7M	CO2	L3
(OR)				
4(a)	Obtain the Histogram equalization for the given 3-bit image $f(x, y) = \begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$	7M	CO2	L3
(b)	Demonstrate that Laplacian can be used for image enhancement in frequency domain with necessary expressions.	7M	CO2	L3
5(a)	Illustrate the techniques used for detection of isolated points in image segmentation.	7M	CO3	L2
(b)	Explain the process of edge linking using local processing.	7M	CO3	L2
(OR)				
6(a)	Discuss about the local thresholding method with neat schematics.	7M	CO3	L2
(b)	Illustrate the concept of region splitting and merging in image segmentation.	7M	CO3	L2
7.	Explain the noise models with necessary expressions used in image restoration.	14M	CO4	L2
(OR)				
8(a)	Discuss the coding redundancy with an example.	7M	CO4	L2
(b)	Examine the process of loss less predictive coding technique in image compression.	7M	CO4	L2
9(a)	With necessary diagram explain the Chromaticity and color gamut with necessary diagram.	7M	CO1	L2
(b)	Explain the RGB color model with neat schematics.	7M	CO1	L2
(OR)				
10(a)	Discuss the logical operations involved in binary image analysis with relevant example.	7M	CO1	L2
(b)	Illustrate the process of smoothening of image features using opening operation.	7M	CO1	L2

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram – 521 230 :: N.T.R Dist.: A.P.

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

**20EE21-INTELLIGENT CONTROL SYSTEMS
(EEE)**

Time : 3 hours

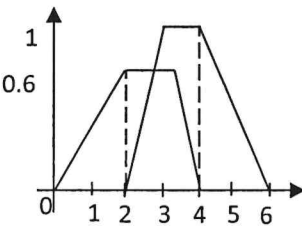
Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

All questions carry equal marks																																					
Q.No	Questions	Marks	CO	BL																																	
1(a)	Determine the response of every neuron in the output layer for single layer feed forward neural network with 3 input neurons and 3 output neurons with the following input data $X = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \quad \text{weights } W = \begin{bmatrix} 1 & 0.5 & 0 \\ 0 & 1 & 0.5 \\ 1 & 0.5 & 1 \end{bmatrix}$	7M	CO1	L3																																	
(b)	Using Mc-Cullouch Pitts model implement the following logic function (i) AND logic (ii) OR logic (iii) NAND logic.	7M	CO1	L2																																	
(OR)																																					
2(a)	List out the learning rules of the Artificial Neural Network.	7M	CO2	L2																																	
(b)	Draw the Schematic block diagram of a Biological Neuron and Describe its Functionality.	7M	CO1	L2																																	
3(a)	Using perceptron algorithm train following ANN and use TLU binary values as +1 or -1 $a_1 = \begin{bmatrix} 2 \\ -1 \end{bmatrix}, d_1 = 1 \quad a_2 = \begin{bmatrix} 0 \\ 3 \end{bmatrix}, d_2 = -1$ $a_3 = \begin{bmatrix} -1 \\ 0 \end{bmatrix}, d_3 = 1 \quad a_4 = \begin{bmatrix} 2 \\ -1 \end{bmatrix}, d_4 = 1$ Find modified weights after 2 nd iteration.	7M	CO2	L3																																	
(b)	Discuss the topology of multilayer perceptron with its architecture.	7M	CO2	L2																																	
(OR)																																					
4(a)	A Kohonen's Self organizing map is shown with weights $W = \begin{bmatrix} 0.2 & 0.6 & 0.4 & 0.9 & 0.2 \\ 0.3 & 0.5 & 0.7 & 0.6 & 0.8 \end{bmatrix}$ (i) Using the Square Euclidean distance find the output unit O_j that is closest to the input vector (0.3 0.4) (ii) Using a learning rate of 0.3 find the new weights for unit O_j	7M	CO3	L3																																	
(b)	Summarize the Several Potential application of ANN.	7M	CO2	L2																																	
5(a)	Train the following ANN using BAM when the following input output vectors are present, use bipolar activation function. <table><tr><th>patterns</th><th>x1</th><th>x2</th><th>x3</th><th>x4</th><th>x5</th><th>x6</th><th>y1</th><th>y2</th><th>y3</th><th>y4</th></tr><tr><td>1st</td><td>1</td><td>-1</td><td>1</td><td>-1</td><td>1</td><td>1</td><td>-1</td><td>-1</td><td>-1</td><td>1</td></tr><tr><td>2nd</td><td>-1</td><td>-1</td><td>1</td><td>1</td><td>-1</td><td>-1</td><td>1</td><td>-1</td><td>-1</td><td>1</td></tr></table>	patterns	x1	x2	x3	x4	x5	x6	y1	y2	y3	y4	1st	1	-1	1	-1	1	1	-1	-1	-1	1	2nd	-1	-1	1	1	-1	-1	1	-1	-1	1	7M	CO3	L3
patterns	x1	x2	x3	x4	x5	x6	y1	y2	y3	y4																											
1st	1	-1	1	-1	1	1	-1	-1	-1	1																											
2nd	-1	-1	1	1	-1	-1	1	-1	-1	1																											

20EE21-INTELLIGENT CONTROL SYSTEMS

(b)	Draw the architecture of Fully connected Recurrent Neural networks.	7M	CO3	L2
(OR)				
6(a)	Discuss about how a Long Short Term Memory Network works.	7M	CO3	L2
(b)	Distinguish between Hetero Associative Memory and Auto Associative Memories.	7M	CO3	L2
(OR)				
7(a)	For the following fuzzy sets $A = \left\{ \frac{1}{2} + \frac{0}{3} + \frac{0.5}{4} + \frac{0.2}{5} \right\}; B = \left\{ \frac{0.5}{2} + \frac{0.7}{3} + \frac{0.2}{4} + \frac{0.4}{5} \right\}$ Find (i) Complement (ii) Union (iii) Intersection (iv) Difference (v) De morgan's $\overline{A \cup B} = \overline{A} \cap \overline{B}; \overline{A \cap B} = \overline{A} \cup \overline{B}$.	7M	CO4	L3
(b)	Summarize the properties of Fuzzy sets.	7M	CO4	L2
(OR)				
8(a)	Describe the following fuzzy membership value assignment methods (i) Intuition (ii) Inference (iii) Rank ordering (iv) Genetic Algorithm.	7M	CO4	L2
(b)	State and Discuss about Min-Max and Max-Average methods for Fuzzy Relations with an example.	7M	CO4	L3
(OR)				
9(a)	Using Centre of sums method, Weighted average method and Mean Max method; Determine defuzzified output for given fuzzy set. 	7M	CO5	L3
(b)	Explain the Fuzzy Logic Control system with block diagrams with example.	7M	CO5	L3
(OR)				
10.	Design a fuzzy controller to determine the wash time of domestic washing machine. Assume that input is dirt and grease on clothes. Use 3 descriptors for each input variable and 5 descriptors for output variable. Derive set of rules for control action and Defuzzification. Assume Greece as 55% and Dust as 50%.	14M	CO5	L4

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

B.Tech. (VI Semester) Supplementary Examinations

**20IT03-DIGITAL IMAGE PROCESSING
(IT)**

9/22

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	What is meant by a pixel? Outline the image formation model.	7M	CO1	L2
(b)	What are the main stages and processes involved in digital image processing and how can they be visually represented in a block diagram to show the flow of image data through various operations?	7M	CO1	L2
(OR)				
2(a)	Discuss about the elements of visual perception.	7M	CO1	L1
(b)	Describe the concept of image sampling and quantization. What are the different types of image quantization?	7M	CO1	L2
(OR)				
3(a)	Identify the spatial High Pass Filter and explain with an example.	7M	CO2	L2
(b)	Explain Histogram and its Equalization.	7M	CO2	L2
(OR)				
4.	Explain point processing techniques in Image Enhancement.	14M	CO2	L2
(OR)				
5(a)	Differentiate between RGB model and CMY model.	7M	CO3	L2
(b)	Describe about Constrained Least Squares Filtering.	7M	CO3	L2
(OR)				
6(a)	How do image degradation and restoration processes relate to each other in terms of causes, effects and corrective actions?	7M	CO3	L2
(b)	What is impulse noise and how does it differ from Gaussian noise?	7M	CO3	L2
(OR)				
7(a)	Describe Huffman coding and its role in compression.	7M	CO4	L2
(b)	Discuss the advantages and disadvantages of JPEG and JPEG 2000 standards.	7M	CO4	L2
(OR)				
8(a)	Summarize the key objectives of image compression.	7M	CO4	L2
(b)	Illustrate the working of Run-Length Encoding.	7M	CO4	L2
(OR)				
9(a)	Discuss the adaptive thresholding process in image segmentation by taking an example.	7M	CO5	L3
(b)	Differentiate between region split and region merge techniques.	7M	CO5	L2
(OR)				
10(a)	Discuss any two region based segmentation techniques.	7M	CO5	L2
(b)	Describe the edge linking process and its role in image segmentation with an example.	7M	CO5	L3

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

20IT04-DATA SCIENCE

(IT)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

All questions carry equal marks																		
Q.No	Questions	Marks	CO	BL														
1(a)	List and illustrate the Fundamental Libraries available for data science applications.	7M	CO1	L1														
(b)	Explain the following terms with suitable examples (i) Reading and Displaying of dataset (ii) Rearranging and Ranking of data.	7M	CO1	L2														
(OR)																		
2(a)	Describe about different Data Structures used in data science with example.	7M	CO1	L2														
(b)	Illustrate Data Analytics Lifecycle with neat sketch.	7M	CO1	L2														
(OR)																		
3(a)	Explain the following i) Hypothesis Testing ii) p-Value.	7M	CO2	L2														
(b)	What does data dispersion mean? How do you calculate it?	7M	CO2	L2														
(OR)																		
4(a)	Differentiate Null Hypotheses and Alternative Hypotheses.	7M	CO2	L2														
(b)	Find the variance and standard deviation of the following scores on exam: 92, 95, 85, 80, 75, 50.	7M	CO2	L2														
(OR)																		
5(a)	Explain why it is vital to develop consistent scales across data variables using appropriate examples.	7M	CO3	L2														
(b)	Describe how to develop consistent scales across data variables.	7M	CO3	L2														
(OR)																		
6(a)	Consider the weight variable have the values 10, 115, 96, 41, 79, 109, 73, 104, 64, 136 apply different normalization techniques like (i) Min-max transformation (ii) Z-score transformation (iii) Standard scaling transformation.	10M	CO3	L3														
(b)	Analyze the ways for converting text to numbers.	4M	CO3	L2														
(OR)																		
7(a)	Discuss the applications of association rules.	4M	CO4	L2														
(b)	Find the frequent item sets and generate association rules for the following set of transactions using Apriori algorithm. <table><tr><th>Transaction ID</th><th>Items</th></tr><tr><td>T1</td><td>Hot Dogs , Buns, Ketchup</td></tr><tr><td>T2</td><td>Hot Dogs, Buns</td></tr><tr><td>T3</td><td>Hot Dogs, Coke , Chips</td></tr><tr><td>T4</td><td>Chips, Coke</td></tr><tr><td>T5</td><td>Chips, Ketchup</td></tr><tr><td>T6</td><td>Hot Dogs, Coke, Chips</td></tr></table>	Transaction ID	Items	T1	Hot Dogs , Buns, Ketchup	T2	Hot Dogs, Buns	T3	Hot Dogs, Coke , Chips	T4	Chips, Coke	T5	Chips, Ketchup	T6	Hot Dogs, Coke, Chips	10M	CO4	L3
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T6	Hot Dogs, Coke, Chips																	
(OR)																		

20IT04-DATA SCIENCE

8(a)	Illustrate the concept of K-means clustering with an example.	7M	CO4	L2																																																		
(b)	Calculate the distance between two observations using following methods with example (i) Euclidean distance (ii) Jaccard Distance.	7M	CO4	L3																																																		
9(a)	State Bayes theorem. Discuss its role in classification.	4M	CO5	L2																																																		
(b)	Consider the following set of training samples and classify a Red Domestic SUV using naïve bayesian classifier. <table border="1"> <thead> <tr> <th>Example No</th><th>Color</th><th>Type</th><th>Origin</th><th>Stolen?</th></tr> </thead> <tbody> <tr><td>1</td><td>Red</td><td>Sports</td><td>Domestic</td><td>Yes</td></tr> <tr><td>2</td><td>Red</td><td>Sports</td><td>Domestic</td><td>No</td></tr> <tr><td>3</td><td>Red</td><td>Sports</td><td>Domestic</td><td>Yes</td></tr> <tr><td>4</td><td>Yellow</td><td>Sports</td><td>Domestic</td><td>No</td></tr> <tr><td>5</td><td>Yellow</td><td>SUV</td><td>Imported</td><td>Yes</td></tr> <tr><td>6</td><td>Yellow</td><td>SUV</td><td>Imported</td><td>No</td></tr> <tr><td>7</td><td>Yellow</td><td>SUV</td><td>Imported</td><td>Yes</td></tr> <tr><td>8</td><td>Yellow</td><td>Sports</td><td>Domestic</td><td>No</td></tr> <tr><td>9</td><td>Red</td><td>Sports</td><td>Imported</td><td>No</td></tr> </tbody> </table>	Example No	Color	Type	Origin	Stolen?	1	Red	Sports	Domestic	Yes	2	Red	Sports	Domestic	No	3	Red	Sports	Domestic	Yes	4	Yellow	Sports	Domestic	No	5	Yellow	SUV	Imported	Yes	6	Yellow	SUV	Imported	No	7	Yellow	SUV	Imported	Yes	8	Yellow	Sports	Domestic	No	9	Red	Sports	Imported	No	10M	CO5	L3
Example No	Color	Type	Origin	Stolen?																																																		
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9	Red	Sports	Imported	No																																																		
(OR)																																																						
10(a)	Explain the following with suitable example. (i) Simple Linear Regression (ii) Multiple Regression	7M	CO5	L2																																																		
(b)	What is decision tree? Using examples , describe the steps of the decision tree induction algorithm.	7M	CO5	L2																																																		

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

20ME21-MODERN MACHINING PROCESSES

(ME)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Which process you select for the following materials and state reasons (i) Glass (ii) Ti alloy (iii) Meat.	7M	CO1	L3
(b)	Exemplify the basic working principle of Abrasive Jet Machining (AJM) Process.	7M	CO1	L2
(OR)				
2(a)	Distinguish between conventional and un-conventional machining processes.	7M	CO1	L2
(b)	Confer the basic principle of ultrasonic machining process with suitable sketch.	7M	CO1	L2
3(a)	Exemplify working principle of chemical machining process and discuss important components in detail.	7M	CO2	L2
(b)	Elucidate electrochemical honing (ECH) process.	7M	CO2	L2
(OR)				
4(a)	What is electrochemical grinding process (ECG) and recognize the main phases of ECG process with a neat Sketch.	7M	CO2	L1
(b)	Confer the electrochemical deburring (ECD) process.	7M	CO2	L2
5(a)	With a neat sketch describe the Mechanism of Metal removal in EDM process.	7M	CO3	L1
(b)	Identify various process parameters influence in EDM process. Briefly.	7M	CO3	L3
(OR)				
6(a)	What bases tool materials are selected in EDM process? List different types of tool electrodes and properties.	7M	CO3	L3
(b)	Describe the material removal mechanism in Wire EDM process.	7M	CO3	L2
7(a)	Explain the working principle of plasma arc machining with a sketch.	7M	CO4	L2
(b)	Discuss the “lasing process” and explain the laser beam machining with a neat sketch.	7M	CO4	L2
(OR)				
8(a)	Distinguish between Laser beam and Electron beam machining process on the basis of their applications and limitations.	7M	CO4	L2
(b)	What is hot machining process? Discuss various types of hot machining processes with neat sketch.	7M	CO4	L1
9(a)	Classify the various Rapid Prototyping systems.	7M	CO5	L2
(b)	Explicate the working principle and process of Fused deposition modeling (FDM).	7M	CO5	L2
(OR)				
10(a)	In detail confer the need of rapid prototyping for manufacturing sector.	7M	CO5	L2
(b)	Describe the process of selective Laser Sintering (SLS).	7M	CO5	L2