AR23

CODE: 23MET312 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B. Tech II Semester Regular Examinations, April-2026

THERMAL ENGINEERING-II

(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 basic principles in reheating and regeneration techniques of improving the performance of a steam power plant with simplified sketches.	7 M	CO1	L2
	b)	Show the simple Rankine cycle on T-s and h-s diagrams.	7 M	CO1	L1
		(OR)			
2.	a)	What is the importance of the binary vapour cycle? Explain the working of a simple Binary vapour cycle with a neat sketch.	8M	CO1	L1
	b)	A steam power plant works between pressure limits of 40 bar and 0.05 bar. If the steam is supplied dry and saturated, and the cycle is operating in the Rankine cycle. Find (i) Cycle efficiency (ii) Specific steam consumption.	6M	CO1	L3
		UNIT-II			
3.	a)	Explain the working of the Benson boiler with a neat sketch and list its salient features.	8M	CO2	L2
	b)	List out different mountings used in boilers and state their functions.	6M	CO2	L1
		(OR)			
4.	a)	Explain the working of the Cochran boiler with a neat sketch.	8M	CO2	L4
	b)	Classify boilers based on at least 7 factors.	6M	CO2	L2
		UNIT-III			
5.	a)	Derive an expression for discharge through a steam nozzle.	8M	CO3	L2
	b)	Explain the working of different nozzles with simplified sketches.	6M	CO3	L3

(OR)

6.	a)	Distinguish between Jet and Surface condensers.	7M	CO3	L4
	b)	In a surface condenser the vacuum maintained is 700 mm Hg. The barometer reads 754 mm Hg when the condensate temperature is 180 °C. Determine (i) the mass of air present per kg of steam, (ii) Vacuum efficiency.	7M	CO3	L3

UNIT-IV

7.		Explain the working of a simple Impulse turbine with a neat sketch. Also show the pressure and velocity variations across the stage.	14M	CO4	L2

(OR)

8.	a)	The following data refer to a particular stage of a Parson's reaction turbine: Speed of the turbine=1500 rpm, Mean diameter of rotor= 1m, Stage efficiency =80%, Blade outlet angle=200, speed ratio =0.7. Determine the available isentropic enthalpy drop in the stage.	8M	CO4	L1
	b)	What is Degree of Reaction? Show that the blades are symmetrical for 50% of degree of reaction.	6M	CO4	L3

UNIT-V

9.	a)	Explain the operation and characteristics of an Alkaline Fuel Cell (AFC)	10M	CO5	L4
	b)	Discuss the electrochemical reactions taking place at the anode and cathode in a Alkaline fuel cell.	4M	CO5	L2

(OR)

10.		Compare different types of fuel cells (PEMFC, SOFC, AFC, PAFC) based on efficiency, operating temperature, and applications	14M	CO5	L4

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CODE: 23MET206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

HEAT AND MASS TRANSFER

(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)	Explain in brief with examples three modes of heat transfer. expression for the same.	4M	1	2
	b)	Derive starting from fundamentals, general heat conduction equation in Cylindrical coordinates.	10M	1	2
		(OR)			
2.	a)	. What do you understand by critical radius of insulation? Obtain an	4M	1	2
	b)	A concrete wall (k=1.4 W/m K) of 10 cm thickness is to be plastered with gypsum (k=0.48 W/m K) so that the heat losses from the wall do not exceed 500 W/m^2 when the inner and outer surfaces of the wall are at 110 ^0C and 40^0C , respectively. Determine the thickness of plastering to be added to the concrete wall.	10M	1	3
		UNIT-II			
3.	a)	What is the purpose of a fin? What are the different types of fins and Give the real time examples of usage of fins.	4M	2	2
	b)	Derive expression for temperature distribution and heat dissipation for an infinitely long fin.	10M	2	3
		(OR)			
4.	a)	Derive the expression for temperature as an expression as a function of time in lumped heat capacity system.	6M	2	2
	b)	A thick stainless-steel slab =1.610 m2/s and =k 60 W/m C is initially at a uniform temperature of 150^0C . Its surface is suddenly lowered to 20^0C . By treating this as a one-dimensional transient heat conduction problem in a semi-infinite medium, determine the temperature at a depth 2 cm from the surface and the heat flux at the surface 1 min after the surface temperature is lowered.	8M	2	3
		UNIT-III			
5.	a)	Sketch the boundary layer development of a flow over a flat plate and explain the significance of boundary layer.	6M	3	2
	b)	Determine the thickness of the velocity boundary layer and the local shear stress at 3m from the leading edge of a flat plate for the boundary layer flow of air at atmospheric pressure and 90^0C with a velocity of 3m/s.	8M	3	3
		(OR)			
6.	a)	Define Reynolds, grashof number and prandtl number. Explain their importance in convection heat transfer?	6M	3	2
	b)	Write the differences between (i) natural and forced convection (ii) Laminar flow and Turbulent flow	8M	3	2

UNIT-IV

7.	a)	What are the differences between film wise condensation and drop wise condensation?	6M	4	2
	b)	Explain the different stages of pool boiling with neat sketch.	8M	4	2
		(OR)			
8.	a)	Give the classification of heat exchangers	4M	4	2
	b)	A counter flow heat exchanger is used to cool 2000kg/hr of oil (cp= 2.5 kJ/kg K) from 105°C to 30°C by the use of water entering 15°C. If the overall heat transfer coefficient is expected to be 1.5kW/m^2K, make Calculations for the water flow rate, the surface area required and the effectiveness of heat exchanger. Assume that the exit temperature of the water is not to exceed 80°C.	10M	4	3

UNIT-V

9.	a)	Explain the concept of black body	4M	5	2
	b)	State and prove Kirchhoff's law of thermal radiation.	10M	5	2
		(OR)			
10.	a)	State and explain Fick's first law of diffusion.	6M	5	
	b)	Calculate the radiation exchange per square meter of the area between two infinite parallel black plates at 300^0C and 150^0C. If the surfaces were to be gray, having an emissivity of 0.9 and 0.7, respectively. Estimate the net energy transfer.	8M	5	3

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CODE: 23EET312 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B. Tech II Semester Regular Examinations, April,2026

POWER SYSTEM ANALYSIS

(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)	Derive the expression for how the Z_{Bus} is modified when an element is connected between new bus and reference bus?	7M	1	2
	b)	Obtain the per-unit impedance diagram of the power system network, as shown in Fig-1. Choose base quantities for the generator circuit.	7M	1	3

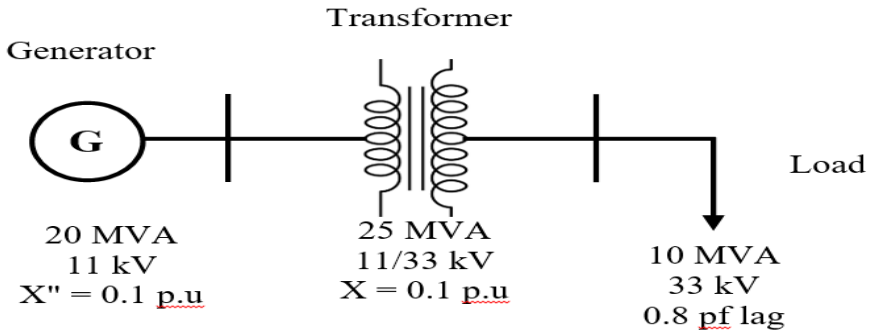

Fig-1. Single-line diagram of the power system network.

(OR)

2.	a)	Find Y-bus for a network with following data by direct inspection method. Line impedance and line charging data:	7M	1	2

Bus code	Line impedance (p.u.)
1-2	$0.02 + j\,0.1$
1-3	$0.05 + j\,0.25$
2-3	$0.04 + j\,0.2$

	b)	Define per unit system and write advantages of per unit system.	7M	1	2
		UNIT-II			
3.	a)	Derive the static power flow equations for a "n" Bus System.	7M	2	3
	b)	Write the algorithm for Gauss seidal method.	7M	2	3

(OR)

4. The series impedance & shunt admittance of each line and the bus specifications and power input at these buses are tabulated as follows. Determine Voltage at Bus-2 by using Gauss Siedel method after first iteration. 14M 2 4

Bus code	Line impedance (p.u.)
1-2	0.028+ *j*0.15
1-3	0.025+ *j*0.11
2-3	0.030+ *j*0.35

Bus	P_G	Q_G	P_L	Q_L	Bus voltage
1	--	--	1.0	0.5	1.03 + *j*0 (Slack bus)
2	0	0	2.0	1.0	Unspecified (PQ bus)
3	0	0	1.2	0.5	Unspecified (PQ bus)

UNIT-III

5. a) with the help of a neat flow chart Explain the Newton-Raphson method of load flow solution. 7M 3 3
   b) Comparison between Gauss-seidel method and NR method 7M 3 2

(OR)

6. a) Develop an algorithm for FDLF load flow method 7M 3 3
   b) Derive the generalized expressions for elements of the Jacobian matrix for the decoupled load method. 7M 3 3

UNIT-IV

7. a) Derive the positive, negative and Zero sequence impedance of 3-phase transmission line. 7M 4 2
   b) Symmetrical components of a set of unbalanced 3 phase voltage are V_0 = j0.6; V_1 = 0.866 + j0.5; V_2 = 0.693-j0.4 Amp. Determine original unbalanced phase voltages. 7M 4 3

(OR)

8. a) Derive the expression for fault current for a double line (L-L) fault at the terminals of an unloaded three-phase alternator. Assume that the alternator neutral is solidly grounded. 7M 4 2
   b) Discuss the different types of unsymmetrical faults that occur in a 3-Phase system 7M 4 3

UNIT-V

9. a) What are the methods considered for improving steady state stability? 7M 5 3
   b) Explain critical clearing time and critical clearing angle, and Derive the expressions. 7M 5 3

(OR)

10. a) Derive the swing equation in transient stability. 7M 5 2
    b) What is Equal Area Criteria and Explain the applications of Equal Area Criterion. 7M 5 3

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CODE: 23ECT313 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2026

MICROPROCESSORS AND MICROCONTROLLERS

(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)	Discuss about the register organization of 8086 Microprocessor	7	1	2
	b)	Describe 8086 timing diagrams.	7	1	2
		(OR)			
2.	a)	Describe the pin configuration of 8086 Microprocessor	7	1	2
	b)	Briefly discuss about different types of interrupts	7	1	2
		UNIT-II			
3.	a)	Describe about flag manipulation instructions	7	2	1
	b)	Briefly discuss about assembly directives used in 8086 Microprocessor	7	2	2
		(OR)			
4.	a)	Write an ALP to find the largest number in the given array	7	2	6
	b)	Write the differences between procedures and macros	7	2	2
		UNIT-III			
5.	a)	Discuss operating Modes of 8255.	7	3	2
	b)	Briefly explain about 8251.	7	3	4
		(OR)			
6.	a)	Discuss about the priority modes in 8259A.	7	3	2
	b)	Discuss about the architecture of Intel 8255.	7	3	4
		UNIT-IV			
7.	a)	Compare 80386, 80486, and Pentium processors.	7	4	2
	b)	Discuss about CPSR and its flags in ARM	7	4	2
		(OR)			
8.	a)	Describe paging techniques used in advanced microprocessors.	7	4	4
	b)	Explain ARM architecture in detail with diagram.	7	4	3
		UNIT-V			
9.	a)	Explain addressing modes of 8051.	7	5	3
	b)	Discuss different types of interrupts in 8051.	7	5	2
		(OR)			
10.	a)	Describe timer modes of 8051.	7	5	4
	b)	Explain the difference between timer and counter.	7	5	2

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CODE: 23CET312 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

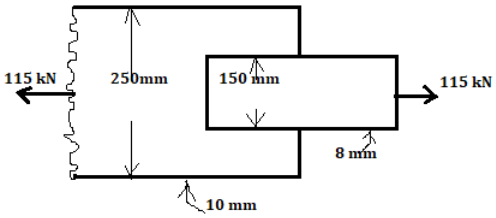
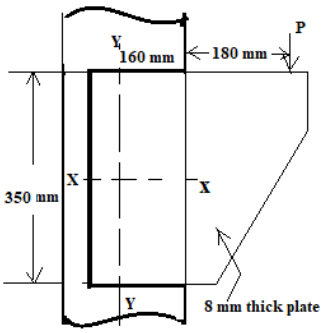
III B.Tech II Semester Regular Examinations, April,2026

DESIGN OF STEEL STRUCTURES

(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 how strength of bolt is ascertained by IS	4	1	2
	b)	Design a suitable fillet weld to connect the two plates as shown in figure. 	10	1	3
		(OR)			
2.	a)	Compare between the welded and riveted connections	4	1	2
	b)	A thick bracket plate of 8 mm is connected with the flange of column ISHB 300@577 N/m. Find the size of the weld to transmit a factored load of P = 190 kN. 	10	1	3
		UNIT-II			
3.		A cantilever beam of length 4.5 m supports a dead load (including self-weight) of 18 kN/m and a live load of 12 kN/m. The compression flange of the beam is laterally supported. Assume a bearing length of 100 mm. Take f_y = 250 MPa, and E = 2× 10^5 MPa. Design the beam.	14	2	3
		(OR)			
4.		Design a simply supported steel joist of 5 m effective span, carrying a uniformly distributed load 12 kN/m inclusive of self-weight. The compression flange of the joist is laterally unrestrained. Take f_y = 250 Mpa.	14	2	3
		UNIT-III			
5.	a)	What is the need for Built up column sections and discuss about design of the column with battens.	4	3	2
	b)	Design a laced column of length 12 m consisting of two channels placed back-to-back to carry an axial factored load of 1600 kN. The column is restrained in position and direction at both ends.	10	3	3

(OR)

6.	a)	Discuss about the modes of failures in tension member.	4	3	2
	b)	Determine the design tensile strength of a roof truss member consists of 2 ISA 100×75×10 mm are connected to 10 mm gusset plates by 6 mm weld to transfer tension. Both angles are connected to 100 mm leg back-to-back. The effective length of weld is 220 mm.	10	3	3

UNIT-IV

7.	a)	Discuss the design of purlin as per IS 875.	4	4	2
	b)	Two electrically operated overhead travelling cranes are to be used in a bay of an industrial building. Design the gantry girder main section for the following data: i) Crane capacity = 200 kN ii) Bay width = 18 m iii) Spacing of columns =4 m iv) Weight of each crane and crab = 200 kN v) Minimum approach of crane hook = 1.0 m vi) Wheelbase = 3.5 m vii) Minimum distance between cranes =1.6 m viii) Weight of trolley = 50 kN. Assume any suitable missing data.	10	4	4

(OR)

8.		Discuss the steps involved in the design of Gantry	4	4	2
		Determine the design loads on the purlins of an industrial building near Hyderabad. Given Class of building: General with a life of 50 years Terrain: Category 2: Maximum dimension 50 m; Width of building 18 m. Height at eve level 8 m; Topography $\theta<3^0$; Permeability: Medium; span of truss: 16m; Pitch:1/4: Sheeting: A.C sheets, Spacing of purlins =1.5 m; Spacing of trusses = 4.5 m.	10	4	3

UNIT-V

9.		Design stiffener for a welded plate girder with the following specifications. Web = 820 mm × 6 mm thick, flanges = 2 No.s of 200 × 12 mm plate on each side, support reaction = 200 kN, width of support = 300 mm.	14	5	4

(OR)

10.		Design a welded plate girder of span 24 m to carry super imposed load of 35 kN/m avoid use of stiffeners.	14	5	4

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CODE: 23BHT314 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2026

Managerial Economics and Management Science

(Common to CSE, CSE(AIML), CSE(DS) & 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	Blooms Level
		UNIT-I			
1.	a)	Define Managerial Economics. Explain the nature of Managerial Economics.	7	1	L2
	b)	Define demand. Explain the determinants of demand.	7	1	L2
		(OR)			
2.	a)	Discuss the exceptions to the Law of Demand?	7	1	L2
	b)	Define demand forecasting and explain the factors governing demand forecasting.	7	1	L2
		UNIT-II			
3.	a)	Explain the concept of Marginal Rate of Technical Substitution (MRTS).	7	2	L1
	b)	From the following information of a company, calculate (a) P/V Ratio and (b) BEP	7	2	L3

Period	Sales (Rs.)	Profit (Rs.)
I	1,10,000	4,000
II	1,50,000	12,000

		(OR)			
4.	a)	Explain the laws of returns in production.	7	2	L2
	b)	Explain the following types of costs: fixed cost, variable cost, explicit cost, and implicit costs.	7	2	L2
		UNIT-III			
5.	a)	Explain the main features of perfect competition.	7	3	L2
	b)	How is price and output determined in a monopoly market?	7	3	L2
		(OR)			
6.	a)	Explain price-output determination under perfect competition under market period.	7	3	L2
	b)	Define Monopolistic Competition and explain its features.	7	3	L2
		UNIT-IV			
7.	a)	Define management and organization. What are the functions of management? Explain briefly.	7	4	L2
	b)	Explain different leadership styles with suitable examples.	7	4	L2
		(OR)			
8.	a)	Explain any seven principles of management given by Henri Fayol.	7	4	L2
	b)	Explain Maslow's Hierarchy of Needs Theory.	7	4	L2
		UNIT-V			
9.	a)	Explain the functions of marketing and their importance in business.	7	5	L2
	b)	Explain marketing strategies based on the product life cycle.	7	5	L2
		(OR)			
10.	a)	Define Human Resource Management (HRM), Human Resource Development (HRD), and Personnel Management. Explain their differences.	7	5	L2
	b)	Explain the basic functions of an HR manager in an organization.	7	5	L2

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CODE: 20HST302 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(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	Blooms Level
	UNIT-I			
1.	Define Managerial Economics. Explain its nature and scope in detail.	10	1	Understanding
	(OR)			
2.	Describe the methods of measuring price elasticity of demand	10	1	Understanding
	UNIT-II			
3.	Explain the various factors governing demand forecasting with suitable examples.	10	2	Understanding
	(OR)			
4.	Compare qualitative and quantitative methods of demand forecasting.	10	2	Understanding
	UNIT-III			
5.	Discuss the law of variable proportions (laws of returns) with suitable examples.	10	3	Understanding
	(OR)			
6.	Explain the Cobb-Douglas production function and its properties.	10	3	Understanding
	UNIT-IV			
7.	Explain the characteristics of different market structures with examples.	10	4	Understanding
	(OR)			
8.	Explain price determination under perfect competition with diagrams.	10	4	Understanding
	UNIT-V			
9.	Discuss the objectives and significance of capital budgeting in an organization.	10	5	Understanding
	(OR)			
10.	A Project involves initial outlay of Rs.1,29,600. Its Working life is expected to be 3 years. The cash inflows are likely to be as follows:year 1 Rs. 64,000: Year 2 Rs 56000 and year 3 Rs 24000. Compute IRR	10	5	Applying
	UNIT-VI			
11.	Explain the concept of **Double Entry Book Keeping**. Discuss its principles and advantages.	10	6	Understanding
	(OR)			
12.	Record the following transactions in **Journal** and post them into **Ledger**: • Started business with ₹80,000 • Purchased goods for cash ₹20,000 • Purchased goods on credit from Ram ₹15,000 • Sold goods for cash ₹25,000 • Sold goods on credit to Shyam ₹10,000 • Paid salaries ₹5,000 • Paid ₹8,000 to Ram	10	6	Applying

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CODE: 20EEI311 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

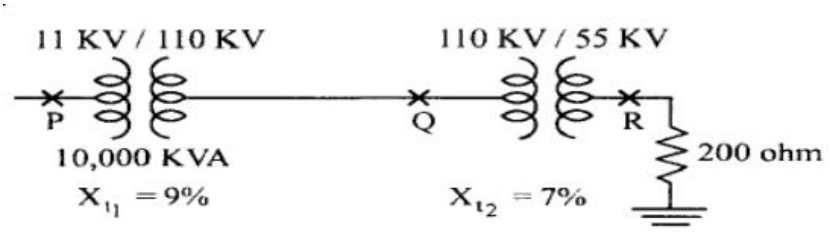
POWER SYSTEM ANALYSIS

(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

			Marks	CO	BTL
		UNIT-I			
1.		A Power system consists of 4 buses. Generators are connected to bus 1 and bus 3 which reactances are the j0.2 and j0.1 respectively. The transmission lines are connected between 1-2, 1-4, 2-3 & 3-4 buses are reactances of j0.25, j0.5, j0.1 & j0.1 respectively. Calculate the Y_{bus} by Direct Inspection Method. .	10	1	K3
		(OR)			
2.	a	Derive Ybus using singular transformation.	5	1	K2
	b	Consider the system shown in Figure. Selecting 10,000 KVA and 110 KV as base values, find the p.u. impedance of the 200 ohm load referred to 110 KV side and 55kV side.	5	1	K3



		UNIT-II			
3.	a	Explain need of load flow analysis.	5	2	K2
	b	Perform Gauss-Seidel load flow for a simple system.	5	2	K3
		(OR)			
4.	a	Explain classification of buses.	5	2	K2
	b	Explain Q-limit check in PV buses with algorithm.	5	2	K2
		UNIT-III			
5.		Derive Newton-Raphson load flow equations and explain Jacobian elements.	10	3	K2
		(OR)			
6.	a	Compare GS, NR and FDLF methods.	5	3	K2
	b	Explain FDLF algorithm with flowchart.	5	3	K2
		UNIT-IV			
7.		Explain Zbus building algorithm with example.	10	4	K2
		(OR)			
8.		Explain symmetrical fault analysis and calculate fault current.	10	4	K2
		UNIT-V			
9.	a	Explain symmetrical components theory.	5	5	K2
	b	Derive sequence network connections for LG fault.	5	5	K2
		(OR)			
10.	a	Derive expression for L-L fault current.	5	5	K2
	b	Derive the an expression for the fault current for a Line-Ground fault on No-Loaded Alternator	5	5	K2
		UNIT-VI			
11.	a	Explain swing equation.	5	6	K2
	b	Apply equal area criterion to determine stability.	5	6	K2
		(OR)			
12.		Explain steady state stability and power angle equation.	10	6	K2

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CODE: 20ECI311 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

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

			Marks	CO	BTL
		UNIT-I			
1.	(a)	Explain the relationship between time domain and frequency domain representations.	(5M)	CO1	L2
	(b)	Explain the impulse response and its significance in system analysis.	(5M)	CO1	L2
		(OR)			
2.	(a)	Derive the convolution property of Z-Transform.	(5M)	CO1	L3
	(b)	Explain the following properties of Z-Transform with proofs: (i)Linearity (ii)Time shifting (iii)Scaling (iv)Convolution	(5M)	CO1	L2
		UNIT-II			
3.	(a)	Discuss the Parseval's theorem for DFS and its significance.	(5M)	CO2	L2
	(b)	Compare the DIT and DIF radix-2 FFT.	(5M)	CO2	L2
		(OR)			
4.	(a)	Derive DFT equation	(5M)	CO2	L3
	(b)	An 8-point sequence is given by: $x(n) = \{0, 1, 2, 3, 4, 3, 2, 1\}$ Compute the DFT using Radix-2 DIT-FFT algorithm.	(5M)	CO2	L3
		UNIT-III			
5.	(a)	Derive the Radix-2 Decimation in Time (DIT-FFT) algorithm.	(5M)	CO3	L3
	(b)	Explain the concept of bit-reversal in DIT-FFT.	(5M)	CO3	L2
		(OR)			
6.	(a)	Discuss the importance of butterfly operations in FFT.	(5M)	CO3	L2
	(b)	Explain the role of twiddle factors in FFT computation.	(5M)	CO3	L2
		UNIT-IV			
7.	(a)	Design an IIR filter using impulse invariant method with a suitable example.	(5M)	CO4	L6
	(b)	Compare FIR and IIR filters in detail.	(5M)	CO4	L4
		(OR)			
8.	(a)	Describe the properties of Butterworth and Chebyshev filters in terms of ripple, roll-off, and stability.	(5M)	CO4	L2
	(b)	Explain the impulse invariant method for IIR filter design.	(5M)	CO4	L2
		UNIT-V			
9.	(a)	Derive the frequency response of an FIR filter from its impulse response.	(5M)	CO5	L3
	(b)	Derive the input-output equation of an FIR filter and explain its operation.	(5M)	CO5	L3
		(OR)			
10.	(a)	Describe the steps involved in designing FIR filters using frequency sampling technique.	(5M)	CO5	L2
	(b)	Explain indetail about situations where IIR filters are preferred over FIR filters.	(5M)	CO5	L2
		UNIT-VI			
11.	(a)	Explain the basic architectural features of DSP processors with neat block diagram.	(5M)	CO6	L2
	(b)	Describe the computational building blocks of a DSP processor (ALU, multiplier, accumulator, shifter with diagram.	(5M)	CO6	L2
		(OR)			
12.	(a)	Describe the functional units and internal organization of TMS320C54XX processor.	(5M)	CO6	L2
	(b)	Explain about the advanced addressing modes such as circular and bit-reversed addressing in TMS320C54XX.	(5M)	CO6	L2

AR20

CODE: 20CSI311 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

WEB TECHNOLOGIES

(COMPUTER SCIENCE AND 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 different types of lists in HTML with examples.	5	CO1	L2
	b)	Explain the CSS Box Model with its components.	5	CO1	L2
		(OR)			
2.	a)	What are HTML forms? Explain commonly used form elements.	5	CO1	L2
	b)	Explain the importance of external style sheets.	5	CO1	L2
		UNIT-II			
3.	a)	What are constructors in JavaScript? How are they used?	5	CO2	L2
	b)	Describe how data binding works in AngularJS.	5	CO2	L2
		(OR)			
4.	a)	Explain regular expressions and their purpose in pattern matching.	5	CO2	L2
	b)	Create an AngularJS program to Show validation messages dynamically.	5	CO2	L3
		UNIT-III			
5.	a)	Describe elements, attributes, and entities in DTD.	5	CO3	L2
	b)	What are restrictions and facets in XSD?	5	CO3	L2
		(OR)			
6.	a)	Explain how the DOM parser processes XML documents.	5	CO3	L2
	b)	Design an XML Schema (XSD) for Employee details with constraints (age, salary).	5	CO3	L3
		UNIT-IV			
7.	a)	Explain SQLException and how it is handled.	5	CO4	L2
	b)	List and explain the steps involved in JDBC connectivity.	5	CO4	L2
		(OR)			
8.	a)	What is connection pooling and why is it needed?	5	CO4	L2
	b)	Create a program to Call a stored procedure using CallableStatement.	5	CO4	L3
		UNIT-V			
9.	a)	What are the key features of Java Servlets?	5	CO5	L2
	b)	Describe the purpose of the following methods: • init() • service() • destroy()	5	CO5	L2
		(OR)			
10.	a)	Explain the use of • HttpServlet • HttpServletRequest • HttpServletResponse	5	CO5	L2
	b)	Create a Servlet to Read user input from an HTML form and display it.	5	CO5	L3
		UNIT-VI			
11.	a)	What are the key features of JSP technology?	5	CO6	L2
	b)	Explain the role of the JSP container in the life cycle.	5	CO6	L2
		(OR)			
12.	a)	What are implicit objects in JSP?	5	CO6	L2
	b)	Develop a JSP page to read user input from a form and display it.	5	CO6	L3

AR20

CODE: 20CEI311 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

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

		Marks	CO	Blooms Level
	UNIT-I			
1.	Explain in detail about different types of steel connections with neat sketches and the strength of a Riveted joint.	10	1	2
	(OR)			
2.	A double riveted double cover butt joint is used to connect plates 12 mm thick. Using Unwin's formula, determine the diameter of river, rivet value, gauge and efficiency of joint. Adopt the following stresses: Working stress in shear in power driven rivets = 100 N/mm^2 (MPa) Working stress in bearing in power driven rivets = 300 N/mm^2 (MPa) For plates working stress in axial tension is 0.6fy where f_y =260 N/mm^2 (MPa)1	10	1	3
	UNIT-II			
3.	Design a simply supported rolled steel laterally restrained beam to carry a distributed load of 60 kN/m over a span of 5 m. Adopt Fe 410 grade of steel. Use f_y = 250N /mm^2 as per Indian standard with page number and table etc.	10	2	3
	(OR)			
4.	Design a simply supported steel beam of span 4 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The uniformly distributed load is made up of 20 kN/m imposed load and 20 kN/m dead load (section is stiff against bearing). Assume Fe 410 grade steel.	10	2	3
	UNIT-III			
5.	Design a splice for tension member sections 160 x 10 mm and 250 x 14 mm the member is subjected to a pull of 200 kN. Assume f_y = 250 N/mm^2.	10	3	3
	(OR)			
6.	Determine the tensile capacity of the section ISA 100 x 75x 8 mm connected to a gusset plate 16 mm thick. Diameter of the bolt =20 mm No. of bolts = 4 Pitch of the bolts = 50mm Edge distance of the bolts = 35 mm Grade of bolts = 4.6 Steel of grade = Fe 410 If i) Angles placed on opposite side of the gusset plate tack bolted ii) Angles placed on same side of the gusset plate tack bolted iii) Angles are not tack bolted	10	3	3

UNIT-IV

7.	A column section ISHB 350@ 0.674 kN/m is carrying an axial load of 1000 kN. It is to be supported over a column section ISHB 450 @ 0.872 kN/m. Design the column splicing.	10	4	3
	(OR)			
8.	Design a slab base for a column consisting of ISHB 300 @ 58.8 kg/m and carrying an axial load of 1000 kN. Take allowable bearing pressure on concrete as 4 N/mm^2.	10	4	3

UNIT-V

9.	Determine the design loads on the purlins of an industrial building near Visakhapatnam, given: Class of building: General with life of 50 years, Terrain category 2. Maximum dimension = 40 m, width of building = 15 m, Height at eve's level = 10 m, Topography = θ less than 3°, permeability = medium, span of truss = 16 m, pitch = 1 in 5, sheeting = A.C. sheets, spacing of purlins = 1.35 m, spacing of truss = 4 m.	10	5	3
	(OR)			
10.	Design a simply supported gantry girder to carry an electric overhead travelling crane for the following data:	10	5	3

Crane capacity	320kN
Weight of crane and crab	300kN
Weight of crane	200 kN
Minimum approach of crane hook	1.20 m
Distance between c/c of wheels	3.20 m
Distance between c/c of gantries	16 m
Span of gantry girder	4.00 m
Weight of rails	300 N/m
Height of rails	75 mm
Yield stress of steel	280MPa

Draw to scale i) the cross-section, ii) the longitudinal section.

UNIT-VI

11.	Design a simply supported plate girder of span 15 m carrying a factored U.D.L. of 48 kN/m, using only end stiffeners. Assume compression flange is laterally supported. Draw to scale the cross section and longitudinal section.	10	6	3
	(OR)			
12.	A deck type welded plate girder railway bridge is to be constructed for a broad gauge single track on the main line. Effective span=20m, c/c distance between plate girders=2m, Dead Load on each girder= (220L+600) N/m, Dead load of track with sleepers=6800 N/m. Design the superstructure of the bridge with welded plate girders.	10	6	3

AR20

CODE: 20CDI308 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

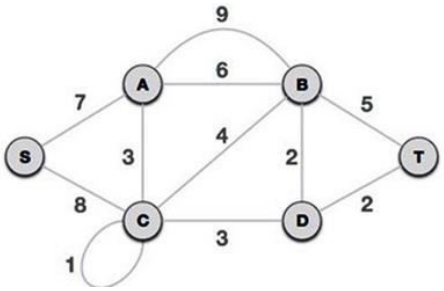
Design and Analysis of Algorithms

(CSE (DS)

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)	What is space complexity? Illustrate with an example for fixed and variable part in space complexity.	5M	1	L2
	b)	Describe various asymptotic notations used to represent complexity of algorithms with examples.	5M	1	L2
		(OR)			
2	a)	Develop an algorithm to solve Towers of Hanoi problem	5M	1	L3
	b)	Write and explain a randomized algorithm for searching an element in an array.	5M	1	L2
		UNIT-II			
3		Compare Merge sort and Quick sort complexities for the given data set: {10, 30, 15, 45, 25, 30, 35, 20, 30, 40, 50}.	10M	2	L3
		(OR)			
4	a)	Write the General method of Divide–and–Conquer approach.	3M	2	L1
	b)	Explain the problem of finding minimum and maximum, and try to apply "divide and conquer" strategy to solve it. Give a general algorithm for doing the same.	7M	2	L3
		UNIT-III			
5	a)	Construct the minimum cost spanning tree using Krushkal algorithm for the given graph and explain the algorithm.	6M	3	L3



	b)	What is a greedy algorithm? Discuss its properties and limitations.	4M	3	L1

(OR)

6	a)	Prove that Prim's method generates minimum-cost spanning tree.	5M	3	L5
	b)	Explain the Knapsack problem. Find an optimal solution to the Knapsack instance n=7, m=15, (p1, p2, p3, …p7)=(10,5,15,7,6,18,3) and (w1, w2, w3, …w7)=(2, 3, 5,7, 1, 4,1).	5M	3	L3

UNIT-IV

7		Write an algorithm of all pairs shortest path problem using dynamic programming with an example problem.	10M	4	L3

(OR)

8		Describe the problem of single–source shortest path and give a solution using dynamic programming.	10M	4	L3

UNIT-V

9	a)	Consider the following Sum of Subsets problem instance: n = 4, m = 31, and w[1:4] = {7,11,13,24} . Find all possible subsets of w that sum to m. Draw the portion of the state space tree that is generated.	5M	5	L3
	b)	Describe the algorithm for Hamiltonian cycles.	5M	5	L4

(OR)

10	a)	Find a solution to the 8-Queens problem using backtracking strategy.	6M	5	L3
	b)	Explain the major drawbacks of the backtracking method with examples.	4M	5	L2

UNIT-VI

11	a)	What are the differences between NP-Hard and NP-Complete classes? Explain with examples.	5M	6	L2
	b)	Explain any two problems of polynomial time algorithms.	5M	6	L2

(OR)

12		State and prove Cook's theorem.	10M	6	L5

AR20

CODE: 20CAI304 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

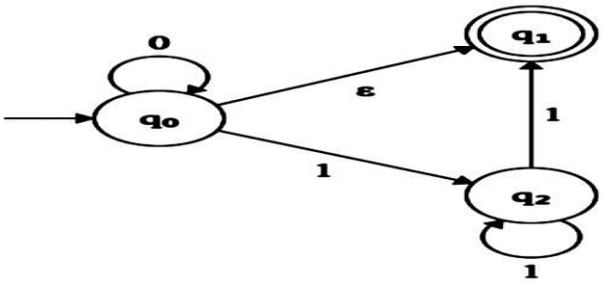
Compiler Design

(CSE (AIML))

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 Deterministic Finite Automata (DFA) with an example.	5	CO1	K2
	b.	Convert the given NFA with ε-transitions into an equivalent DFA.	5	CO1	K3



(OR)

2.		What are the various phases of compiler? Explain each phase in details. Write down the output of each phase for the expression a := b + c * d	10	CO1	K3
		UNIT-II			
3.	a.	What is Top-Down Parsing? Explain Recursive Descent Parsing with example.	5	CO2	K2
	b.	Eliminate Left Recursion from the given grammar: A → Aα | β	5	CO2	K3
		(OR)			
4.	a.	What are the rules are used to compute the FIRST. Compute the FIRST sets for the following grammar: S → AB A → aA | ε B → bB | c	5	CO2	K3
	b.	State and explain the rules are used to compute the FOLLOW set. Plan to find the FOLLOW set for the below grammar G. S → A B A → aA | ε B → bB | C C → c | ε	5	CO2	K3
		UNIT-III			
5.	a.	Construct CLR(1) parsing table for the following grammar. S → CC C → cC | d	5	CO3	K3
	b.	Differentiate between LL and LR parsers. Explain why LR parsers are more powerful.	5	CO3	K2
		(OR)			

6.	a.	Explain Shift-Reduce conflicts and Reduce-Reduce conflicts with suitable examples.	5	CO3	K2
	b.	Perform Shift-Reduce parsing for the given grammar and input string. Show stack and actions. Grammar: E → E + T | T T → id Input: id + id	5	CO3	K3

UNIT-IV

7.	a.	Generate Three Address Code (TAC) for the given expression. Represent using Quadruples,Triples ,Indirect triples x = a * (-b) + a * (-b)	5	CO4	K3
	b.	Construct the Abstract Syntax Tree (AST) and Directed Acyclic Graph (DAG) for the following expression: x = a * b + c * a + b * c	5	CO4	K3

(OR)

8.	a.	Explain L-attributed Syntax Directed Definitions (SDD). Illustrate with a suitable example and show how attributes are evaluated.	5	CO4	K2
	b.	What is Type Checking in compiler design. Discuss different types of type conversion with suitable examples.	5	CO4	K2

UNIT-V

9.	a.	Explain procedure calls and parameter passing mechanisms with examples.	5	CO5	K2
	b.	Construct Basic Blocks and Flow Graph for the given code. Example: 1. a = b + c 2. d = a - e 3. if d > 0 goto 5 4. d = d + 1 5. return d	5	CO5	K3

(OR)

10.	a.	Explain principle sources of code optimization in compiler design.	5	CO5	K2
	b.	Apply Peephole Optimization to the given code and show optimized output. Example: a = b * 1 c = d + 0 e = e * 0	5	CO5	K3

UNIT-VI

11.	a.	Analyze the issues in code generation and suggest solutions to improve efficiency.	5	CO6	K4
	b.	Explain about the Position of code generator.	5	CO6	K2

(OR)

12.	a.	Explain Register Allocation and Assignment with example.	5	CO6	K2
	b.	Explain different Object Code Forms with suitable examples.	5	CO6	K2

AR18

CODE: 18MET313 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

CAD/CAM

(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

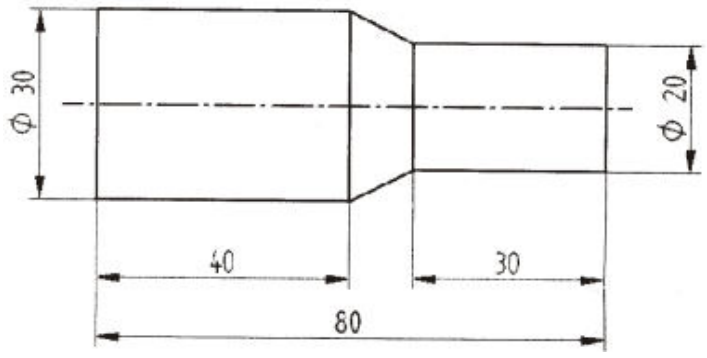
UNIT-I

1.	a)	Briefly explain the term scaling, translation and rotation used in Graphics.	6M
	b)	Draw and explain the CAD/CAM product cycle.	6M
		(OR)	
2.	a)	Differentiate between working coordinate system and screen coordinate system.	4M
	b)	The vertices of a triangle are situated at points (15, 30), (25, 35) and (5, 45). Find the coordinates of the vertices if the triangle is rotated by 30° in counter clockwise direction about its centroid.	8M

UNIT-II

3.	a)	Explain the Constructive Solid Geometry (CSG) method to create models	6M
	b)	Write the properties of Bezier and B-Spline curves.	6M
		(OR)	
4.	a)	Explain Bezier curve with a neat sketch. Explain its advantages and limitations.	6M
	b)	Derive the parametric equation of Hermite cubic spline curve.	6M

UNIT-III

5.	a)	What are the types of statements used in APT programming? Explain in detail.	6M
	b)	Write a part program for the component shown in figure below:  Note: Assume the required data.	6M
		(OR)	
6.	a)	Explain the difference between CNC and DNC.	6M
	b)	State the advantages and disadvantages of Numerical Control.	6M

UNIT-IV

7.	a)	Explain Opitz classification and coding system in GT.	6M
	b)	Explain about generative CAPP system.	6M

(OR)

8.	a)	Compare a process type layout and group technology layout for batch production.	6M
	b)	What is computer aided process planning? Explain the variant and generative CAPP systems.	6M

UNIT-V

9.	a)	Describe the types of material handling devices in FMS	6M
	b)	Discuss the following types of layouts in the design of FMS. i) Robot centred layout ii) Ladder layout iii) Loop layout iv) Free layout	6M

(OR)

10.	a)	Compare the merits and demerits of AGV.	6M
	b)	Sketch the layout of a typical FMS and explain the important subsystems.	6M

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AR18

CODE: 18ECT316 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

DIGITAL SIGNALPROCESSING

(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 following properties of LTI signals. a) Time Shifting b) convolution c) Linearity d) Scaling	6M
	b)	Check the stability of the following systems: (i). $y(n) = e^{x(n)}$ (ii). $y(n) = \cos x(n)$	6M

(OR)

2.	a)	Define discrete time signals with examples.	6M
	b)	Write about the Z- properties.	6M

UNIT-II

3.	a)	State and prove the multiplication property of Discrete time Fourier series.	6M
	b)	Write about Differences between DFT and FFT.	6M

(OR)

4.	a)	State and prove time reversal and circular shift properties of DFT	6M
	b)	Find the 8 point DFT of the sequence $x(n) = \{1,2,3,4,4,3,2,1\}$ using radix-2 DIT FFT algorithm.	6M

UNIT-III

5.	a)	Explain the cascade form realization of IIR filters with suitable example.	6M
	b)	Draw and explain different realization FIR filters.	6M

(OR)

6.	a)	Write the advantages and disadvantages of IIR filter over FIR filters.	6M
	b)	Obtain the cascade realization of the given FIR filter $H(z) = 1 + 6z^{-1} + 19z^{-2} + 35z^{-3} + 42z^{-4} + 29z^{-5} + 12z^{-6}$	6M

UNIT-IV

7.	a)	Explain the application of Wiener smoothing to noise cancelling.	6M
	b)	Explain Wiener smoothing and prediction filters.	6M

(OR)

8.	a)	Discuss the factors determine the choice of adaptation.	6M
	b)	Explain Normal equations for linear prediction filtering.	6M

UNIT-V

9.	a)	Explain the various CPU components of TMS320C5X processor.	6M
	b)	Explain Von-Neumann architecture with neat block diagram.	6M

(OR)

10.	a)	What are the differences between digital signal processors and microprocessors?	4M
	b)	Define pipelining. Explain the advantages of pipelining.	8M

AR18

CODE: 18CET317 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

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. Explain failures in bolted connections with neat sketches. (12M)

(OR)

2. A tie member of a roof truss consists of 2 ISA 10075, 8mm.The angles are connected to either side of a 10mm gusset plates and the member is subjected to a working pull of 300KN. Desgin the welded connection. Assume connections are made in the workshop. (12M)

UNIT-II

3. Design a beam of effective span 6.0m and subjected to a bending moment of 105.3×10^6Nmm.The compression flange is laterally supported throughout. Check for deflections and shear. Assume fy =250MPa. (12M)

(OR)

4. Determine the design bending strength of ISLB 350 @ 486 N/m considering the beam to be
(a) laterally supported (b) laterally unsupported
The design shear force V is less than the design shear strength. The unsupported length of the beam is 3.0 m. Assume steel of grade Fe 410 (12M)

UNIT-III

5. A column section ISHB 350@ 0.674kN/m is carrying an axial load of 1000kN. It is to be supported over a column section ISHB 450 @ 0.872kN/m. Design the column splicing. (12M)

(OR)

6. Design a compression member of two channels placed toe-to-toe. The length of the compression member is 12m and carries a load of 1500kN The width over the backs of channels is 450mm. The channels are connected by double lacing. Sketch the cross-section of the column. (12M)

UNIT-IV

7. A hand operated 50 kN overhead crane is provided in a workshop. The details are given below: Centre to centre between gantry girders = 16 m,Span of the gantry girder = 6 m,Weight of the crane = 40 kN,Wheel spacing = 3 m,Weight of the crab = 10kN,Maximum edge distance=1 m,Design a simply supported gantry girder, assuming the flange is laterally supported (12M)

(OR)

8. a) Draw a neat sketch of Gantry girder and mention its parts ? (6M)

b)Write down the Design Steps involved while designing a gantry girder? (6M)

UNIT-V

9. Design a welded plate girder for a simply supported bridge deck beam with a clear span of 18 m. Dead Load including self weight = 20 kNm and imposed load = 10 kNm. Two moving loads of 100 kN each spaced 2 m apart. Assume the top compression flange of the plate girder is restrained laterally and prevented from rotating. (12M)

(OR)

10. Design an 18m long simply supported welded plate girder carrying a uniformly distributed load of 50kN/m excluding self-weight and two concentrated loads of 350kN each at quarter points of the span. Assume that girder is laterally supported throughout . (12M)