

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a Construct an NFA transition graph for the regular expression $(a b)^*abb$ and also represent by a <i>transition table</i> . b Write a LEX program to recognize identifiers, keywords, and numbers.	5 5	CO1	K3 K3
	(OR)			
2.	Explain the various phases of a compiler in detail. Also write down the output for the following expression: position: = initial+ rate * 60	10	CO1	K3
	<u>UNIT-II</u>			
3.	a Define a context-free grammar (CFG). How does it differ from a regular grammar? b Calculate FIRST and FOLLOW for the following grammar: $E \rightarrow E+T T$ $T \rightarrow T*F F$ $F \rightarrow (E) id$	5 5	CO2	K3 K4
	(OR)			
4.	Consider the following context-free grammar: $S \rightarrow SS+ SS* a$ Given the string $aa + a^*$, answer the following: a) Generate a leftmost derivation for the given string. b) Generate a rightmost derivation for the given string. c) Construct a parse tree for the string.	10	CO2	K3

UNIT-III

5. a a) Define LL(1)? 10 CO3 K3
b) Differences between SLR, CLR, LALR parsers?
c) Problems in Top Down Parsing?
d) Define Handle pruning?
e) Define Ambiguous grammar?

(OR)

6. Explain the working principle of CLR(1) parser and construct the parse table for the given grammar $S \rightarrow L=R/R$ $R \rightarrow L$ $L \rightarrow *R/id$ 10 CO3 K3

UNIT-IV

7. a Differentiate between Syntax-Directed Definitions (SDDs) and Syntax-Directed Translation Schemes (SDTs). 5 CO4 K3
b Discuss the applications of Syntax-Directed Translation (SDT) in compiler construction? 5 CO4 K3

(OR)

8. What is an intermediate code? Explain different types of intermediate codes forms and represent the following statement in different forms:
 $W = (A + B) - (C + D) + (A + B + C).$ 10 CO4 K3

UNIT-V

9. a Explain the difference between static, stack, and heap allocation with examples. 5 CO5 K2
b Define basic blocks in the context of code optimization. 5 CO5 K3

(OR)

10. a Explain how loop optimizations are different from local optimizations? 5 CO5 K2
b Describe how parameter passing mechanisms affect run-time storage allocation. 5 CO5 K3

UNIT-VI

11. a Discuss instruction selection important in code generation? Explain with an example. 5 CO6 K3
b Describe the steps involved in a typical code generation algorithm. 5 CO6 K3

(OR)

12. a Explain the difference between register allocation and register assignment. 5 CO6 K2
b Given the following expression and a limited number of registers, allocate registers efficiently:
 $X = A + B * C - D$ Assume only two registers are available. 5 CO6 K3

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

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		<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a	What is an asymptotic notation? Explain different types of asymptotic notations with examples	5	1	K2
	b	What do you mean by performance analysis? Give the algorithm for matrix multiplication and find the time complexity of the algorithm using step-count method.	5	1	K2
(OR)					
2.	a	Give the algorithm for addition of two matrices and determine the time complexity of this algorithm by frequency – count method	5	1	K2
	b	Develop an algorithm to solve Towers of Hanoi problem	5	1	K2
		<u>UNIT-II</u>			
3.	a	Discuss the working strategy of merge sort and illustrate the process of merge sort algorithm for the given data: 43, 32, 22, 78, 63, 57, 91 and 13	5	2	K2
	b	Discuss the time complexity of Binary search algorithm for best and worst case?	5	2	K2
(OR)					
4.	a	Illustrate the tracing of quick sort algorithm for the following set of numbers: 25, 10, 72, 18, 40, 11, 64, 58, 32, 9.	5	2	K2
	b	Write an algorithm based on divide-and-conquer strategy to search an element in a given list. Assume that the elements of list are in sorted order	5	2	K2

UNIT-III

5. a Explain the general principle of Greedy method 5 3 K2
and also list the applications of Greedy method
b Solve the following job sequencing with 5 3 K3
deadlines problem: $(D_1, D_2, D_3, D_4) = (2, 1, 2, 3)$ and $(P_1, P_2, P_3, P_4) = (5, 8, 6, 5)$

(OR)

6. a What is a Spanning tree? Explain Prim's 5 3 K2
Minimum cost spanning tree algorithm with
suitable example.
b Derive the time complexity of the Quicksort 5 3 K2
algorithm for the worst case

UNIT-IV

7. a Discuss the 4 – queen's problem. Draw the 5 4 K2
portion of the state space tree for $n = 4$ queens
using backtracking algorithm.
b Describe the Dynamic 0/1 Knapsack problem. 5 4 K3
Find an optimal solution for the dynamic
programming 0/1 knapsack instance for $n=3$,
 $m=6$, profits are $(p_1, p_2, p_3) = (1, 2, 5)$, weights
are $(w_1, w_2, w_3) = (2, 3, 4)$

(OR)

8. Construct an optimal travelling sales person tour 10 4 K3
using Dynamic Programming for the given data:

0	10	9	3
5	0	6	2
9	6	0	7
7	3	5	0

UNIT-V

9. Write an algorithm for N – queen's problem. 10 5 K3
Give time and space complexity for 8– queen's
problem

(OR)

10. Explain the Graph – coloring problem. And 10 5 K3
draw the state space tree for $m= 3$ colors $n=4$
vertices graph. Discuss the time and space
complexity

UNIT-VI

11. Distinguish between deterministic and non- 10 6 K2
deterministic algorithms?

(OR)

12. Explain the strategy to prove that a problem is 10 6 K2
NP-hard?

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

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	Discuss different types of welds also mention advantageous and disadvantages of welded connections	10	1	2
	(OR)			
2.	An unequal angle 1.5m long is connected to a gusset plate, It carries an ultimate tension of 350kN. Design the section using 4mm weld.	10	1	3
	<u>UNIT-II</u>			
3.	A simply supported beam of span 6m carries a UDL of 30kN/m. In addition to UDL the beam is carrying a central point load of 70kN. The beam is laterally supported. Design the section and check the section for shear and deflection.	10	2	3
	(OR)			
4.	A beam of clear span 10meters has a bearing of 300mm at each end. It has to carry a superimposed load of 60kN/m Design the section as a plated beam assuming that only 12mm mild steel plates are available. The top flange of the plated beam may be assumed to be laterally restrained at 3m.	10	2	3
	<u>UNIT-III</u>			
5.	What Are Tension Members? Discuss about different types of tension members and its behavior	10	3	2
	(OR)			
6.	Design a tension member of a roof truss which carries a factored axial tension of 500kN. Design the connection when (i) No lug angle is provided (ii) Lug angle is provided	10	3	4
	<u>UNIT-IV</u>			
7.	Design a compound column to carry an axial load of 1000 kN. The column consists of two channels placed back to back and laced together. Take effective length of column is 6m.	10	4	4

(OR)

- | | | | | |
|----|---|----|---|---|
| 8. | Design a battened column with channels placed back to back of length 5m carries a factored load of 2400 kN. The column may be assumed to have fixed at both ends. | 10 | 4 | 4 |
|----|---|----|---|---|

UNIT-V

- | | | | | |
|----|---|----|---|---|
| 9. | Design a purlin for a roof truss having the following data: Span of the truss = 10.0m, Spacing of truss = 3.2m c/c, Inclination of roof = 30°, Spacing of Purlin = 2.2m c/c, Wind pressure = 3.0 kN/m ² , Roof coverage = A.C Sheeting weighing 200 N/m ² . Provide a channel section for Purlin. | 10 | 5 | 4 |
|----|---|----|---|---|

(OR)

- | | | | | |
|-----|--|----|---|---|
| 10. | Design a gantry girder to be used in an industrial building carrying a manually operated overhead travelling crane, for the following data. Crane capacity : 300kN Self-weight of the crane girder excluding Self-weight of the trolley: 200kN
Self-weight of the trolley, electric motor, hook, etc. 60 KN Approximate minimum approach of the crane hook to the gantry girder 1.20 m. Wheel base 3.5 m. c/c distance between gantry rails 12m clc distance between columns (span of gantry girder) 8 m Self-weight of rail section: 300N/m. Diameter of crane wheels 150mm. Steel is of grade Fe 410. | 10 | 5 | 4 |
|-----|--|----|---|---|

UNIT-VI

- | | | | | |
|-----|--|----|---|---|
| 11. | A plate girder of span 12m is made-up of web plates of 1600mm x 8mm flange angles 150mm x 115mm x 10mm and two flange plates 480mm x 10mm it carries a uniformly distributed load of 120kN/m including its own weight. Design and sketch the web splices at 6m from one end. | 10 | 6 | 4 |
|-----|--|----|---|---|

(OR)

- | | | | | |
|-----|--|----|---|---|
| 12. | Design a bearing stiffener for a welded plate girder with the following specifications. Web = 1200mm X 8mm thick. Flanges = 2 Nos. of 300X20mm plate on each side. Support reaction = 400kN. Width of the support = 300mm. | 10 | 6 | 4 |
|-----|--|----|---|---|

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

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a. Explain Frame in HTML with relevant examples.	5	CO1	L2
	b. What is list? Explain various types of lists with a program	5	CO1	L3
	(OR)			
2.	a. Discuss different types of CSS with example?	5	CO1	L2
	b. Illustrate different Form tags with suitable syntax?	5	CO1	L3
	<u>UNIT-II</u>			
3.	a. Explain control statements in java script with a program?	5	CO2	L2
	b. Explain Pattern Matching using Regular Expressions	5	CO2	L2
	(OR)			
4.	a. Explain Angular JS Objects and Arrays in detail	5	CO2	L2
	b. Write a Angular JS program for validating the login-page.	5	CO2	L3
	<u>UNIT-III</u>			
5.	a. What is XML? Explain Differences between XML and HTML.	5	CO3	L2
	b. Difference between DOM and SAX parsers?	5	CO3	L2
	(OR)			
6.	Explain XML schemas in detail.	10	CO3	L2
	<u>UNIT-IV</u>			
7.	a. Illustrate Architecture of JDBC Drivers?	5	CO4	L3
	b. Discuss Steps to connect java to database management systems?	5	CO4	L4
	(OR)			
8.	a. Explain types of jdbc drivers in detail.	5	CO4	L2
	b. Differences between statement and prepared statement.	5	CO4	L2
	<u>UNIT-V</u>			
9.	a. Explain about Lifecycle of a Servlet?	5	CO5	L2
	b. How to Read Parameters in servlet with proper syntax and example?	5	CO5	L3
	(OR)			
10.	a. Explain Servlet API in detail.	5	CO5	L2
	b. Write a servlet program to demonstrate generic servlet and http servlet.	5	CO5	L3
	<u>UNIT-VI</u>			
11.	a. Write short notes on javax.servlet Package?	5	CO6	L2
	b. Give an example for servlet and Servlet API.	5	CO6	L2
	(OR)			
12.	a. Write a JSP life cycle in detail.	5	CO6	L3
	b. Explain JSP implicit objects?	5	CO6	L2

Time: 3 Hours

Max Marks: 60

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a) Explain about energy signal, power signal and periodic signal b) Determine whether or not the system is time invariant i) $y(n) = nx(n)$ ii) $y(n) = e^{x(n)}$	(6M) (4M)	CO1 CO1	K2 K3
	(OR)			
2.	a) A discrete time signal has unit sample response $h(n)$ given by $h(n) = \frac{1}{2}\delta(n) + \delta(n-1) + \frac{1}{2}\delta(n-2)$. Determine and sketch magnitude and Phase response. b) State and prove linearity property and time reversal property of Z transform	(5M) (5M)	CO1 CO1	K3 K3
	<u>UNIT-II</u>			
3.	a) Compute DFT of a sequence $x(n) = \{1, 1, 0, 0\}$ b) State and prove time shifting and periodic convolution property of DFS.	(5M) (5M)	CO2 CO2	K3 K3
	(OR)			
4.	a) Compare linear convolution and circular convolution b) Compute IDFT of $Y(k) = \{1, 0, 1, 0\}$	(5M) (5M)	CO2 CO2	K2 K3
	<u>UNIT-III</u>			
5.	Explain Radix-2 DIT FFT algorithm with neat sketch	(10M)	CO3	K2
	(OR)			
6.	a) An 8-point sequence is given by $x[n] = \{1, 2, 3, 4, 4, 3, 2, 1\}$. Compute 8-point DFT of $x(n)$ using radix-2 DIF FFT algorithm b) What is FFT and explain the need for FFT.	(6M) (4M)	CO3 CO3	K3 K2

UNIT-IV

7. a) What are the steps to design analog Butterworth low pass filter and explain. (5M) CO4 K2
b) Explain about Bilinear transformation (5M) CO4 K2
(OR)
8. a) Compare Analog filter and Digital filter (4M) CO4 K2
b) Determine the order and poles of type1 chebyshev filter that has 1 dB ripple in the pass band and pass band frequency =1000 Π rad/s stop band frequency of 2000 Π rad/s and an attenuation of 40dB (6M) CO4 K3

UNIT-V

9. a) What are the advantages of FIR filters over IIR filters and explain (5M) CO5 K2
b) Explain frequency sampling method of FIR filter design (5M) CO5 K2
(OR)
10. a) Explain cascade form realization of FIR Filter (4M) CO5 K2
b) The frequency response of FIR high pass filter is given by (6M) CO5 K3
$$H_d(e^{j\omega}) = 1 \text{ for } \frac{\pi}{4} \leq |\omega| \leq \pi$$
$$= 0 \text{ for } |\omega| \leq \frac{\pi}{4}$$

Determine the filter coefficients for N=11 using Hanning window.

UNIT-VI

11. a) Explain about DSP computational building blocks (5M) CO6 K2
b) Explain on-chip peripherals of TMS320C54XX DSP Processor (5M) CO6 K2
(OR)
12. a) Explain data addressing modes of TMS320C54XX DSP Processor (5M) CO6 K2
b) What is programmable DSP Processor and explain various types of programmable DSP Processor (5M) CO6 K2

Time: 3 Hours

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UNIT-I

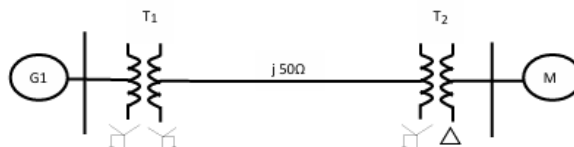
1. a Determine the Y bus matrix by inspection method for line 7 Marks CO 1 Blooms Level Applying
specification as mentioned below.

Line	Impedance (p.u)	Half Line charging admittance(p.u)
1-2	$0.04+j0.02$	$j0.05$
1-4	$0.05+j0.03$	$j0.07$
1-3	$0.025+j0.06$	$j0.08$
2-4	$0.08+j0.015$	$j0.05$
3-4	$0.035+j0.045$	$j0.02$

- b Discuss the advantages of per unit system. 3 1 Understanding

(OR)

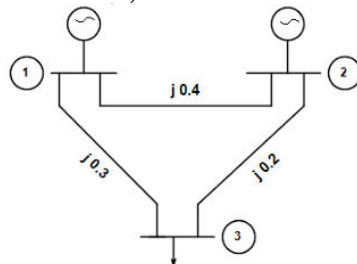
2. Draw the reactance diagram for the power system shown in fig. 10 1 Applying
Neglect resistance and use a base of 100 MVA, 220 kV in 50Ω line. The ratings of the generator, motor and transformer are given below.

Generator: 40MVA, 25 kV, $X''=20\%$ Synchronous motor: 50 MVA, 11 kV, $X''=30\%$ Y- Y Transformer: 40MVA, 33/220 kV, $X=15\%$ Y - Δ Transformer: single phase units each rated 10 MVA, 11/220 kV (Δ/Y), $X=15\%$ **UNIT-II**

3. a Derive the static load flow equations for 'n' bus system 7 2 Understanding
b Classify buses in a power system. 3 2 Understanding

(OR)

4. Determine the load flow solution by Gauss-Seidal method. 10 2 Analyzing
Neglect limits on reactive power generation for the three-bus power system. (one iteration)

Bus 1: Slack bus, $V=1.05 \angle 0^\circ$ p.u.Bus 2: PV bus, $|V|=1.0$ p.u, $P_g=3$ p.u.Bus 3: PQ bus, $P_L=4$ p.u, $Q_L=2$ p.u.**UNIT-III**

5. a Compare Newton-Raphson and Fast Decoupled Load Flow methods. 4 3 Understanding
b Describe the Procedure for load flow solution by Newton Raphson method. 6 3 Applying

(OR)

6. The following is the system data for a load flow solution: 10 3 Analyzing
Determine the voltages at the end of first iteration using newton Raphson method.

Load Data

Bus Code	P	Q	V	Remarks
1	-	-	1.06	Slack
2	0.5	0.2	1+j0	PQ
3	0.4	0.3	1+j0	PQ
4	0.3	0.1	1+j0	PQ

Line Data

Bus Code	Admittance
1-2	2-j8
1-3	1-j4
2-3	0.66-j2.66
2-4	1-j4
3-4	2-j8

UNIT-IV

7. Eliminate bus 4 in the given bus admittance matrix and form new bus impedance matrix. 10 4 Applying

$$Y_{bus} = \begin{bmatrix} -j9.8 & 0.0 & j4.0 & j5.0 \\ 0.0 & -j8.3 & j2.5 & j5.0 \\ j4.0 & j2.5 & -j14.0 & j8.0 \\ j5.0 & j5.0 & j8.0 & -j18.0 \end{bmatrix}$$

(OR)

8. The section bus-bars A and B are linked by a bus-bar reactor rated at 5000KVA with 10% reactance. On bus-bar A there are two generators each of 10000KVA with 10% reactance and on bus-bar B two generators each of 8000KVA with 12% reactance. Calculate the short circuit MVA fed into a dead short circuit between all phases on bus-bar section B with bus-bar reactor in the circuit. 10 4 Analyzing

UNIT-V

9. a Derive the expression for power in terms of symmetrical components. 5 5 Understanding
b Derive an expression for finding the fault current of a LLG of an unloaded generator. 5 5 Applying

(OR)

10. a Show that positive and negative sequence currents are equal to magnitude but out of phase by 180° in a line to line fault. 5 5 Understanding
b The line currents in a 3-phase supply to an unbalanced load are respectively, $I_a=10+20j$, $I_b=12-10j$, $I_c=-3-5j$ Amp, phase sequence is abc. Determine the sequence components of currents. 5 5 Applying

UNIT-VI

11. a Derive the expression for swing equation of the machine and explain its significance. 5 6 Understanding
b A 100 MVA synchronous generator operates on full load at a frequency of 50Hz. The load is suddenly reduced to 50MW. Due to the lag in governor system, the steam valve begins to close after 0.4 Secs. Determine the change in frequency that occurs in this time. Given $H = 5KW-s/KVA$ 5 6 Applying

(OR)

12. a Explain 'Equal Area Criterion of Stability' to a power system and derive necessary equations. 5 6 Understanding
b A generator operating at 50 Hz delivers 1 PU power to an infinite bus through a transmission circuit in which the resistance is ignored, when a fault occurs which reduces the maximum power transferable to 0.5 PU. Whereas the maximum power transferable before the fault was 2.0 PU and 1.5 PU after the fault is cleared. By using the Equal Area Criterion determine the critical clearing angle. 5 6 Analyzing

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- | | <u>UNIT-I</u> | Marks | CO | Blooms Level |
|---|---------------|-------|----|--------------|
| 1. Define the role of managerial economics in business. How does it help in decision-making? | | 10 | 1 | Understand |
| (OR) | | | | |
| 2. a Discuss the factors influencing demand and how they impact market behaviour. | | 5 | 1 | Understand |
| b Understanding b. Explain the concept of cross elasticity and income elasticity of demand with examples. | | 5 | 1 | Understand |
| <u>UNIT-II</u> | | | | |
| 3. Describe the various demand forecasting techniques and their applications in business. | | 10 | 2 | Understand |
| (OR) | | | | |
| 4. a What are the advantages and limitations of demand forecasting techniques? | | 5 | 2 | Understand |
| b Understanding b. Explain the significance of controlled experiments and test marketing in demand forecasting. | | 5 | 2 | Understand |
| <u>UNIT-III</u> | | | | |
| 5. a Define the Marginal Rate of Technical Substitution and explain its importance in production decisions. | | 5 | 3 | Understand |
| b Illustrate the concept of economies of scale with suitable examples. | | 5 | 3 | Understand |
| (OR) | | | | |
| 6. ABC Ltd. provides the following cost data:
Sales Revenue: Rs. 5,00,000 Variable Cost: Rs. 2,00,000 Fixed Cost: Rs. 1,50,000 | | 10 | 3 | Apply |
| Calculate: a) Contribution margin
b) Break-even sales
c) Profit when sales increase by 20% | | | | |

UNIT-IV

7. a Differentiate between oligopoly and monopolistic competition with examples. 5 4 Understand
b Explain the pricing strategies used in different market structures. 5 4 Understand

(OR)

8. Discuss the price-output determination under monopoly with the help of a suitable diagram. 10 4 Understand

UNIT-V

9. Elaborate on the importance of capital budgeting in business investments. Discuss any two traditional methods of project evaluation. 10 5 Apply

(OR)

10. A company is evaluating an investment project requiring Rs. 2,50,000. The estimated annual cash inflows are: 10 5 Apply

Year	CIF
1	60,000
2	70,000
3	80,000
4	75,000
5	65,000

Calculate NPV and payback period considering a discount rate of 10%.

UNIT-VI

11. Record the following transactions in the journal of Sunil Enterprises: Date Particulars 2.2.2023 Commenced business with capital Rs.70,000 5th Purchased raw materials for cash Rs.25,000 10th Sold goods to Anil on credit Rs.18,000 15th Paid office rent Rs.4,000 22nd Received cash from Anil Rs.10,000 27th Paid wages to workers Rs.6,500 30th Purchased furniture for office Rs.5,000. 10 6 Apply

(OR)

12. What is financial statement analysis? Discuss the different types of financial statements and their significance in business decision-making. 10 6 Understand

III B.Tech II Semester Supplementary Examinations, July, 2025
ADVANCED JAVA AND WEB TECHNOLOGIES
(INFORMATION TECHNOLOGY)

Time: 3 Hours

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		Marks	CO	Blooms Level
UNIT-I				
1.	a) Describe the standard structure of an HTML document.	5	CO1	L2
	b) Design a simple webpage with a navigation bar using CSS.	5	CO1	L3
(OR)				
2.	a) What is a CSS selector? Explain different types of selectors with examples.	5	CO1	L2
	b) Identify three new features introduced in HTML5.	5	CO1	L3
UNIT-II				
3.	a) Write Keywords and operators in JavaScript	5	CO2	L3
	b) What are constructors in JavaScript? How are they different from regular functions?	5	CO2	L3
(OR)				
4.	a) Differentiate between let, var, and const in JavaScript.	5	CO2	L2
	b) Examine the difference between == and === in JavaScript with suitable examples.	5	CO2	L4
UNIT-III				
5.	a) Write an Angular JS expression to display the sum of two numbers entered by a user.	5	CO3	L3
	b) Write are the advantages of Angular JS.	5	CO3	L2
(OR)				
6.	a) Explain MVC architecture in Angular JS.	5	CO3	L3
	b) Explain any five directives in Angular JS.	5	CO3	L3
UNIT-IV				
7.	a) What is the role of parsers in XML processing?	5	CO4	L2
	b) Compare and contrast DOM (Document Object Model) and SAX (Simple API for XML) parsers.	5	CO4	L2
(OR)				
8.	a) What are well-formed XML documents , and why are they important?	5	CO4	L2
	b) Explain the difference between internal DTD and external DTD .	5	CO4	L3
UNIT-V				
9.	a) Write a Java program using JDBC to fetch and display all rows from a database table.	5	CO5	L3
	b) What is the purpose of the doGet() and doPost() methods in Servlets?	5	CO5	L2
(OR)				
10.	a) What are the different methods of the Servlet API ?	5	CO5	L2
	b) Explain life cycle of servlet.	5	CO5	L3
UNIT-VI				
11.	a) Create a JSP page that demonstrates the use of request, response, and session implicit objects.	5	CO6	L3
	b) How does JSP handle error handling and exception management?	5	CO6	L2
(OR)				
12.	a) Develop a JSP page that accepts user input (name, age) from an HTML form and displays it on the page.	5	CO6	L2
	b) Examine the difference between session management using cookies and session management using URL rewriting .	5	CO6	L4

AR18

CODE: 18MET313

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech II Semester Supplementary Examinations, July, 2025

**CAD/CAM
(MECHANICAL ENGINEERING)**

Time: 3 Hours

Max Marks: 60

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UNIT-I

1. a) Summarize the benefits and applications of CAD. 6M
- b) Explain with neat sketch product life cycle. 6M

(OR)

2. a) Demonstrate the CAD database models with the help of neat sketches. 6M
- b) Explain about the following 3D transformations: 6M
- (i) Translation and (ii) Rotation

UNIT-II

3. a) What are the requirements of geometric modelling? 6M
- b) Distinguish between 2D and 3D wireframe models. 6M

(OR)

4. a) Define the cubic spline and Bezier curves. Which of them is more popular in CAD and why? 6M
- b) Distinguish between solid modelling using CSG technique and B-rep technique. 6M

UNIT-III

5. a) With a neat sketch, explain the functioning of a NC machine. State three important differences between NC and CNC. 6M
- b) Differentiate between CNC and DNC and list down its advantages. 6M

(OR)

6. a) Describe various G and M codes used in CNC machines? 6M
- b) What are the features of CNC machining centre? 6M

UNIT-IV

7. a) Explain Retrieval type CAPP system with the help of a block diagram. 6M
- b) What is group technology? Classify a component using any one type of coding system. 6M

(OR)

8. a) Explain about OPITZ coding system in group technology. 6M
- b) Briefly explain the need of CAPP (Computer Aided Process Planning). 6M

UNIT-V

9. a) List out the objectives of Flexible Manufacturing Systems. 6M
- b) Discuss about various workstations that are used in FMS. 6M

(OR)

10. a) With a neat sketch explain about machine layouts used in FMS. 6M
- b) With a neat sketch discuss about various parts of Flexible Manufacturing Systems. 6M

AR18

CODE: 18CET317

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech II Semester Supplementary Examinations, July, 2025

**Basic Design of Steel Structures
(CIVIL ENGINEERING)**

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Explain various types of bolts and bolted joints with neat sketches. 6 M
b) Write a brief note on Specifications of bolted joints. 6 M
(OR)
2. Design the size of end fillet weld to connect two plates with cross-section of 125×8 mm and 125×12 mm which are subjected to a tension of 100 kN at working load. The ultimate strength of the plates. $f_u = 410$ MPa. 12 M

UNIT-II

3. a) Explain the terms 6 M
a) Beam b) Design beam strength c) Design shear strength d) Web buckling
b) List different rolled steel sections used in the construction of steel structures with designation. Also mention economical sections for beams and truss members. 6 M
(OR)
4. Design a rolled steel beam using I-section for a simply supported beam of span 5.5 m to carry a uniformly distributed load of 20 kN/m excluding self-weight. Assume that the compression flange of the beam is laterally restrained and $f_y = 250$ MPa. 12 M

UNIT-III

5. Select a suitable angle section to carry a factored tensile force of 300 kN, assuming a single row of M20 bolts. Take $f_y = 250$ N/mm² 12 M
(OR)
6. Design a rolled steel column section to carry an axial load of 1000 kN. The column is 4 m long and adequately held in position but not in direction at both ends. 12 M

UNIT-IV

7. Design a hand operated travelling crane simply supported by gantry girder for the given data: 12 M
Span of gantry girder = 5 m
Span of crane girder = 15 m
Crane capacity = 200 kN
Self weight of crane girder excluding trolley = 200 kN
Self weight of trolley = 30 kN
Minimum hook approach = 1m
Distance between wheels = 3.5m c/c
Self weight of rails = 0.3 kN/m
(OR)

8. Design a suitable Purlin for an industrial building to support a galvanized corrugated iron sheet given
spacing of the trusses = 6 m,
Inclination of the main rafter = 30° ,
Spacing of purlins = 1.5 m,
Weight of corrugated sheeting = 130 N/m^2 ,
Live load = 0.6 kN/m^2 ,
Wind load = 1.8 kN/m^2 , suction,
Yield stress in steel = 250 MPa 12 M

UNIT-V

9. Design a welded plate girder subjected to a maximum factored moment of 2500 kN.m and a factored shear force of 400 kN . Use intermediate stiffener only. Draw the cross section and longitudinal section of the plate girder. 12 M
- (OR)**
10. Design a welded plate girder of span 12 m to carry a superimposed load of 30 kN/m without bearing and intermediate stiffeners. Draw the cross section and longitudinal section of the plate girder. 12 M

AR18

CODE: 18ECT316

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech II Semester Supplementary Examinations, July, 2025

**DIGITAL SIGNAL PROCESSING
(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) Determine whether the following system is: i) Linear ii) Causal and iii) Stable 6M
 $y[n] = \log_{10} |x[n]|$. Justify your answer.
- b) Define time invariant system. Determine the following systems 6M
are time invariant or not: (i) $y[n] = x[n] + nx[n - 2]$ (ii) $y[n] = x[n/2]$.

(OR)

2. a) Find the z-transform and ROC of the signal $x[n] = [3(3)^n - 4(2)^n] u[n]$. 6M
- b) Determine whether the following systems are causal or not: (i) $y[n] = x[n] + x^2[n-1]$ 6M
and (ii) $y[n] = \frac{1}{2} \left[x[n-1] + \frac{x[n]}{x[n-1]} \right]$.

UNIT-II

3. a) Explain the procedure to compute 8-point DFT using DIT FFT algorithm. 6M
- b) Determine the output response $y[n]$ if $h[n] = \{1, 1, 1\}$ and $x[n] = \{1, 2, 3, 1\}$ using linear 6M
convolution.

(OR)

4. a) Find the 4-point IDFT of $[k] = \{10, -2 + j2, -2, -2 - j2\}$ using DIF FFT 6M
algorithm.
- b) Distinguish between linear convolution and circular convolution. 6M

UNIT-III

5. a) Find the transfer function in terms of $[z]$, for a 3rd order Butterworth digital filter 6M
using impulse invariant transformation method. Assume $T = 1$ sec.
- b) Distinguish between FIR and IIR filters. 6M

(OR)

6. a) Implement the IIR filter with difference equation $[n] = -0.1[n-1] + 0.72y[n-2]$ 6M
 $+ 0.7x[n] - 0.252x[n-2]$ in parallel form.
- b) Obtain direct form I and cascade realizations of system described by 6M
the equation, $y[n] = y[n-1] - (1/2)y[n-2] + x[n] - x[n-1] + x[n-2]$

UNIT-IV

7. a) Explain the properties of LMS algorithm. 6M
- b) Explain the concept of Direct form linear prediction filtering. 6M

(OR)

8. a) Explain how Weiner smoothing is used in noise cancellation. 6M
- b) Explain about prediction filters. 6M

UNIT-V

9. a) Explain the short direct addressing and circular addressing modes in 6M
programmable DSP's.
- b) Write a short notes on the following: (i) Multiple access memory (ii) Multiported 6M
memory

(OR)

10. Draw and explain the architecture of TMS320C54XX DSP Processor. 12M

AR18

CODE: 18EET315

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech II Semester Supplementary Examinations, July, 2025

**POWER SYSTEM ANALYSIS
(ELECTRICAL AND ELECTRONICS ENGINEERING)**

Time: 3 Hours

Max Marks: 60

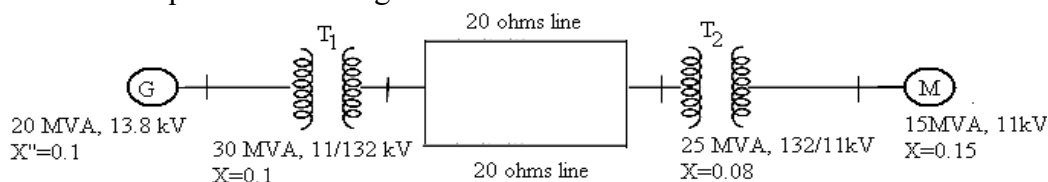
Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

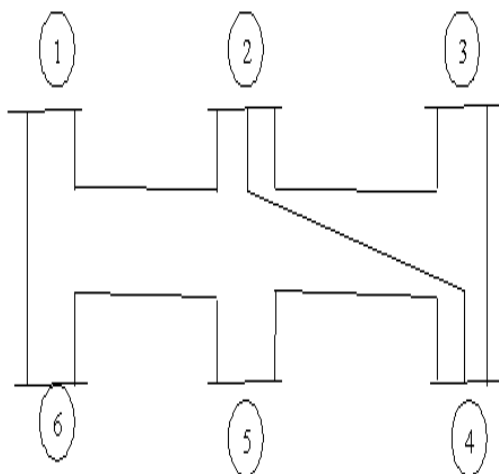
UNIT-I

1. a) Identify and list the merits and Demerits of Per Unit Representation. 6M
b) Develop the per unit impedance diagram of the network shown in the figure. Choose base quantities as the generator values?



(OR)

2. a) Derive an expression for Bus Admittance Matrix by using Singular Transformation Method. 6M
b) For the system as shown in figure, construct Y_{BUS} by using Direct Inspection method. The parameters of various elements are given in table. Take node 1 as reference node.



Element	Reactance in p.u
1-2 (1)	0.04
1-6 (2)	0.02
2-4 (3)	0.03
2-3 (4)	0.02
3-4 (5)	0.08
4-5 (6)	0.06
5-6 (7)	0.05

UNIT-II

3. a) Briefly Explain about the classification of Buses in Power System. 6M
b) Derive the Static Load Flow Equations for n Bus System. 6M

(OR)

4. The system data for load flow solution are given in the following tables. Determine the voltages at various buses at the end of the first iteration by using GS method. Take $\alpha=1.6$

Bus code	Admittance
1-2	2-j8
1-3	1-j4
2-3	0.666-j2.664
2-4	1-j4
3-4	2-j8

Table-2: Bus specifications				
Bus code	P	Q	V	Remarks
1	-	-	1.06	Slack bus
2	0.5	0.2	-	PQ bus
3	0.4	0.3	-	PQ bus
4	0.3	0.1	-	PQ bus

12M

UNIT-III

5. Build step by step algorithm for modification of Z - Bus (Neglecting Mutual Coupling) 12M
- (OR)
6. a) Derive the Maximum Momentary Current when a transient occurred on transmission line due to short Circuit. 6M
- b) The short circuit MVA at the bus bars for a power plant A is 1200 MVA and for another plant B is 1000 MVA at 33 KV. If these two are to be interconnected by a tie-line with reactance 1.2 ohm. Determine the possible short circuit MVA at both the plants. 6M

UNIT-IV

7. a) Explain the sequence networks of a three-phase alternator. 6M
- b) In a 3-phase, 4-wire system, the currents in R, Y and B lines under abnormal conditions of loading are as under: $I_R = 100 \angle 30^\circ$ A ; $I_Y = 50 \angle 300^\circ$ A ; $I_B = 30 \angle 180^\circ$ A Calculate the positive, negative and zero sequence currents in the R-line and return current in the neutral wire? 6M
- (OR)
8. a) Derive an expression for the fault current for a double line fault as an unloaded generator and draw its equivalent circuit. 6M
- b) A 25 MVA, 13.2 kV alternator with solidly grounded neutral has a sub transient reactance of 0.25 p.u. The negative and zero sequence reactance's are 0.35 and 0.1 p.u. respectively. A single line to ground fault occurs at the terminals of an unloaded alternator; determine the fault current and the line-to-line voltages. Neglect resistance. 6M

UNIT-V

9. Show that if the X of the line could be varied with resistance R remaining constant, the maximum steady state power that could be transmitted over the line would be greater when $X = \sqrt{3}R$. 12M
- (OR)
10. Elaborate the recent methods to improve the transient state stability. 12M