AR23

CODE: 23CAT204 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April 2026

ARTIFICIAL INTELLIGENCE

CSE(AIML)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Define Artificial Intelligence and list four applications of AI.	7	CO1	K1
	b)	Illustrate how the A* algorithm finds an optimal path in a search problem.	7	CO1	K3
		(OR)			
2.	a)	Describe the concept of state-space representation with an example.	7	CO1	K2
	b)	Compare exhaustive search and heuristic search techniques.	7	CO1	K3
		UNIT-II			
3.	a)	Define problem reduction and explain its importance in AI.	7	CO2	K1
	b)	Explain the working of the AO* algorithm with a suitable example.	7	CO2	K2
		(OR)			
4.	a)	Explain the concept of Means–Ends Analysis with an example.	7	CO2	K2
	b)	Solve the following crypt arithmetic puzzle. S E N D + M O R E ---------- M O N E Y	7	CO2	K3
		UNIT-III			
5.	a)	Define knowledge representation and list its approaches.	7	CO3	K1
	b)	Analyze the role of Cyc theory in representing common-sense knowledge.	7	CO3	K3
		(OR)			
6.	a)	Compare frames and semantic networks.	7	CO3	K3
	b)	Differentiate with an example representation of “Instance” and “Isa” relationships.	7	CO3	K3
		UNIT-IV			
7.	a)	Define probability theory in the context of AI.	7	CO4	K1
	b)	Compare Bayesian networks and certainty factor approaches.	7	CO4	K3
		(OR)			
8.	a)	Describe the concept of Bayesian Belief Networks.	7	CO4	K2
	b)	Evaluate the importance of statistical inference in uncertain reasoning.	7	CO4	K4
		UNIT-V			
9.	a)	Explain the concept of Nonlinear planning.	7	CO5	K2
	b)	Explain the architecture of an Expert System, with the steps involved in building an expert system and a diagram.	7	CO5	K2
		(OR)			
10.	a)	Explain the Blocks World problem used in planning systems.	7	CO5	K2
	b)	Describe the components of a planning system.	7	CO5	K2

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CODE: 23CDT201 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April-2026

FUNDAMENTALS OF DATASCIENCE

CSE(DS)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	BTL
		UNIT-I			
1.	a)	Describe the role of a data scientist at different phases of a data science lifecycle.	7	1	2
	b)	Explain Boolean indexing and discuss its use in filtering array elements.	7	1	3
		(OR)			
2.	a)	Demonstrate indexing and slicing operations in NumPy arrays with suitable examples	7	1	3
	b)	Compare sorting and unique operations in NumPy with suitable examples.	7	1	4
		UNIT-II			
3.	a)	Explain the main components of pandas library architecture.	7	2	4
	b)	Differentiate between loc[] and iloc[] indexing methods with appropriate examples and use cases.	7	2	4
		(OR)			
4.	a)	Describe different methods used to handle missing data in pandas.	7	2	2
	b)	Explain sorting and ranking operations in pandas and discuss their importance in data analysis.	7	2	3
		UNIT-III			
5.	a)	Explain the process of reading and writing data in CSV and JSON formats with suitable examples.	7	3	2
	b)	Describe storing and loading data in MongoDB.	7	3	2
		(OR)			
6.	a)	Discuss the process of extracting data using HTML/XML parsing techniques in web scraping.	7	3	2
	b)	Compare HDF5 with relational databases and evaluate their use in different scenarios.	7	3	4
		UNIT-IV			
7.	a)	Explain how merging and joining are performed in pandas and discuss its significance in combining datasets.	7	4	2
	b)	Demonstrate methods to identify and remove duplicate records in a dataset.	7	4	3
		(OR)			
8.	a)	Discuss different data transformation techniques applied in preprocessing.	7	4	2
	b)	Describe pivoting operations and their role in summarizing data.	7	4	2
		UNIT-V			
9.	a)	Explain the concept of subplots in matplotlib and their role in comparative visualization.	7	5	2
	b)	Discuss the significance of scatter plots in data visualization for exploring relationships between variables.	7	5	2
		(OR)			
10.	a)	Explain how legends and annotations improve plot readability and apply them in visualization.	7	5	3
	b)	Describe histograms and their role in understanding data distribution.	7	5	2

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CODE: 23CET206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April- 2026

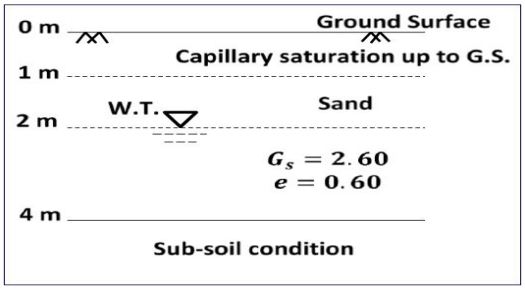
Geotechnical Engineering

(CIVIL ENGINEERING)

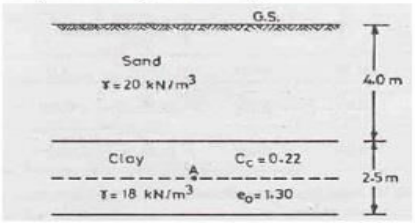
Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	BTL
		UNIT-I			
1.	a)	Write the Classification of soil based on IS 1498 (Indian Standard).	7M	CO1	Understand
	b)	Two cubic meter of wet soil weighs 25 kN. Its dry weight is 20 kN and specific gravity of soil solids is 2.7. Examine the water content, porosity, void ratio and degree of saturation of the given soil sample.	7M	CO1	Analyze and Understand
		(OR)			
2.	a)	Compare flocculant and dispersed soil structural arrangement	7M	CO1	Understand
	b)	An airport runway fill requires 9,50,000 m^3 of soil to be compacted to a void ratio of 0.75. The soil for this project is to be sourced from a borrow pit with an in-situ void ratio of 0.85. Analyze the volume of soil to be excavated from the borrow pit. Given that the transportation cost is Rs. 9 per m^3, examine the total cost for the filling work of the airport runway project.	7M	CO1	Analyze and Understand
		UNIT-II			
3.	a)	Explain the factors affecting the permeability of soil.	7M	CO2	Understand
	b)	A sand deposit contains three distinct horizontal layers of equal thickness. The hydraulic conductivity of the upper and lower layers is $3x10^{-3}$ cm/sec and that of the middle is $2x10^{-2}$ cm/sec. Examine the equivalent values of the horizontal and vertical hydraulic conductivities of the three layers, and their ratio.	7M	CO2	Analyze and Understand
		(OR)			
4.	a)	Explain the properties or characteristics of flow net with neat sketches.	7M	CO2	Analyze
	b)	Solve for hydraulic conductivity, the discharge and seepage velocity in cm/sec by make use of the following soil test conditions: A sand sample of 38 cm^2 cross sectional area and 18 cm long was tested in a constant head permeameter. Under a head of 55 cm, the discharge was 100 ml in 5 min. The dry weight of sand used for the test was 1020 g and specific gravity of soil solids is 2.7.	7M	CO2	Analyze and Understand
		UNIT-III			
5.	a)	What do you mean by quick condition or boiling condition in cohesionless soils? List all the conditions favourable for the formation of quick sand.	7M	CO3	Analyze
	b)	A 10 m thick clay layer is underlaid by a sand layer of 20 m depth. The water table is 5 m below the surface of clay layer. The saturated unit weight of clay and sand are 19 kN/m^3 and 21 kN/m^3 respectively and bulk unit weight of clay soil above water table is 17.5 kN/m^3. Due to a rainfall event, if the water table rises to the surface, identify the amount of change in effective stress at a point P on the soil interface before and after the rainfall event. Assume that the unit weight of water is 10 kN/m^3.	7M	CO3	Analyze and Understand
		(OR)			

6.	a)	Summarize the piping failure in hydraulic structures and examine the methods to prevent piping failure.	7M	CO3	Analyze
	b)	For the sub-soil conditions shown in the figure below, examine the effective stress values at 0 m, 1 m, 2 m and 4 m depths? (Note capillary saturation is from 0-2m from ground level) Assume γ_w = 10 kN/m^3. 	7M	CO3	Analyze and Understand

UNIT-IV

7.	a)	Compare compaction and consolidation properties of soil.	7M	CO4	Understand
	b)	Interpret the final settlement value of a clay layer as shown in figure due to an increase in pressure of 30 kN/m² at mid height (point A). Take $\gamma_w = 10\frac{kN}{m^3}$. Also calculate the settlement value when the water table rises to ground surface with saturated unit weight of sand and clay are 22 kN/m³ and 20 kN/m³ respectively. 	7M	CO4	Analyze and Understand

(OR)

8.	a)	List out the assumptions and limitations of Terzaghi`s 1 D consolidation theory	7M	CO4	Analyze
	b)	In the laboratory test on a clay sample of thickness 25 mm, it was observed that 50 percent consolidation occurred in 11 minutes. Interpret the time required for a field clay soil of thickness 3 m to undergo 70 percent consolidation by considering the double drainage conditions exists in both lab and field.	7M	CO4	Analyze and Understand

UNIT-V

9.	a)	Explain Direct shear test and state its advantages and disadvantages with neat sketch.	7M	CO5	Analyze
	b)	Show that, $\sigma_1 = \sigma_3 \tan^2\left(45° + \frac{\varphi}{2}\right) + 2C \tan\left(45° + \frac{\varphi}{2}\right)$	7M	CO5	Analyze and Understand

(OR)

10.	a)	A CU triaxial compression test was performed on saturated sand at a cell pressure of 100 kPa. The ultimate deviator stress was 350 kPa and the pore pressure at the peak stress was 40 kPa (suction). Interpret the total and effective shear strength parameters.	7M	CO5	Analyze
	b)	A CU triaxial test conducted on saturated clay soil sample with the following testing conditions: **Cell Pressure (kN/m²) / Additional Axial Stress (or) Deviator stress (kN/m²) / Pore Water Pressure at Failure (kN/m²)** 100 / 300 / - 45 200 / 410 / - 15 400 / 610 / 50 600 / 850 / 110 Identify the effective shear strength parameters by using Mohr's circle method. (use normal graph provided)	7M	CO5	Analyze

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CODE: 23CST207 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April,2026

OBJECT ORIENED PROGRAMMING

(Common TO CSE & IT Branches)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	BTL
		UNIT-I			
1.	a)	List and explain Java buzzwords. Which factors are making Java famous Language?	7M	1	K2
	b)	When to use a Static variable in JAVA programming? Explain the importance of Static Variable with a JAVA program	7M	1	K2
		(OR)			
2.	a)	What is the role and responsibility of JVM in program execution?	7M	1	K2
	b)	What is an operator? Explain different types of operators in JAVA.	7M	1	K2
		UNIT-II			
3.	a)	What are objects and how they are created from Class? Explain the dynamic initialization of objects using constructors.	7M	2	K2
	b)	Explain the different types of constructors with an example.	7M	2	K2
		(OR)			
4.	a)	What is a nested class? Differentiate between static nested classes and non-static nested classes.	7M	2	K2
	b)	With suitable code segments illustrate various uses of 'final' keyword.	7M	2	K2
		UNIT-III			
5.	a)	Define Overloading in JAVA? What is the scope rules governing the Method Overloading?	7M	3	K2
	b)	What is the interface? Write a program to demonstrate how interfaces can be extended.	7M	3	K2
		(OR)			
6.	a)	Give an example where the interface can be used to support multiple inheritances.	7M	3	K2
	b)	With suitable program segments describe the usage of 'super' keyword	7M	3	K2
		UNIT-IV			
7.	a)	Explain Creating Packages and Accessing a Package with examples.	7M	4	K2
	b)	How Packages differ from Interfaces? Explain it with a suitable example program to calculate student marks statement.	7M	4	K2
		(OR)			
8.	a)	Write a Java program to find the area and perimeter of square and circle using interface.	7M	4	K2
	b)	What is the significance of the CLASSPATH environment variable in creating or using a packag	7M	4	K2
		UNIT-V			
9.	a)	Explain the synchronization of multiple threads in Java with an example.	7M	5	K2
	b)	Discuss about try with multiple catch statements.	7M	5	K2
		(OR)			
10.	a)	Explain the thread state diagram and thread API.	7M	5	K2
	b)	Explain how communication between threads takes place with a programming example.	7M	5	K2

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CODE: 23ECT207 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April,2026

DIGITAL ELECTRONICS

(ELECTRONICS AND COMMUNICATION ENGINEERING)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	BTL
		UNIT-I			
1.	a)	Subtract the following using 2's complement arithmetic: (i) 46-19 (ii) 27-75 (iii) 125.3-46.7	7	1	L2
	b)	Explain the procedure for construction of a Hamming code word for a particular message word with an example.	7	1	L3
		(OR)			
2.	a)	Represent the decimal numbers 1234, 678.7 in (i) Binary (ii) Excess-3 code	7	1	L2
	b)	Generate the even parity hamming code for the following binary codes: (i) 1101 (ii) 1001	7	1	L3
		UNIT-II			
3.	a)	Find the Complement and Dual of the Function $F = AB\bar{C}\bar{D}$+A$\bar{C}D + AB\bar{D}$	7	1	L3
	b)	Convert the following expressions. (i) $F = X\bar{Z} + \bar{X}Z$ to Canonical SOP (ii) $F = AB + \bar{C}$ to Canonical POS.	7	1	L3
		(OR)			
4.	a)	Simplify the following Boolean functions using K-Map (i) f (A, B,C, D) =∑m (15,7,3,10)+∑d (11,2, 12) (ii) f (A, B,C, D) =∑m (10,9,8,3,2,11)	7	1	L3
	b)	Reduce the expression f= (B+BC)(B+$\bar{B}$C)(B+D) and represent using NAND gates only.	7	1	L2
		UNIT-III			
5.	a)	Use a 4X1 MUX to implement the logic function F (A,B,C) = Σ m(1,2,4,7)	7	1	L3
	b)	Draw a full adder circuit using NAND gates and explain its operation	7	1	L2
		(OR)			
6.	a)	Explain about seven segment display with necessary truth table.	7	1	L2
	b)	Design a 4x16 Decoder with 2x4 decoders.	7	1	L3
		UNIT-IV			
7.	a)	Draw the logic diagram of parallel-in, parallel-out shift register and explain its operation.	7	1	L2
	b)	What is race-around condition in a JK flip-flop? Explain the methods used to eliminate it with neat circuit diagrams.	7	1	L3
		(OR)			
8.	a)	Explain different types of flip-flops with truth tables.	7	1	L2
	b)	Design a Mod-10 ripple counter using T- Flip Flops.	7	1	L3
		UNIT-V			
9.	a)	Implement half adder circuit using PROM.	7	1	L2
	b)	Realize the function F = ABC^1 + AD + AD^1; G =ABC + ABC + AD^1 H =ABC + BD; J = B + AD using PAL.	7	1	L4
		(OR)			
10.	a)	Implement the combinational circuit defined by the functions (i) F_1 (A,B,C,D) = ∑m(0,2,5,7,8,10,12,13) and (ii) F_2 (A,B,C,D) = ∑m(0,2,5,6,8,9,14,15) using PAL.	7	1	L3
	b)	Compare the features of PAL, PLA and ROM devices.	7	1	L2

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CODE: 23EET206 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular & Supplementary Examinations, April-2026
CONTROL SYSTEMS
(ELECTRICAL AND ELECTRONICS ENGINEERING)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	BTL
		UNIT-I			
1.	a)	Explain the difference between open loop and closed loop systems with examples.	7	CO1	Remember
	b)	Obtain the transfer function $\frac{\theta(s)}{T(s)}$ for the mechanical rotational system shown in Fig.1.	7	CO1	Understand

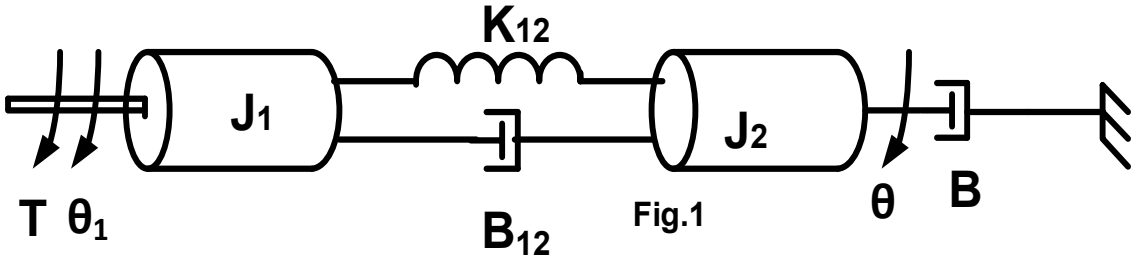

Fig.1

(OR)

2.		Determine the overall transfer function relating C(s) and R(s) for the system whose block diagram is shown in Fig.2 by using block diagram reduction technique.	14	CO1	Understand

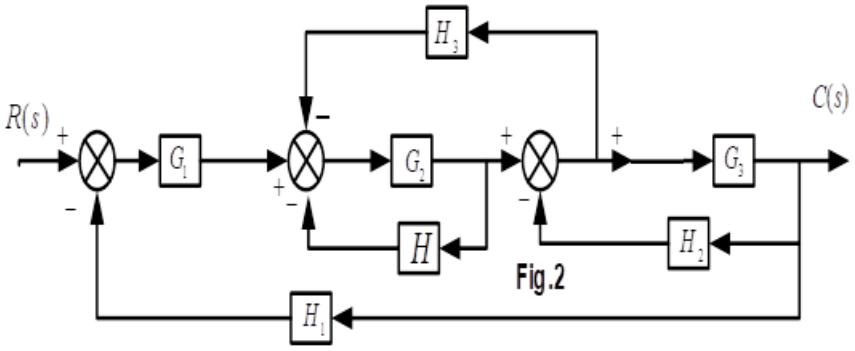

Fig.2

UNIT-II

3.	a)	Constriction working principle of an AC servo motor and derive its transfer function.	7	CO2	Understand
	b)	Derive the time response of a second order control system with unit step input and $\zeta<1$.	7	CO2	Understand
		(OR)			
4.	a)	The overall transfer function is a unity feedback control system is given by, $\frac{C(s)}{R(s)} = \frac{10}{S^2+6S+10}$ (i) Find K_p, K_v and K_a. (ii)Determine the steady state error if the input is $r(t)=1+t+t^2$.	7	CO2	Apply
	b)	Explain the working of a proportional-integral (PI) controller and derive its transfer function.	7	CO2	Remember

UNIT-III

5.		A unity feedback control system has an open loop transfer function $G(s) = \frac{K}{S(S+2)(S+5)}$ Sketch the root loci of the system and show (i)Breakaway point (ii)Line for $\zeta=0.5$ and the value of K for this damping ratio (iii) The frequency at which the root locus crosses the imaginary axis and the corresponding value of K.	14	CO3	Apply
		(OR)			

6.	a)	Decide the stability of the control system whose characteristic equation is $S^5 + 2S^4 + 5S^3 + 10S^2 + 4S + 8 = 0$ by using Routh Hurwitz Criterion.	7	CO3	Apply
	b)	Define the Root locus. Explain the procedure to construct Root Locus.	7	CO3	Understand

UNIT-IV

7.	a)	The open loop transfer function of a unity feedback system is $G(s) = \frac{K}{S(S+2)(S+20)}$ Construct Bode plot and determine (i)The limiting values of 'K' for system to be stable (ii)Value of K for gain margin to be 10dB (iii) Value of K for phase margin to be 50^0	7	CO4	Apply
	b)	Explain lag and lead compensation in control systems.	7	CO4	Understand

(OR)

8.	a)	Explain frequency domain specifications of a control system.	7	CO4	Remember
	b)	Construct the complete Nyquist plot for a unity feedback control system whose open loop transfer function is $G(s)H(s) = \frac{K(1+S)^2}{S^3}$ Find range of 'K' for stability.	7	CO4	Apply

UNIT-V

9.	a)	Explain the concept of state, state variables and state model in detail.	7	CO5	Understand
	b)	A linear time-variant system is characterized by the state equation $\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}1 & 0\\ 1 & 1\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u$ where u is a unit step function. The initial condition is $\mathbf{X}(0)=\begin{bmatrix}1\\ 0\end{bmatrix}$ Using inverse Laplace transform method, obtain the solution of the state equation.	7	CO5	Analyze

(OR)

10.	a)	A system is described by the transfer function $\frac{Y(S)}{U(S)}=\frac{20(4S+2)}{S^3+5S^2+8S+2}$ Obtain a state model of the system.	7	CO5	Analyze
	b)	A linear time-invariant system is described by the following state variable model: $\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}-1 & 0\\ 0 & -2\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u$ $\mathbf{Y}=\begin{bmatrix}1 & 2\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}$ Comment on the controllability of the system.	7	CO5	Apply

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CODE: 23MET205 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April- 2026

MANUFACTURING TECHNOLOGY - I

(MECHANICAL ENGINEERING)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	List and explain any two pattern allowances with sketches.	7 M	1	Understanding
	b)	What are the distinguishing features between casting and pattern.	7 M	1	Understanding
		(OR)			
2.	a)	Explain the steps involved in making a casting.	7 M	1	Understanding
	b)	List and explain any four casting defects.	7 M	1	Understanding
		UNIT-II			
3.	a)	Explain working of SMAW process with a sketch.	7 M	2	Understanding
	b)	List and explain any four welding defects.	7 M	2	Understanding
		(OR)			
4.	a)	Differentiate between soldering, brazing and welding process.	7 M	2	Analyse
	b)	Draw a neat sketch, explain Thermit welding process.	7 M	2	Understanding
		UNIT-III			
5.	a)	Describe and specify the merits and limitations of the different kinds of rolling mills.	7 M	3	Understanding
	b)	Explain tube drawing process with a sketch.	7 M	3	Understanding
		(OR)			
6.	a)	Explain the following: a) Recovery b) Recrystallization c) Grain growth	7 M	3	Understanding
	b)	List the advantages, limitations and applications of impact extrusion process	7 M	3	Understanding
		UNIT-IV			
7.	a)	Explain punching vs blanking with diagram.	7 M	4	Understanding
	b)	Explain bending operation and springback control.	7 M	4	Understanding
		(OR)			
8.	a)	Explain briefly a) Drawing out b) Upsetting	7 M	4	Understanding
	b)	Describe briefly press forging method with neat sketch	7 M	4	Understanding
		UNIT-V			
9.	a)	Describe magnetic pulse forming process with a sketch.	7 M	5	Understanding
	b)	List the properties and applications of thermosetting plastics.	7 M	5	Understanding
		(OR)			
10.	a)	Discuss about in detail about Injection molding process and list advantages, disadvantages and applications	10 M	5	Understanding
	b)	What is the high velocity forming process?	4 M	5	Understanding

AR20

CODE: 20MET206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech.II Semester Supplementary Examinations, April,2026

MANUFACTURING TECHNOLOGY-I

(MECHANICAL ENGINEERING)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

			Marks	CO	BTL
		UNIT-I			
1.	a)	Explain pattern allowances with neat sketches.	5	1	K2
	b)	With a neat labeled diagram, explain the construction and operation of a Cupola Furnace.	5	1	K2
		(OR)			
2.	a)	Give the steps in the sand-casting process and explain each briefly.	5	1	K2
	b)	Describe the CO_2 Molding process. State its advantages and limitations.	5	1	K2
		UNIT-II			
3.	a)	What is a Riser? Explain its primary function in a casting and define Directional Solidification.	5	2	K2
	b)	With a neat diagram, explain the three types of Oxy-Acetylene Flames.	5	2	K2
		(OR)			
4.	a)	Distinguish between True Centrifugal Casting and Semi-Centrifugal Casting.	5	2	K2
	b)	Illustrate the five basic types of Welding Joints.	5	2	K2
		UNIT-III			
5.	a)	With a neat sketch, describe the Shielded Metal Arc Welding (SMAW) process. List two limitations.	5	3	K2
	b)	Distinguish between Brazing and Soldering based on filler metal melting points and joint strength.	5	3	K2
		(OR)			
6.	a)	Define Polarity in DC Arc Welding. Distinguish between Straight Polarity (DCEN) and Reverse Polarity (DCEP).	5	3	K2
	b)	Explain Seam Welding. How is it different from Spot Welding in terms of electrode shape?	5	3	K2
		UNIT-IV			
7.	a)	Define Metal Working. Distinguish between Hot Working and Cold Working based on Recrystallization Temperature.	5	4	K2
	b)	List the common Rolling Defects and suggest their causes.	5	4	K2
		(OR)			
8.	a)	What is Extrusion? Differentiate between Forward Extrusion and Backward Extrusion with diagrams.	5	4	K2
	b)	Explain the various Rolling Stand Arrangements with neat sketches.	5	4	K2
		UNIT-V			
9.	a)	Distinguish between Open Die Forging and Closed Die Forging with simple sketches.	5	5	K2
	b)	Define Bending. Explain the terms Spring back and Bend Allowance.	5	5	K2
		(OR)			
10.	a)	Describe the working principle of Drop Forging. How does it differ from Press Forging?	5	5	K2
	b)	Explain the principle of Shearing in sheet metal working with a neat labeled diagram.	5	5	K2
		UNIT-VI			
11.	a)	Describe the Explosive Forming process with a neat sketch. Mention the role of Standoff Distance.	5	6	K2
	b)	Describe the Injection Molding process with a neatly labeled diagram of the machine	5	6	K2
		(OR)			
12.	a)	With a neat diagram, explain Electro-Hydraulic Forming.	5	6	K2
	b)	Differentiate between Thermoplastics and Thermosetting Plastics with two examples each.	5	6	K2

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CODE: 20EET206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, April-2026

A.C. MACHINES

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	BTL
		UNIT-I			
1.	a)	Explain the working principle of 3-φ Induction motor.	5M	CO1	L2
	b)	A 3-φ, 6 pole, 50Hz, induction motor has a slip of 1% at No-load and 3% at full load. Determine 1.) Synchronous speed 2) No-load speed (3) Full-load speed. 4) frequency of Rotor current at standstill 5) frequency of Rotor current at full-load.	5M	CO1	L3
		(OR)			
2.	a)	Explain the Torque- Slip Characteristics of 3-Ø Induction Motor.	5M	CO1	L2
	b)	A 4-pole, 3-phase induction motor operates from a supply whose frequency is 50 Hz. Calculate(i)The speed at which the magnetic field of the stator is rotating(ii)The speed of the rotor when the slip is 0.04(iii)The frequency of the rotor currents when the slip is 0.03(iv)The frequency of the rotor currents at standstill	5M	CO1	L3
		UNIT-II			
3.	a)	Explain Autotransformer Method of starting 3-φ Induction motor.	5M	CO2	L2
	b)	Explain any one method of speed control for 3-φ Induction motor	5M	CO2	L2
		(OR)			
4.		Plot the circle diagram for a three-phase, 400 V, 50 Hz, 4 pole, 5 kW, Delta connected Induction motor from the following test data: Assume rotor copper losses and stator copper losses are equal. Determine the line current, power factor, torque, slip speed, and efficiency of the motor at full load from its circle diagram.	10M	CO2	L3

Test Type	Line Voltage	Line Current	Input Power
No Load Test	400 V	3 A	400 W
Blocked Rotor Test	80 V	10 A (Full load current)	700 W

		UNIT-III			
5.		Derive the Emf Equation of Alternator in terms of pitch and distribution factors.	10M	CO3	L2
		(OR)			
6.	a)	Explain the effect of armature reaction on the magnetic field of the rotor under different power factor loads (resistive, inductive, capacitive).	5M	CO3	L2
	b)	Compare salient-pole machines (low speed) and cylindrical/non-salient pole machines (high speed) regarding construction and operation.	5M	CO3	L2

UNIT-IV

7.	a)	Explain Synchronous impedance method of finding Voltage Regulation in an alternator.	5M	CO4	L2
	b)	Explain two Reaction theory in case of Synchronous machines.	5M	CO4	L3

(OR)

8.	a)	Explain MMF method to find the regulation of an Alternator.	5M	CO4	L2
	b)	A 10 kVA, 440 V, 50 Hz, 3 phase star connected alternator has the open circuit characteristics as given below :	5M	CO4	L3

I_f Amp	1.5	3	5	8	11	15
(V_{oc}) line volts	150	300	440	550	600	635

With full load zero p.f, the applied excitation required is 14 A to produce 500 V of terminal voltage. On short circuit, 4 A excitation is required to give full load current. Determine the voltage regulation for full load, 0.8 p.f. lagging and leading using ZPF method

UNIT-V

9.		Explain why synchronous Motors are not self starting. Discuss various starting methods.	10M	CO5	L2

(OR)

10.	a)	What is hunting ? State its causes. How it can be minimized ? Explain the use of damper winding in synchronous motor.	5M	CO5	L2
	b)	Why synchronous motors are not self starting ? Explain in detail.	5M	CO5	L2

UNIT-VI

11.	a)	Explain double-field Revolving theory in case of 1-φ I.M	5M	CO6	L2
	b)	Explain the principle of operation of split-phase I.M.	5M	CO6	L2

(OR)

12.	a)	Explain the operation of Shaded pole motor	5M	CO6	L2
	b)	Explain the operation of Capacitor start motor.	5M	CO6	L2

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CODE: 20ECT206 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, April-2026

ANALOG COMMUNICATIONS

(ELECTRONICS AND COMMUNIATION ENGINEERING)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	BTL
		UNIT-I			
1.	a)	Develop the equation of a single tone modulation of AM system and explain the power relations.	5M	CO1	K3
	b)	A carrier of amplitude 100 is modulated by a signal of amplitude 40. Calculate modulation index and total power if $R_c = 50\Omega$	5M	CO1	K3
		(OR)			
2.	a)	An AM transmitter has an un-modulated carrier power of 10KW. Find the total transmitted power when the modulation index is i) 10% ii)50%	5M	CO1	K3
	b)	Explain the square law detection of AM signals.	5M	CO1	K2
		UNIT-II			
3.	a)	Describe COSTAS loop for coherent detection of DSB-SC.	5M	CO2	K2
	b)	How is SSB signal generated by Phase discrimination method? Explain with neat sketch.	5M	CO2	K2
		(OR)			
4.	a)	Explain the generation of DSB-SC signal using balanced modulator. Derive the expression for DSB-SC signal.	5M	CO2	K2
	b)	A carrier signal $c(t) = 10\cos(2\pi.10^6 t)$ is modulated by a message signal $m(t) = 2\cos(8\pi.10^3 t)$ to generate a DSB-SC signal. Calculate the B.W and power.	5M	CO2	K3
		UNIT-III			
5.	a)	Explain the difference between Narrow band FM and Wide band FM.	5M	CO3	K2
	b)	Draw the block diagram of FM by using indirect method and explain its working.	5M	CO3	K2
		(OR)			
6.	a)	Draw and explain the FM demodulator using PLL.	5M	CO3	K2
	b)	Draw the circuit and explain the working of a Balanced Frequency discriminator.	5M	CO3	K2
		UNIT-IV			
7.		Draw the block diagram of a superhetrodyne receiver and explain its operation What are the advantages of this receiver?	10M	CO4	K2
		(OR)			
8.		Describe the operation of variable reactance type and phase modulated type FM transmitter.	10M	CO4	K2
		UNIT-V			
9.		Mention and explain different methods for generation of PWM	10M	CO5	K2
		(OR)			
10.	a)	Analyze advantages of PPM over PAM and PWM.	5M	CO5	K4
	b)	Explain sampling theorem and its significance.	5M	CO5	K2
		UNIT-VI			
11.	a)	Evaluate pre-emphasis and de-emphasis techniques in FM systems.	5M	CO6	K2
	b)	With a neat block diagram, explain the operation of Time division multiplexing technique	5M	CO5	K2
		(OR)			
12.	a)	What is Noise figure? Find the Average Noise Figure of cascaded networks	5M	CO6	K3
	b)	Analyze noise performance of DSB-SC system	5M	CO6	K3

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CODE: 20CST206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech.II Semester Supplementary Examinations, April,2026

DATABASE MANAGEMENT SYSTEMS

(Common to CSE & IT Branches)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	BTL
		UNIT-I			
1.	a)	Differentiate between Database Systems and File Systems	5	1	L2
	b)	What are the different levels of data abstraction? Explain.	5	1	L2
		(OR)			
2.	a)	Explain different types of database users.	5	1	L2
	b)	What is DML? Differentiate between DDL and DML.	5	1	L2
		UNIT-II			
3.	a)	What are Entities, Attributes, and Entity Sets? Explain with examples.	5	2	L2
	b)	What are integrity constraints? Explain different types.	5	2	L2
		(OR)			
4.	a)	How can tables and views be altered or deleted? Explain with commands.	5	2	L2
	b)	Explain Selection and Projection operations with examples.	5	2	L2
		UNIT-III			
5.	a)	Explain nested queries with suitable examples.	5	3	L2
	b)	Explain IN, ANY, ALL operators.	5	3	L2
		(OR)			
6.	a)	Explain Outer Joins with examples.	5	3	L2
	b)	Define triggers with examples.	5	3	L2
		UNIT-IV			
7.	a)	What are anomalies caused due to redundancy? Explain.	5	4	L2
	b)	Explain Second Normal Form (2NF) with example.	5	4	L2
		(OR)			
8.	a)	What is decomposition in DBMS? Explain its need.	5	4	L2
	b)	Problem 1: Functional Dependency Given relation R(A, B, C) with FD: $A \rightarrow B, B \rightarrow C$ 1)Find closure of A 2)Identify candidate key	5	4	L3
		UNIT-V			
9.	a)	Explain different states of a transaction	5	5	L2
	b)	Explain serializability in DBMS.	5	5	L2
		(OR)			
10.	a)	Explain timestamp-based concurrency control.	5	5	L2
	b)	Describe log-based recovery mechanism	5	5	L2
		UNIT-VI			
11.	a)	Explain clustered and unclustered indexes	5	6	L2
	b)	Compare different file organizations.	5	6	L2
		(OR)			
12.		Explain ISAM structure and working.	10	6	L2

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CODE: 20CET206 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech.II Semester Supplementary Examinations, April-2026

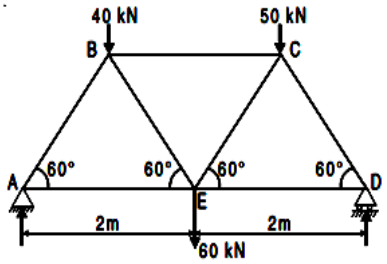
Structural Analysis

(CIVIL ENGINEERING)

Time: 3 Hours **Max Marks: 60**

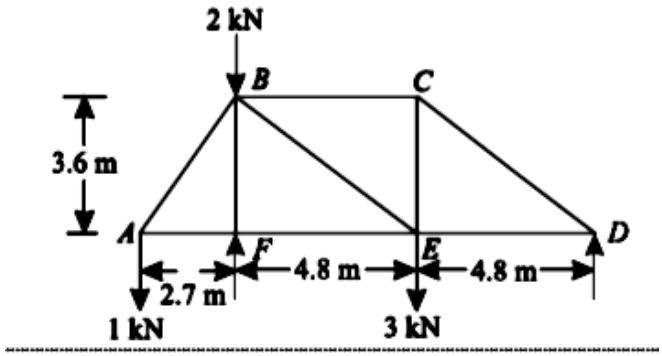
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.		Determine the forces in all the members of the truss using method of joints, each of length 2m as shown in figure and indicate whether they are in tension or compression.	10	CO1	3

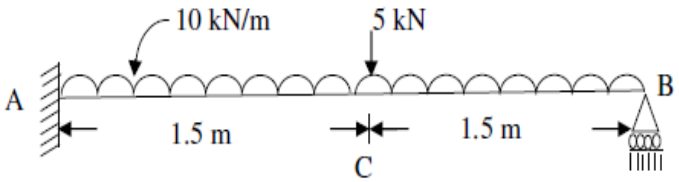


(OR)

2.		Find the forces in all the members of the truss shown in the below figure.	10	CO1	3



		UNIT-II			
3.	a)	Analyze the propped cantilever beam loaded as shown in the Figure. Draw the S.F.D and B.M.D. Assume EI constant throughout.	5	CO2	3



	b)	A fixed beam AB (6 m) carries a U.D.L. of 30 kN/m over its entire span. Determine fixed-end moments, reactions, and sketch S.F. and B.M. diagrams.	5	CO2	3

(OR)

4.	a)	A fixed beam AB of 6 m carries a point load of 10 kN at its mid span. Determine fixed-end moments, reactions, and sketch S.F. and B.M. diagrams.	5	CO2	3
	b)	A cantilever of length4m carries a uniformly distributed load of 1kN/m length over the whole length. The free end of the cantilever is supported on a prop. If E = 2 x 10^5 N/ mm^2 and I = 10^8 mm^4, then (i) find the prop reaction (ii) deflection at the centre of cantilever.	5	CO2	3

UNIT-III

5.	a)	Using Strain energy method determine the deflection at the free end of a cantilever of length 'L' subjected to a concentrated load of P at the free end.	5	CO3	2
	b)	Derive the expression for the stain energy for axially loaded member.	5	CO3	2

(OR)

6.	a)	A Simply supported beam of length 'L' subjected to udl 'w' over entire span find the strain energy stored and maximum deflection in the beam.	5	CO3	3
	b)	Derive the expression for strain energy due to shear and bending.	5	CO3	2

UNIT-IV

7.		Determine the horizontal thrust for a three-hinged parabolic arch of span 10m and rise 2m subjected to a UDL of 10kN/m over the left half of the span. Also find the normal thrust, radial shear 3m from the left support.	10	CO4	3

(OR)

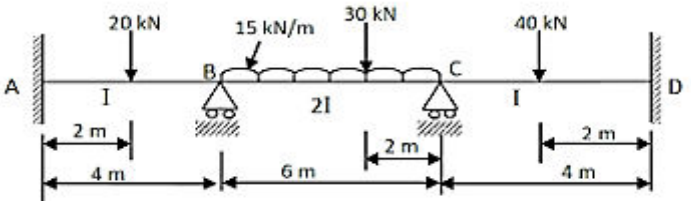
8.	a)	A two hinged parabolic arch of constant cross section has a span of 60m and a rise of 10m. It is subjected to a load of 40kN at a distance of 10m from the left end. Calculate reactions of the arch if the temperature of the arch is raised by 40°C. Assume co-efficient of thermal expansion as $\alpha = 12\times10^{-6}/\ °C$	5	CO4	3
	b)	Explain the classification of arches based on shape and number of hinges with neat sketches.	5	CO4	2

UNIT-V

9.	a)	A continuous beam ABC is simply supported at A and C and continuous over support B with AB = 4m and BC = 6m. A uniformly distributed load of 10kN/m is acting over the beam. The Moment of inertia is I throughout the span. Analyse the continuous beam and draw S.F.D and B.M.D.	10	CO5	3

(OR)

10.		Analyse the beam by using Clapeyron's theorem of three moments and and draw S.F.D and B.M.D.	10	CO5	3



UNIT-VI

11.		A uniformly distributed load of 60kN/m and of length 4m transverse across the span of simply supported length of 20m. Compute the maximum bending moment at 5m from left support and absolute bending moment.	10	CO6	3

(OR)

12.		Two-point loads of 110 kN and 210 kN spaced 3 m apart cross a girder of span 12m from left to right with the 100 kN leading. i) Draw the ILD for shear force and bending moment and the values of maximum bending moment ii) Find the maximum shear force and bending moment at a section 4 m from the left support.	10	CO6	3

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CODE: 18ECT208 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, April-2026

ANALOG COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain the need of modulation. And mention its advantages.	6M
	b)	Explain the generation of AM wave using square law modulator.	6M
		(OR)	
2.	a)	Explain amplitude modulation for an arbitrary baseband signal m(t) with necessary expressions, wave forms and spectrums.	6M
	b)	Explain the method of AM detection by envelope detector.	6M

UNIT-II

3.	a)	Explain the balanced modulator method to generate DSBSC waveform with neat diagram.	6M
	b)	Explain the phase discrimination method of generating SSB modulated wave with neat diagram.	6M
		(OR)	
4.	a)	Explain the coherent detection process of DSBSC modulated waveform with neat diagram.	6M
	b)	Calculate the percentage of power saving when the carrier and one of the sidebands are suppressed in a AM wave modulated to a depth of (i) 100% (ii) 50%.	6M

UNIT-III

5.	a)	Obtain the relationship between phase and frequency modulation techniques with suitable expressions and sketch the modulated outputs of both the techniques for sinusoidal modulating signal.	6M
	b)	Compare AM and FM modulation techniques.	6M
		(OR)	
6.	a)	Describe the process of detection of FM wave using phase discriminator method.	6M
	b)	Explain time division multiplexing technique with neat diagram.	6M

UNIT-IV

7.	a)	Explain phase modulated type FM transmitter with a neat block diagram.	6M
	b)	Compare AM and FM receivers.	6M
		(OR)	
8.	a)	Explain AM transmitter using low level modulation with a neat block diagram.	6M
	b)	Explicate the operation of Super heterodyne receiver with neat block diagram.	6M

UNIT-V

9.	a)	Describe the generation and demodulation of PPM with the help of block diagram.	6M
	b)	Obtain the expression for figure of merit for FM receiver.	6M
		(OR)	
10.	a)	Illustrate the modulation and demodulation of PAM with the help of block diagram.	6M
	b)	What is threshold effect in FM? Explain how it can be reduced?	6M

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