AR23

CODE: 23MET207 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

DESIGN OF MACHINE MEMBERS – I

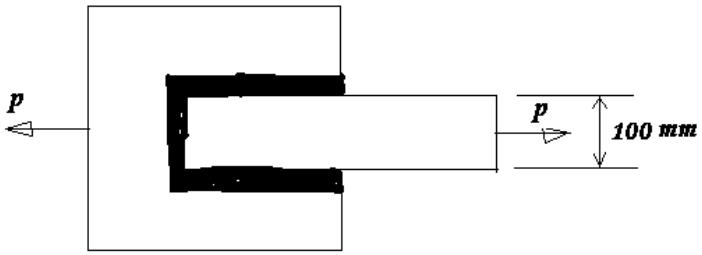
(MECHANICAL ENGINEERING)

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	BTL
		UNIT-I			
1.	a)	Explain the machine design procedure in detail with the help of a flow diagram.	7M	CO1	K2
	b)	A steel shaft 50 mm diameter and 500 mm long is subjected to a twisting moment of 1100 N-m, the total angle of twist being 0.6°. Find the maximum shearing stress developed in the shaft and modulus of rigidity.	7M	CO1	K3
		(OR)			
2.	a)	What is Mohr's Circle? Explain the procedure for finding principal stresses and maximum shear stress in a member subjected to: (1) uniaxial normal stress σ_x, and (2) pure shear stress τ_{xy}, using Mohr's Circle method.	7M	CO1	K2
	b)	A cylindrical shaft made of steel yield strength 800Mpa is subjected to static loads bending moment 20kN-m and twisting moment 30KN-m. Calculate the diameter of the shaft using Normal stress theory. Assume factor of safety is 2.	7M	CO1	K3
		UNIT-II			
3.	a)	Explain the following loading conditions with suitable stress–time curves: 1. Completely reversed load, 2. Repeated load 3. Fluctuating load	6M	CO2	K2
	b)	A machine component is subjected to a flexural stress which fluctuates between +300 MN/m^2 and -150 MN/m^2. Determine the value of minimum ultimate strength according to Soderberg relation. Take yield strength = 0.55 times Ultimate strength and Endurance strength = 0.5 times Ultimate strength. Consider factor of safety = 2.	8M	CO2	K3
		(OR)			
4.	a)	Explain Goodman's method to calculate the safe values of fluctuating stress. For what materials it is applicable?	6M	CO2	K3
	b)	A mild steel cover plate is to be designed for an inspection hole in the shell of a pressure vessel. The hole is 120mm in diameter and the pressure inside the vessel is 6 N/mm^2. Design the cover plate along with the bolts. Assume allowable tensile stress for mild steel as 60 MPa and for bolt material as 40 MPa. Take number of bolts as 6.	8M	CO2	K3
		UNIT-III			
5.	a)	Discuss any three modes of failure that can be observed in a riveted joint.	6M	CO3	K2
	b)	Two plates of 10 mm thickness each are to be joined by means of a single riveted double strap butt joint. Determine the rivet diameter, rivet pitch, strap thickness and efficiency of the joint. Take the working stresses in tension and shearing as 80 MPa and 60 MPa respectively.	8M	CO3	K3
		(OR)			

6.	a)	What are advantages and disadvantages of welded joints over riveted joints?	6M	CO3	K1
	b)	A plate 100mm wide and 12.5mm thick is joined with another plate by a single transverse weld and a double parallel fillet weld as shown in fig. The maximum tensile and shear stresses are 70MPa and 56MPa respectively. Find the length of each parallel fillet weld, if the joint is subjected to both static and fatigue loading.	8M	CO3	K3



UNIT-IV

7.	a)	A hollow shaft for a rotary compressor is to be designed to transmit a maximum torque of 4750 N-m. The shear stress in the shaft is limited to 50 MPa. Determine the inside and outside diameters of the shaft, if the ratio of the inside to the outside diameter is 0.4.If the hollow shaft is replaced by a solid shaft of equal strength, determine the ratio of the masses of the solid shaft and the hollow shaft.	10M	CO4	K3
	b)	Why hollow shafts are better than solid shafts? Explain.	4M	CO4	K2

(OR)

8.	a)	Design a muff coupling to connect two shafts transmitting 40KW at 120rpm. The permissible shear and crushing stress for the shaft and key material are 30MPa and 80MPa respectively. The material of muff is cast iron with permissible shear stress of 15MPa. Assume that the maximum torque transmitted is 25 per cent greater than mean torque.	10M	CO4	K3
	b)	What are the requirements of a key material?	4M	CO4	K1

UNIT-V

9.		Draw and design a knuckle joint to transmit 150 kN. The design stresses may be taken as 75 MPa in tension, 60 MPa in shear and 150 MPa in compression.	14M	CO5	K3

(OR)

10.	a)	A Rail wagon weighing 300kN is moving with a velocity of 2 m/sec. It is to be brought to rest by two buffers with springs of 300 mm diameter. The maximum deflection of spring is 300 mm, allowable shear stress in the spring = 600 N/mm^2. Design the spring.	10M	CO5	K3
	b)	Give classification of springs and list applications for each.	4M	CO5	K1

AR23

CODE: 23ITT204 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

Artificial Intelligence

(INFORMATION TECHNOLOGY)

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)	Formulate the Tic-Tac-Toe problem as a state-space problem.	7	1	Understanding
	b)	Differentiate between agents and environments with examples.	7	1	Analyzing
		(OR)			
2.	a)	Explain the concept of a utility-based agent and how it differs from goal-based agents.	7	1	Understanding
	b)	Describe the components and working of a learning agent.	7	1	Analyzing
		UNIT-II			
3.	a)	Explain the Breadth-First Search (BFS) algorithm with an example.	7	2	Understanding
	b)	Explain the Hill Climbing algorithm with its limitations.	7	2	Applying
		(OR)			
4.		Describe the AO* algorithm in detail and explain how it is used for AND-OR graphs.	14	2	Understanding
		UNIT-III			
5.	a)	Explain the MIN-MAX algorithm with a suitable example.	7	3	Understanding
	b)	Describe the 8-Queens problem and how it is solved using backtracking.	7	3	Applying
		(OR)			
6.		Discuss the map coloring problem as a CSP. Explain how constraints are applied and solved.	14	3	Understanding
		UNIT-IV			
7.		Explain rule-based knowledge representation in detail. Discuss its structure, advantages, and limitations with examples.	14	4	Understanding
		(OR)			
8.		State and explain Bayes' Theorem. Illustrate with a real-world example.	14	4	Understanding
		UNIT-V			
9.	a)	Explain the architecture of an expert system with a neat diagram.	7	5	Understanding
	b)	What is meta-knowledge? How is it useful in expert systems?	7	5	Applying
		(OR)			
10.		Compare MYCIN, DART, and XCON systems in terms of domain, approach, and performance.	14	5	Analyzing

AR23

CODE: 23EET208 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ELECTRICAL MEASUREMENTS

(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)	Illustrate the construction and working principle of a PMMC instrument	7M	1	2
	b)	Explain the Classification of measuring instruments briefly with an example.	7M	1	3
		(OR)			
2.	a)	Illustrate the different types of errors that occur in a measuring instrument?	7M	1	2
	b)	Illustrate the different methods for producing the Controlling torque in a measuring instrument.	7M	1	2
		UNIT-II			
3.	a)	Explain the procedure for extending the range of a wattmeter using CT and PT	7M	2	3
	b)	Derive the expression for the measurement of power factor by two wattmeter method.	7M	2	2
		(OR)			
4.	a)	Explain the different types of errors in a dynamometer type wattmeter.	7M	2	2
	b)	Derive the expressions for the ratio error of a current transformer.	7M	2	3
		UNIT-III			
5.	a)	Derive the torque expression for a single phase induction type energy meter.	7M	3	2
	b)	What is phantom loading? Explain with an example how is it more advantages than treating with direct loading?	7M	3	2
		(OR)			
6.	a)	Explain the working of a three phase moving iron type power factor meter with a neat sketch.	7M	3	2
	b)	Explain the various methods for compensating the errors in a energy meter.	7M	3	3
		UNIT-IV			
7.	a)	Describe the working of hay's bridge for measurement of inductance. Derive the equations for balance condition	7M	4	3
	b)	Describe the working of Kelvin's double bridge for measurement of low resistance. Derive the equations for balance condition	7M	4	2
		(OR)			
8.	a)	Describe the working of wien's bridge for measurement of frequency.	7M	4	2
	b)	Describe the working of Wheatstone bridge for measurement of resistance. Derive the equations for balance condition	7M	4	2
		UNIT-V			
9.	a)	Explain briefly the working principle of a thermocouple?	7M	5	2
	b)	Explain briefly the working principle of a Strain gauge?	7M	5	3
		(OR)			
10.	a)	Illustrate the working principle of Peizo-Electric transducers	7M	5	2
	b)	Illustrate the working principle of a Thermistors.	7M	5	2

AR23

CODE: 23ECT209 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

PULSE CIRCUITS AND IC APPLICATIONS

(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	Blooms Level
		UNIT-I			
1.	a)	Explain response of an RC Low pass circuit for Square input?	7M	CO1	L2
	b)	Prove that a RC high pass circuit acts as differentiator?	7M	CO1	L2
		(OR)			
2.	a)	Explain two level clipping using diodes with necessary diagrams?	7M	CO1	L2
	b)	With the help of neat circuit diagram explain the working of a negative clamping circuit.	7M	CO1	L2
		UNIT-II			
3.	a)	Draw the block diagram representing a typical OP-Amp and explain the function of each block.	7M	CO2	L2
	b)	Explain the DC characteristics of an OP-Amp	7M	CO2	L2
		(OR)			
4.	a)	Explain an inverting amplifier and derive the expression for gain	7M	CO2	L2
	b)	What are the ideal characteristics of an operational amplifier?	7M	CO2	L1
		UNIT-III			
5.	a)	How an op-amp can act as a summing amplifier and an averaging circuit explain with neat sketch.	7M	CO3	L1
	b)	Show an op-amp can act as an integrator with neat circuit diagram.	7M	CO3	L2
		(OR)			
6.	a)	Explain an op-amp can act as a Schmitt Trigger to generate square wave with relevant diagrams.	7M	CO3	L2
	b)	Explain about V-I converter?	7M	CO3	L1
		UNIT-IV			
7.	a)	Explain about first order high pass butter worth filter and also draw its frequency response.	7M	CO4	L2
	b)	Recall the pin diagram of a 555 timer IC and explain significance of pins.	7M	CO4	L1
		(OR)			
8.	a)	With a neat diagram explain the wide band pass filter and also draw the frequency response.	7M	CO4	L2
	b)	List the basic building blocks of PLL and explain importance of each block.	7M	CO4	L1
		UNIT-V			
9.	a)	Explain the basic working principle of a binary-weighted resistor DAC and derive expression for output-analog voltage.	7M	CO5	L2
	b)	Explain about R-2R Ladder DAC and derive expression for output-analog voltage?	7M	CO5	L2
		(OR)			
10.	a)	Recall the basic circuit of parallel comparator type A/D converter and explain its operation.	7M	CO5	L1
	b)	With a clear block diagram explain the data conversion procedure for dual slope ADC.	7M	CO5	L2

AR23

CODE: 23CST208 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

Database Management Systems

(COMPUTER SCIENCE AND 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)	Describe entities, attributes, relationships, and constraints with examples.	7M	CO1	L3
	b)	Explain the roles and responsibilities of different Database Users and Administrators.	7M	CO1	L2
		(OR)			
2.	a)	Discuss advantages of DBMS over file systems with suitable examples.	7M	CO1	L3
	b)	Discuss how databases are accessed from application programs.	7M	CO1	L3
		UNIT-II			
3.	a)	Discuss different types of attributes (simple, composite, derived, multivalued) with suitable examples.	7M	CO2	L2
	b)	Explain how ER diagrams are converted into relational schemas with an example.	7M	CO2	L3
		(OR)			
4.	a)	Explain domain constraints, key constraints, entity integrity, and referential integrity.	7M	CO2	L2
	b)	Describe different types of Join operations in Relational Algebra.	7M	CO2	L3
		UNIT-III			
5.	a)	Explain the structure of a basic SQL query. Describe SELECT, FROM, WHERE clauses with suitable examples.	7M	CO3	L2
	b)	What is the usage of 'group by' and 'having' clauses in SQL?	7M	CO3	L3
		(OR)			
6.	a)	Consider the following schema to write queries in Domain relational calculus: Sailor(sid, sname, age, rating) Boats(bid, bname, bcolor) Reserves(sid,bid,day) i. Find the boats reserved by sailor with id 567. ii. Find the names of the sailors who reserved 'red' boats. iii. Find the boats which have at least two reservations by different sailors.	7M	CO3	L3
	b)	Describe the importance of nested queries. Give its application in performing various aggregation operations	7M	CO3	L3
		UNIT-IV			
7.	a)	What are the steps to be followed to convert a relation in 3NF to BCNF?	7M	CO4	L3
	b)	Discuss about Triggers and active Database in SQL with examples. Write the differences between constraints and triggers in SQL	7M	CO4	L3
		(OR)			
8.	a)	Consider the relation R(A,B,C,D,E,F) and FDs A → BC, F → A, C → A, D → E, E → D. A→D is the decomposition of R into R1(A,C,D), R2(B,C,D) and R3(E,F,D) lossless? Explain the requirement of Lossless decomposition	7M	CO4	L3
	b)	What are the reasons for strict 2PL is used in many database systems? How the use of 2PL would prevent interference between the two transactions? Explain.	7M	CO4	L3
		UNIT-V			
9.	a)	Explain the distinction between closed and open hashing of hash based indexing. Discuss the relative merits of each technique in database applications	7M	CO5	L3
	b)	Define the concept of schedule for a set of concurrent transaction. Give a suitable example	7M	CO5	L2
		(OR)			
10.	a)	How records are represented and organized in a file? Explain with suitable example	7M	CO5	L3
	b)	Write the significant differences between B-Trees and B+ Trees for creating dynamic indexes in DBMS.	7M	CO5	L3

AR23

CODE: 23CET208 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

Engineering Geology

(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)	Explain the scope of Engineering Geology in Civil Engineering Projects with examples.	7	01	2
	b)	Define Mineral and discuss the different types of minerals cleavage with suitable examples.	7	01	2
		(OR)			
2.	a)	Describe the physical properties of the Feldspar group of minerals.	7	01	2
	b)	Explain the physical properties of Olivine and Calcite.	7	01	2
		UNIT-II			
3.	a)	Discuss the significance of petrology in civil engineering projects.	7	02	2
	b)	What are dykes? Explain their formation, characteristics, and significance in Civil Engineering.	7	02	2
		(OR)			
4.	a)	Describe the different structures and textures of sedimentary rocks with examples.	7	02	2
	b)	Discuss the geological description and engineering significance of Limestone, Slate, and Gneiss.	7	02	2
		UNIT-III			
5.	a)	Define strike and dip. Explain their significance in geological mapping and civil engineering.	7	03	2
	b)	Explain the classification of faults and their impact on civil engineering structures.	7	03	2
		(OR)			
6.	a)	Explain the engineering considerations of rock weathering with examples of how it affects construction and foundation stability.	7	03	2
	b)	Explain the geological classification of soils and describe the different types of Indian soils with their engineering significance.	7	03	2
		UNIT-IV			
7.	a)	What are the different types of dams? Explain their purposes with examples.	7	04	2
	b)	Discuss the major causes of dam failures in the past. How can geological factors contribute to dam failures?	7	04	2
		(OR)			
8.	a)	What is the purpose of tunnels in civil engineering? Discuss the various effects of tunnelling on the surrounding environment.	7	04	2
	b)	Describe the geological problems encountered during tunnelling and the methods used to overcome them.	7	04	2
		UNIT-V			
9.	a)	Explain the causes and effects of earthquakes. How do earthquakes impact engineering structures?	7	05	2
	b)	Describe seismic belts and the seismic zones of India. How is seismic zoning helpful in engineering construction?	7	05	2
		(OR)			
10.	a)	What are landslides? Explain their causes and effects on the environment and civil engineering projects.	7	05	2
	b)	What is geophysical investigation? Explain its significance in civil engineering with examples.	7	05	2

AR23

CODE: 23CAT205 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

DATA MINING

(Common to CSE(AIML) & CSE (DS) 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	Blooms Level
		UNIT-I			
1.	a)	Discuss star schema and snowflake schema in detail.	7	1	K2
	b)	Discuss various OLAP operations that can be performed on a data cube.	7	1	K2
		(OR)			
2.	a)	Discuss the different types of materialization of data cubes in detail.	7	1	K2
	b)	Differentiate between OLAP and OLTP Systems.	7	1	K3
		UNIT-II			
3.	a)	Discuss KDD Process with a neat sketch.	7	2	K2
	b)	Discuss various feature subset selection methods in detail.	7	2	K2
		(OR)			
4.	a)	Discuss any two predictive data mining tasks in detail.	7	2	K2
	b)	Discuss various sampling approaches related to data pre processing.	7	2	K2
		UNIT-III			
5.	a)	Describe Decision Tree Induction algorithm in detail.	7	3	K3
	b)	Discuss Bayes Theorem in detail.	7	3	K2
		(OR)			
6.	a)	Discuss various causes for Model overfitting.	7	3	K2
	b)	Discuss holdout and random sub sampling methods for evaluating the performance of the classifier.	7	3	K2
		UNIT-IV			
7.		Find the frequent item sets for the following transactional data bases whose minimum support count is 3.	14	4	K3

TID	*List of item_IDs*
T100	I1, I2, I5
T200	I2, I4
T300	I2, I3
T400	I1, I2, I4
T500	I1, I3
T600	I2, I3
T700	I1, I3
T800	I1, I2, I3, I5
T900	I1, I2, I3

		(OR)			
8.	a)	Discuss maximal frequent itemsets in detail.	7	4	K2
	b)	Discuss how FP Growth algorithm is different from Apriori Algorithm?	7	4	K2
		UNIT-V			
9.	a)	Discuss various types of clustering methods in detail.	7	5	K2
	b)	Write the algorithm for k-means.	7	5	K2
		(OR)			
10.	a)	Write the algorithm for DBSCAN	7	5	K2
	b)	Discuss various types of data in cluster analysis.	7	5	K2

AR20

CODE: 20IET214 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

Elements of Building Planning

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.		Explain the manufacturing process of the clay bricks?	10	01	02
		(OR)			
2.	a.	Explain the Objectives, merits and demerits of Ready Mix Concrete?	05	01	02
	b.	What do you mean by seasoning of timber and summarize the defects of timber?	05	01	02
		UNIT-II			
3.	a.	Illustrate the following: a) Set-back or Building line b) Floor Space Index or Floor area ratio	05	02	02
	b.	Classify the Buildings as per National Building Code (NBC)?	05	02	02
		(OR)			
4.	a.	Explain the objectives of building bye-laws and summarize their principles?	05	02	02
	b.	Explain the open space requirements which are essential to satisfy the lighting and ventilation requirement of a building?	05	02	02
		UNIT-III			
5.		What is meant by superstructure and explain the following terms: i) Plinth ii) Plinth Beam iii) Damp Proof Course	10	03	02
		(OR)			
6.	a.	Illustrate the following beams with a neat sketch i. Reinforced Concrete Beam ii. Steel Beam iii. Cantilever Beam	06	03	02
	b.	Determine the estimation of peak discharge for the residential colonies	04	03	05
		UNIT-IV			
7.	a.	Explain the following points related to planning of school (public) building? i) Aspect ii) Prospect and iii) Grouping	06	04	02
	b.	Explain the requirements and minimum standards for group B– Educational Buildings	04	04	02
		(OR)			
8.		Draw the line plan of a hospital with the given site measurement 15mx10m?	10	04	03
		UNIT-V			
9.	a.	Draw the sun path diagram and Summarize the CBRI recommendations for obtaining optimum orientation of a building?	06	05	02
	b.	Illustrate the English and Flemish brick bonds with a neat sketch?	04	05	02
		(OR)			
10.		What do you mean by orientation of building and Explain the criteria for orientation of residential building with reference to climate zones of India?	10	05	02
		UNIT-VI			
11.		Draw the line diagram of plan and elevation for single room residential building with suitable dimensions?	10	06	03
		(OR)			
12.		Draw the single room office building section and elevation with suitable dimensions?	10	06	03

AR20

CODE: 20IET213 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

INTRODUCTION TO NUMBER THEORY

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 g.c.d of 275 and 200, and express it in the form of m.275+n.200.	10	CO1	L3
	(OR)			
2.	Prove that $3^{2n+2} - 8n - 9$ is divisible by 64	10	CO1	L3
	UNIT-II			
3.	Show that $10^n + 3.4^{n+2} + 5 \equiv 0\ (Mod\ 9)$	10	CO2	L3
	(OR)			
4.	Solve the congruence $17x \equiv 9\ \ (Mod\ 276)$	10	CO2	L3
	UNIT-III			
5.	Show that 4(29!)+5! ≡ 0(mod 31). Find 4^{532}(mod 11) by Fermat theorem.	10	CO3	L3
	(OR)			
6.	Solve $x \equiv 2(mod3), x \equiv 4(mod5), x \equiv 5(mod7)$, using Chinese remainder theorem	10	CO3	L3
	UNIT-IV			
7.	Determine the number of divisors and sum divisors of 1800	10	CO4	L3
	(OR)			
8.	Determine $\emptyset(96), \emptyset(720)\ ,\ \emptyset(1200), \emptyset(3600)$ Determine $\mu(11), \mu(15)\ ,\ \mu(17), \mu(20)$	10	CO4	L3
	UNIT-V			
9.	Find NRP &N$\bar{R}$P when p=7,17,19	10	CO5	L3
	(OR)			
10.	Determine whether 85 is quadratic residue of 223 or not	10	CO5	L3
	UNIT-VI			
11.	Using Caesar cipher method , To decrypt the message " wklvlvkrzzhghflskhu " by using transformation $p \equiv c - 3(mod26)od26)$	10	CO6	L3
	(OR)			
12.	To encrypt the plaintext message "MILLENNIUM" using the key "YTWOK''	10	CO6	L3

***

AR20

CODE: 20IET21B **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

Advanced Coding-I

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.	a	Define function, what are the advantages of functions?	5	CO1	K4
	b	Given a number N and an array A of N numbers. Write a code to print the smallest possible result of Ai + Aj + j - i, where $1 \leq i < j \leq N$. **Input** The first line consists a number N ($2 \leq N \leq 100$) number of elements. The second line contains N numbers ($-10^6 \leq Ai \leq 10^6$). Example: Input: 4 20 1 9 4 Output: 7 Explanation: All possible (i, j) where ($1 \leq i < j \leq N$) are : i = 1, j = 2 then result = a1 + a2 + j - i = 20 + 1 + 2-1 = 22. i = 1, j = 3 then result = a1 + a3 + j - i = 20 + 9 + 3-1 = 31. i = 1, j = 4 then result = a1 + a4 + j - i = 20 + 4 + 4-1 = 27. i = 2, j = 3 then result = a2 + a3 + j - i = 1 + 9 + 3-2 = 11. i = 2, j = 4 then result = a2 + a4 + j - i = 1 + 4 + 4-2 = 7. i = 3, j = 4 then result = a3 + a4 + j - i = 9 + 4 + 4-3 = 14. So the smallest possible result is 7.	5	CO1	K6
		(OR)			
2.	a	Define pointer, wild pointer, dangling pointer and pointer to pointer with suitable example.	5	CO1	K1
	b	Given an array A of size N. Write a code to print the array elements after shifting all zeroes in array A to the right. **Input** First line will contain a number N ($1 \leq N \leq 10^3$) number of elements. Second line will contain N numbers ($0 \leq Ai \leq 10^3$) **Example:** **Input:** 4 2 0 0 5 **Output:** 2 5 0 0	5	CO1	K6
		UNIT-II			
3.	a	What is object oriented programming and explain four pillars of OOPs?	5	CO2	K2
	b	Write a C++ program to create Student class with following attributes name, cgpa, dept and member function which returns the Grade of student based on cgpa.	5	CO2	K3
		(OR)			
4.	a	What is polymorphism? Demonstrate polymorphism with a code?	6	CO2	K2
	b	Demonstrate virtual function with code?	4	CO2	K2
		UNIT-III			
5.	a	What is algorithm and define characteristics of an algorithm?	5	CO3	K1
	b	Find the time complexity for the recurrence relation given below. $T(n)=2T(n^{1/2})+1$ for n>1where T(1)=1 for n=1	5	CO3	K4

(OR)

6.	a	How to find Best, Average and Worst case complexity for an Algorithm?	5	CO3	K2

	b	Find the time complexity for below code snippet?
		int sum=0;
		for(int i=1;i<=n; i=i++)
		{
		for(int j=1;j<=n; j=j+2)
		{
		for(int k=1;k<=n; k=k*2)
		{
		sum=sum + i;
		}
		}
		}
			5	CO3	K5

UNIT-IV

7.	a	What is map in STL? Explain different methods in map with examples?	5	CO4	K1
	b	Given an array of integers nums and an integer target, find two indices of the two numbers such that they add up to target. You may assume that each input would have exactly one solution, and you may not use the same element twice assume solution exist. Write a code to find the solution with O (n) complexity. Example: Input: N = 4, nums = [2,7,11,15], target = 9 Output: [0,1] Explanation: Because nums [0] + nums [1] == 9	5	CO4	K6

(OR)

8.	a	What is priority queue in STL explain different methods of priority queue with example?	5	CO4	K1
	b	Given an integer array nums, write a code to print true if any value appears at least twice in the array, and print false if every element is distinct in o (n). **Input**: N = 4, nums = [1,2,3,1] **Output:** true	5	CO4	K6

UNIT-V

9.	a	What is Recursion? Write a recursion code to print binary representation of number?	5	CO5	K3
	b	Write a program to compute x^n with in O(logn)?	5	CO5	K6

(OR)

10.		Given a collection of candidate numbers (candidates) and a target number (target), Write a code to **find all unique combinations** in candidates where the candidate numbers sum is equal to target. Each number in candidates may only be used once in the combination. Note: The solution set must not contain duplicate combinations. **Input**: N = 7, candidates = [10,1,2,7,6,1,5], target = 8 **Output:** [[1,1,6], [1,2,5], [1,7], [2,6]	10	CO5	K6

UNIT-VI

11.	a	How to find Modular multiplicative inverse of a given number?	5	CO6	K3
	b	Given an integer n, write a code to find the number of prime numbers that are strictly less than n?	5	CO6	K6

(OR)

12.	a	Explain naive and better approach of prime numbers.	5	CO6	K5
	b	Given an integer n, write a code to print count of trailing zeroes in n! **Input:** n = 20 **Output:** 4 **Explanation:** Factorial of 20 is 2432902008176640000 which have 4 trailing zeroes.	5	CO6	K6

AR23

CODE: 23CST208 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

Database Management Systems

(COMPUTER SCIENCE AND 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)	Describe constraints with examples.	7M	CO1	L3
	b)	Explain the roles and responsibilities of different Database Users and Administrators.	7M	CO1	L2
		(OR)			
2.	a)	Discuss advantages of DBMS over file systems with suitable examples.	7M	CO1	L3
	b)	Discuss how databases are accessed from application programs.	7M	CO1	L3
		UNIT-II			
3.	a)	Discuss different types of attributes, entities and relationships with suitable examples.	7M	CO2	L2
	b)	Explain how ER diagrams are converted into relational schemas with an example.	7M	CO2	L3
		(OR)			
4.	a)	Explain domain constraints, key constraints, entity integrity, and referential integrity.	7M	CO2	L2
	b)	Describe different types of Join operations in Relational Algebra.	7M	CO2	L3
		UNIT-III			
5.	a)	Explain the structure of a basic SQL query. Describe SELECT, FROM, WHERE clauses with suitable examples.	7M	CO3	L2
	b)	What is the usage of 'group by' and 'having' clauses in SQL?	7M	CO3	L3
		(OR)			
6.	a)	Consider the following schema to write queries in Domain relational calculus: Sailor(sid, sname, age, rating) Boats(bid, bname, bcolor) Reserves(sid,bid,day) i. Find the boats reserved by sailor with id 567. ii. Find the names of the sailors who reserved 'red' boats. iii. Find the boats which have at least two reservations by different sailors.	7M	CO3	L3
	b)	Describe the importance of nested queries with examples.	7M	CO3	L3
		UNIT-IV			
7.	a)	What are the steps to be followed to convert a relation in 3NF to BCNF?	7M	CO4	L3
	b)	Discuss about Triggers and active Database in SQL with examples.	7M	CO4	L3
		(OR)			
8.	a)	Consider the relation R(A,B,C,D,E,F) and FDs A → BC, F → A, C → A, D → E, E → D. A→D is the decomposition of R into R1(A,C,D), R2(B,C,D) and R3(E,F,D) lossless? Explain the requirement of Lossless decomposition	7M	CO4	L3
	b)	What are the reasons for strict 2PL is used in many database systems? How the use of 2PL would prevent interference between the two transactions? Explain.	7M	CO4	L3
		UNIT-V			
9.	a)	Explain the distinction between closed and open hashing of hash based indexing. Discuss the relative merits of each technique in database applications	7M	CO5	L3
	b)	Define the concept of schedule for a set of concurrent transaction. Give a suitable example	7M	CO5	L2
		(OR)			
10.	a)	How records are represented and organized in a file? Explain with suitable example	7M	CO5	L3
	b)	Write the significant differences between B-Trees and B+ Trees for creating dynamic indexes in DBMS.	7M	CO5	L3