

**HEAT AND MASS TRANSFER
(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

		<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a	What are the mechanisms of heat transfer? How are they distinguished from each other?	4M	CO1	Remember
	b	A hollow sphere ($k = 65 \text{ W/mK}$) of 120 mm inner diameter and 350 mm outer diameter is covered 10 mm layer of insulation ($k = 10 \text{ W/mK}$). The inside and outside temperatures are 500°C and 50°C respectively. Calculate the rate of heat flow through this sphere.	6M	CO1	Apply
(OR)					
2.		Derive the general heat conduction equation in cylindrical coordinates.	10M	CO1	Apply
<u>UNIT-II</u>					
3.	a	What is lumped system analysis? When is it used?	4M	CO2	Remember
	b	A metallic rod 12.5 mm diameter at 90°C is cooled to 35°C in 105 s by placing it in air stream at 30°C . Calculate the heat transfer coefficient, h , for air. For rod: mass = 0.1kg, $c = 350 \text{ J/kg}$, surface area = 0.004 m^2 .	6M	CO2	Apply
(OR)					
4.	a	What is meant by transient heat conduction?	4M	CO2	Remember
	b	A stainless steel rod of outer diameter 1 cm originally at a temperature of 320°C is suddenly immersed in a liquid at 12°C for which the convective heat transfer coefficient is $100 \text{ W/m}^2 \text{ K}$. Determine the time required for the rod to reach a temperature of 200°C .	6M	CO2	Apply
<u>UNIT-III</u>					
5.	a	What are the assumptions of the Buckingham Pi Theorem?	4M	CO3	Remember
	b	What are the dimensionless parameters used in forced and free convection heat transfer analysis?	6M	CO3	Apply
(OR)					
6.	a	What is velocity and thermal boundary layer in convection heat transfer?	5M	CO3	Remember
	b	Calculate the convective heat loss from a radiator 0.5 m wide and 1 m high maintained at a temperature of 84°C in a room at 20°C . Treat the radiator as a vertical plate.	5M	CO3	Apply

UNIT-IV

7. a Describe the difference between free and forced convection 4M CO4 Remember
b A hot flat plate at 80°C is placed horizontally and wind is blowing over it at 2m/s . The length and width of the plate are 10m and 5m respectively. Find the heat loss per unit area from the plate. 6M CO4 Apply

(OR)

8. a Discuss briefly the various regimes in boiling heat transfer? 4M CO4 Remember
b Water is boiled at a rate of 30kg/h in a copper pan, 30cm in diameter, at atmospheric pressure. Estimate the temperature of the bottom surface of the pan assuming nucleate boiling conditions. 6M CO4 Apply

UNIT-V

9. a How are the heat exchangers classified? 4M CO5 Remember
b The engine oil at 150°C is cooled at 80°C in a parallel flow heat exchanger by water entering at 25°C and leaving at 60°C . Estimate the exchanger effectiveness and the number of transfer units. If the fluid flow rates and the inlet conditions remain unchanged. 6M CO5 Apply

(OR)

10. a Discuss the advantages of NTU method over the LMTD method of the in heat exchangers design. 4M CO5 Remember
b Water enters a cross flow heat exchanger (both fluids unmixed) at 5°C and flows at the rate of 4600 kg/h to cool 4000 kg/h of air that is initially at 40°C . Assume the U value to be $150\text{W/m}^2\text{K}$. For an exchanger surface area of 25m^2 , Calculate exit temperature of air and water. 6M CO5 Apply

UNIT-VI

11. a What is the Stefan-Boltzmann law? Explain the concept of total emissive power of surface. 4M CO6 Remember
b A mild steel ball is maintained at a temperature of 5700°C . Calculate the emissive power of the surface of the sun and wavelength of maximum spectral intensity. 6M CO6 Apply

(OR)

12. a Write down the physical significance of following non-dimensional numbers-i) Stanton number ii) Schmidt number iii) Grashof number iv) Nusselt number. 4M CO6 Remember
b Derive the one dimensional mass diffusion transfer rate through plane wall. 6M CO6 Apply

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

		<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a	Describe in detail about input buffering in lexical analysis	5	1	2
	b	Compare and contrast compiler and interpreter.	5	1	2
		(OR)			
2.	a	Describe the languages denoted by the following regular expressions i) $0(0 1)^*0$ ii) $((\epsilon 0)1^*)^*$ iii) $0^*10^*10^*10^*$	5	1	3
	b	Explain about LEX tool for specifying lexical analyser	5	1	2
		<u>UNIT-II</u>			
3.	a	What is a context free grammar? Explain with an example	5	2	2
	b	What is a left recursive grammar? Write an algorithm to eliminate left recursion from a CFG	5	2	2
		(OR)			
4.		Check if the following grammar is LL(1) or not $S \rightarrow iEtSS' a$ $S' \rightarrow eS \epsilon$ $E \rightarrow b$	10	2	3
		<u>UNIT-III</u>			
5.		Construct CLR parsing table for the following grammar. $S \rightarrow CC$ $C \rightarrow cC$ $C \rightarrow d$	10	3	3
		(OR)			
6.	a	Describe in detail about the structure about Yacc program	5	3	2
	b	Explain the following terms with examples. Use the given grammar wherever required. $S \rightarrow aABe$ $A \rightarrow Abc b$ $B \rightarrow d$	5	3	2
		a. Bottom-Up parsing b. Handle c. Handle Pruning			

UNIT-IV

7. What do you mean by an L-attributed Definition? Check whether the following SDD is an L-attributed Definition. 10 4 3

PRODUCTION	SEMANTIC RULES
$A \rightarrow LM$	$L.i = l(A.i)$
	$M.i = m(L.s)$
	$A.s = f(M.s)$
$A \rightarrow QR$	$R.i = r(A.i)$
	$Q.i = q(R.s)$
	$A.s = f(Q.s)$

(OR)

8. a What are the various implementations of three address code? Explain 5 4 2
- b Produce three address code for the following program fragment. 5 4 3

```
if(count<10)
{
    prod = 0;
    i=1;
    while(i<=20)
    {
        prod = prod + a[i] * b[i];
        i = i + 1;
    }
}
```

UNIT-V

9. a Explain the various data structures that are used for the symbol table construction 5 5 2
- b Write a short notes on type checking 5 5 2
- (OR)
10. Write type expressions for the following types 10 5 2
- a) An array of pointers to reals, where the array index ranges from 1 to 100
- b) A two dimensional array of integers whose rows are indexed from 0 to 9 and whose columns are indexed from -10 to 10
- c) Functions whose domains are functions from integers to pointers to integers and whose ranges are records consisting of an integer and a character

UNIT-VI

11. a What is DAG for a basic block? Explain how DAG is constructed. 5 5 2
- b Explain Machine independent code optimization Techniques 5 5 2
- (OR)
12. Explain the various design the issues of code generator 10 5 2

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

	<u>UNIT-I</u>	Marks	CO	Blooms Level
1. a)	Draw and explain the architecture of 8086 processor	10	1	Understand
	(OR)			
2. a)	Write the difference between microprocessor and microcontroller	5	1	Understand
b)	Draw and explain memory read cycle of 8086	5	1	Understand
	<u>UNIT-II</u>			
3. a)	Explain the following data transfer instructions of 8086 microprocessor with examples. i) OUT ii) XOR iii) TEST iv) IRET	4	2	Understand
b)	Develop an Assembly Language Program to perform descending order for ten 16-bit numbers in 8086	6	2	Apply
	(OR)			
4. a)	List out and explain string instructions of 8086	5	2	Understand
b)	Develop an Assembly Language Program to find sum of squares of first six numbers in 8086	5	2	Apply
	<u>UNIT-III</u>			
5. a)	Draw and explain the pin configuration of 8255 PPI	5	3	Understand
b)	Illustrate the concept of BSR mode	5	3	Understand
	(OR)			
6. a)	Write the features of 8257 DMA	5	3	Understand
b)	Draw and explain architecture of 8251 USART	5	3	Understand
	<u>UNIT-IV</u>			
7. a)	Illustrate register organization of 8086 and explain its applications of each register	10	4	Understand Apply
	(OR)			
8. a)	Write the difference between 8086 and 80386	5	4	Understand
b)	Write the features of 80486	5	4	Understand
	<u>UNIT-V</u>			
9. a)	Draw and explain the architecture of ARM Processor	10	5	Understand
	(OR)			
10. a)	List out the applications of ARM Processor	5	5	Understand
b)	Interpret the concept of Pipelining	5	5	Understand
	<u>UNIT-VI</u>			
11. a)	Draw and explain the pin diagram of 8051	10	6	Understand
	(OR)			
12. a)	Draw and explain TMOD register of 8051	5	6	Understand
b)	Develop an Assembly Language Program to perform addition subtraction and multiplication on two 8-bit numbers 58H and 8BH in 8051.	5	6	Apply

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)	Obtain the expressions for the field components of E and H for TE mode in a rectangular waveguide.	7	1	3
b)	Define degenerate and dominant modes in waveguide propagation.	3	1	1
	(OR)			
2. a)	A rectangular waveguide has a cross-sectional area of $2.29 \times 1.45 \text{ cm}^2$ and the operating frequency is 10 GHz. Calculate the following (i) Free space wavelength; (ii) Cut-off wavelength; (iii) Cut-off frequency; (iv) Angle of incidence; (v) Guided wavelength	7	1	5
b)	List the advantages of Microwaves.	3	1	1
	<u>UNIT-II</u>			
3. a)	Show that it is impossible to construct a perfectly matched loss less, reciprocal port microwave junction.	5	2	1
b)	Using the scattering matrix explain the properties of magic tee	5	2	1
	(OR)			
4. a)	The incident power is 500 mW for a directional coupler. If the coupling factor is 20 dB, calculate the power in the main and auxiliary arm.	6	2	5
b)	What is a Circulator? Describe the properties of Circulator.	4	2	1
	<u>UNIT-III</u>			
5. a)	Draw the applegate diagram of a reflex Klystron and explain the phenomenon of electronic tuning.	6	3	1
b)	Explain the limitations of conventional tubes and transistors to work at high frequencies.	4	3	1
	(OR)			
6. a)	Explain two cavity klystron amplifier with a neat diagram.	5	3	1
b)	The operating frequency of a reflex klystron is 10 GHz, it has a DC beam voltage of 200 V, a Repeller spacing of 0.1cm for $1\frac{3}{4}$ mode. Determine the maximum value of power and the corresponding Repeller voltage for a beam current of 60 mA.	5	3	5
	<u>UNIT-IV</u>			
7. a)	With a neat schematic diagram of helix TWT, explain the principle of working and nature of the propagation constants.	6	4	1
b)	Explain Pi mode of operation of Magnetron. How is mode separation achieved by strapping?	4	4	1

(OR)

- | | | | | | |
|----|----|--|---|---|---|
| 8. | a) | Derive Hull-cut off voltage equation of magnetron oscillator. | 5 | 4 | 3 |
| | b) | A TWT is operated at 10 GHz with a beam voltage and a beam current of 3 kV and 30 mA, respectively. If the slow-wave structure has a characteristic impedance Z_0 of 10 Ω , the electronic circuit length $N_l = 50$. Find out (i) The gain parameter C (ii) The output power gain A_p (in dB) (iii) v_0 | 5 | 4 | 5 |

UNIT-V

- | | | | | | |
|-------------|----|---|---|---|---|
| 9. | a) | Explain Gunn effect using two valley theory. Describe domain formation in Gunn diode. | 5 | 5 | 1 |
| | b) | Explain the principle of operation of TRAPATT diode with suitable diagram. | 5 | 5 | 1 |
| (OR) | | | | | |
| 10. | a) | With neat diagram, explain the operation of IMPATT diode. | 5 | 5 | 2 |
| | b) | Explain with neat diagram about Gunn Diode V-I characteristics. | 5 | 5 | 1 |

UNIT-VI

- | | | | | | |
|-------------|----|--|---|---|---|
| 11. | a) | Explain Slotted line method for impedance measurement. | 5 | 6 | 1 |
| | b) | Discuss about the important considerations when making attenuation measurements. | 5 | 6 | 6 |
| (OR) | | | | | |
| 12. | a) | Explain with the help of a neat diagram the method to measure microwave power. | 5 | 6 | 1 |
| | b) | Outline the features of different blocks used in Microwave Bench setup. | 5 | 6 | 2 |

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.	List and explain in detail about different phases of Compilation with an example.	10M	1	K1,K2
(OR)				
2. a)	What is Input Buffering? Explain in detail.	4M	1	K1
b)	Explain how tokens are recognized in compiler design with an example?	6M	1	K2
UNIT-II				
3. a)	What is a parser and explain the various types of parsers?	7M	2	K1
b)	What are the key components of a context-free grammar used in compiler design?	3M	2	K1
(OR)				
4. a)	Compute FIRST and FOLLOW for the grammar: $S \rightarrow SS + \mid SS * \mid a$	6M	2	K3
b)	What are the advantages of using recursive descent parsing over other parsing algorithms?	4M	2	K1
UNIT-III				
5.	What is bottom-up parsing in the context of compiler design, and how does it differ from top-down parsing? Explain with an example.	10M	3	K1,K3
(OR)				
6. a)	How can you construct an LR parsing table, and what are the key steps involved in the parsing process?	8M	3	K1
b)	What are the key advantages of using a canonical parser?	2M	3	K1
UNIT-IV				
7. a)	What are the different types of SDD, and how do they differ from each other in terms of their complexity and functionality?	7M	4	K1,K4
b)	What is Syntax-Directed Translation?	3M	4	K1
(OR)				
8. a)	Differentiate between S-attributed and L-attributed definitions.	5M	4	K4
b)	What is the role of semantic analysis in the construction of a syntax tree?	5M	4	K1
UNIT-V				
9. a)	What are the principal sources of optimization in compiler design? List various types of code optimization techniques used?	6M	5	K1
b)	What is back patching? How does it help in code optimization?	4M	5	K1,K4
(OR)				
10. a)	How are procedure calls handled during intermediate code generation?	4M	5	K1
b)	State and implement DAG algorithm with an example.	6M	5	K1,K3
UNIT-VI				
11. a)	What is global optimization in compiler design? How is global optimization different from local optimization?	6M	6	K1,K2
b)	What is redundant sub expression elimination and How is it different from common sub expression elimination?	4M	6	K1,K2
(OR)				
12. a)	What are some of the issues that need to be considered when designing a code generator?	5M	6	K1,K4
b)	How is run time storage management handled in compiler design?	5M	6	K1

(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

- | | | Marks | CO | Blooms Level |
|-------------|---|-------|-----|--------------|
| 1. | a. Explain the principle of working of weighing bucket type recording raingauge with a neat sketch. | 5 | CO1 | Understand |
| | b. What is Rain Gauge? Explain with neat sketches the different types of Rain Gauges. | 5 | CO1 | Remember |
| (OR) | | | | |
| 2. | a. Define Hydrology and list out the applications of hydrology in engineering. | 5 | CO1 | Understand |
| | b. Define precipitation. Explain any two methods to measure the precipitation | 5 | CO1 | Remember |

UNIT-II

- | | | | | |
|-------------|---|----|-----|-------|
| 3. | The rates of rainfall for successive 30 minutes periods of a 3 – hour storm are as follows: 3.0, 4.0, 5.0, 2.0, 1.5, 1.0 cm/hr. Take ϕ – Index as 2 cm/hr. Compute the following i) Total depth of rainfall ii) Total rainfall excess iii) W-index. | 10 | CO2 | Apply |
| (OR) | | | | |
| 4. | The shape of a catchment approximately resembles a square of side 8 km. With reference to an x-y coordinate frame whose origin is coinciding with one of the corners of the catchment the locations of the four corners of the catchment are (0,0), (8,0), (8,8) and (0,8). These are four raingauges A, B, C and D within this catchment whose positions with reference to the same coordinate frame are (2,2), (6,2), (6,6) and (2,6) respectively. The rainfall recorded by the raingauges A, B, C and D during a storm are 8, 6, 9 and 11 cm respectively. Determine the average depths of rainfall over the catchment by Arithmetic mean and Thiessen polygon methods. | 10 | CO2 | Apply |

UNIT-III

- | | | | | |
|-------------|---|----|-----|-------|
| 5. | Discuss with neat sketches various methods to determine Unit Hydrograph of different duration from Unit Hydrograph of some unit duration. | 10 | CO3 | Apply |
| (OR) | | | | |
| 6. | Table below gives ordinates of 6-hr Unit Hydrograph. Derive the ordinates of S-Hydrograph. | 10 | CO3 | Apply |

Time(Hrs)	0	3	6	9	12	15	18	21	24
Ordinates of 6-Hr UH (m^3/sec)	0	10	20	30	40	30	20	10	0

UNIT-IV

- | | | | | |
|-------------|---|----|-----|------------|
| 7. | Derive an equation for finding the yield from a tube well fully penetrating into an unconfined aquifer. | 10 | CO4 | Understand |
| (OR) | | | | |
| 8. | In an artesian aquifer of 8m thickness, a 10 cm diameter well is pumped at a constant rate of 100 lit/min. The steady state draw down observed in two wells located at 10 m and 50 m distance from the centre of the well are 3m and 0.05 m respectively. Compute the Transmissibility and permeability of the aquifer. | 10 | CO4 | Apply |

UNIT-V

- | | | | | |
|-------------|---|----|-----|----------|
| 9. | Explain with neat sketches different types of irrigation. | 10 | CO5 | Remember |
| (OR) | | | | |
| 10. | What is consumptive use and discuss about various methods to measure consumptive use? | 10 | CO5 | Remember |

UNIT-VI

- | | | | | |
|-------------|--|----|-----|------------|
| 11. | Design an irrigation channel to carry a discharge of $45\text{m}^3/\text{sec}$. assume $N=0.0225$, critical velocity ratio $(m)=1$, and the channel has a bed slope of $0.16\text{m}/\text{km}$. | 10 | CO6 | Apply |
| (OR) | | | | |
| 12. | Describe the method of designing a canal based on Lacey's theory. | 10 | CO6 | Understand |

AR18

CODE: 18EET316

SET-1

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

III B.Tech II Semester Supplementary. Examinations, August, 2023

**INDUSTRIAL AUTOMATION
(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) Define automation? Explain the necessity of industrial automation. 6M
b) Describe vertical integration industrial automation 6M
- (OR)
2. a) List out various applications of industrial automation. 6M
b) Write short note on classification of automation. 6M

UNIT-II

3. a) Define PLC. Explain the capabilities of PLC. 6M
b) Illustrate the sourcing and sinking concept of PLC briefly. 6M
- (OR)
4. Give the architecture of PLC and explain the function of each block in detail. 12M

UNIT-III

5. a) Explain relay ladder logic methodology. 6M
b) Explain different types of ladder logic programming. 6M
- (OR)
6. a) Develop the digital logic gates with their PLC equivalents. 6M
b) Explain various ladder symbols. 6M

UNIT-IV

7. Explain on-delay timer and off-delay timer functions with examples. 12M
- (OR)
8. a) What do you mean by latching and explain. 6M
b) Outline various PLC counters briefly. 6M

UNIT-V

9. a) Describe master terminal unit. 6M
b) Give some applications and advantages of SCADA systems. 6M
- (OR)
10. a) Write short note on SCADA interface. 6M
b) Differentiate discrete and analog control SCADA systems. 6M

AR18

CODE: 18CET315

SET-2

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

III B.Tech II Semester Supplementary Examinations, August,2023

**Transportation Engineering-I
(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 john macadam construction of a road with neat sketch 6M
b) Explain various salient features of Lucknow road plan 6M
- (OR)**
2. a) Explain various engineering surveys to be conducted for road alignment 6M
b) Explain various drawing used for a proper road alignment 6M

UNIT-II

3. a) Calculate the overtaking sight distance if the speed of over taken and over taking vehicles are 80km/hr and 100 km/hr respectively. Assume any other data required 6M
b) Design an expression for super elevation on a curve with neat sketch. 6M
- (OR)**
4. a) Calculate the length of transition curve for a two lane road having a speed of 100km/hr. Assume any other data required. 7M
b) Explain the concept of PIEV theory and coefficient of longitudinal and lateral friction used in geometric design of highways 5M

UNIT-III

5. Explain Marshall method of bituminous mix design 12 M
- (OR)**
6. a) State various properties of aggregates and also state their importance 7M
b) Differentiate between tar and bitumen also mention various properties of Tar 5M

UNIT-IV

7. a) Explain in detail construction of cement concrete pavements 6M
b) Write a detailed note on street lightning 6M
- (OR)**
8. a) Mention how maintenance of flexible pavements is carried out in detail 6M
b) Explain in brief various steps involved in the construction of bituminous concrete roads 6M

UNIT-V

9. a) Explain various methods of conducting traffic volume studies 6M
b) Explain various type of on-street parking with neat sketches 6M
- (OR)**
10. a) Define spot speed and explain various methods of conducting spot speed studies 6M
b) State various advantages and disadvantages of grade separated intersections 6M

AR16

CODE: 16CS3017

SET-2

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

III B.Tech II Semester Supplementary Examinations, August, 2023

**Compiler Design
(Common to CSE & IT)**

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

UNIT-I

1. a) Explain about compiler construction tools in detail. 7M
- b) What is regular expression? Write the regular expression following. 7M
 - i. Accepts all strings of 0's & 1's which and with 01.
 - ii. Accepts all strings of 0's & 1's, whose 9th position from the right end is 1.
 - iii. Equal no of 1's & 0's

(OR)

2. a) What is a cross compiler? What are the advantages of boot strapping process? 7M
- b) Describe the need and functionality of linkers, assemblers and loaders. 7M

UNIT-II

3. Write an algorithm for construction of a predictive parsing table. And construct a predictive parsing table for the following grammar: 14M

$E \rightarrow T E^I$
 $E^I \rightarrow + T E^I \mid \epsilon$
 $T \rightarrow F T^I$
 $T^I \rightarrow * F T^I \mid \epsilon$
 $F \rightarrow (E) \mid id$

(OR)

4. Convert the following grammar into LL(1) grammar and construct the LL(1) Parsing table: $bexpr \rightarrow bexpr \text{ or } bterm \mid bterm$ 14M
 $bterm \rightarrow bterm \text{ and } bfactor \mid bfactor$
 $bfactor \rightarrow \text{not } bfactor \mid (bexpr) \mid \text{true} \mid \text{false}$

UNIT-III

5. What are the contents of symbol table? Explain in detail about the data structures used to implement the symbol tables. 14M

(OR)

6. a) Explain about block structure and non-block structure storage allocation 7M
b) Write short notes on the following 7M
i) S – attributed definition ii) L – attributed definition

UNIT-IV

7. a) Give a detailed account on loop optimization techniques. 7M
b) What is a DAG? Explain its applications. 7M
(OR)
8. a) Explain common sub expression elimination optimization technique with an example. 7M
b) Explain the following 7M
(i) Copy Propagation
(ii) Dead-Code Elimination

UNIT-V

9. a) Explain the concept of Object Code forms. 7M
b) What are the various machine dependent code optimization techniques? 7M
(OR)
10. Explain about Code-Generation algorithm. 14M

AR16

CODE: 16CE3017

SET-2

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

III B.Tech II Semester Supplementary Examinations, August, 2023

WATER RESOURCE ENGINEERING

(CIVIL ENGINEERING)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) What is precipitation? Explain any two methods to measure the precipitation. 6M
- b) Table below gives ordinates of 6-hr Unit Hydrograph. Derive ordinates of 3-hr Unit Hydrograph for the same catchment? 8M

Time(Hrs)	0	3	6	9	12	15	18	21	24
Ordinates of 6-Hr UH	0	10	20	30	40	30	20	10	0

(OR)

2. a) What is Runoff? Explain various factors affecting Runoff. 6M
- b) The rates of rainfall for successive 30 minutes periods of a 3 –hour storm are as follows: 3.0, 4.0, 5.0, 2.0, 1.5, 1.0 cm/hr. Take ϕ – Index as 2 cm/hr. Compute the following, 8M
 - i) Total depth of rainfall
 - ii) Total rainfall excess
 - iii) W-index.

UNIT-II

3. a) Derive an expression for discharge from a well fully penetrated into an unconfined Aquifer. 6M
- b) During a recuperation test conducted on an open well in a region, the water level in the well was depressed by 3m and it was observed to rise by 1.75 m in 75 minutes. What is the specific yield of open well in that region and what could be the yield from a well of 5m diameter under a depression head of 2.5m? 8M

(OR)

4. a) What do you understand by Recuperation? Derive the equation to determine the discharge from the open well by this method? 6M
- b) A tube well penetrates fully a 8 m thick water bearing stratum (confined) of medium sand having coefficient of permeability of 0.004 m/sec. The well radius is 15 cm and is to be worked under a drawdown of 3 m at the well face. Calculate the discharge from the well. What will be the increase in discharge if the radius of the well is doubled? Take radius of zero draw down equal to 400 m in each case. 8M

UNIT-III

5. a) Write the step by step procedure of calculating the safe yield of a reservoir by mass curve of inflow for the given storage capacity. 6M
- b) The yield of water in Mm^3 from a catchment area during each successive month is given in the following table. 8M

1.4	2.1	2.8	8.4	11.9	11.9
7.7	2.8	2.52	2.24	1.96	1.68

Determine the minimum capacity of a reservoir required to allow the above volume of water to be drawn off at a uniform rate assuming that there is no loss of water over the spillway.

(OR)

6. a) Explain various measures that can be adopted to control the sedimentation in the reservoir. 7M
- b) Explain various investigations required for reservoir planning. 7M

UNIT-IV

7. a) Define Duty and Delta. Derive the relation between them. 6M
- b) A water course has a culturable command area of 2000 Ha. The intensity of irrigation for crop A is 40% and for B 35%, both crops being Rabi crops. Crop A and B has kor period of 25 days and 15 days respectively. Kor depth for crop A and B has 20 cm and 15 cm respectively. Determine the discharge required in the water course if the canal losses are 20%. 8M

(OR)

8. a) What is consumptive use and discuss about various methods to measure consumptive use? 6M
- b) The base period, intensity of irrigation and duty of water for various crops under the canal system are given. Determine the reservoir capacity if the culturable command area is 4000 hectares, canal losses are 20% and reservoir losses are 10%. 8M

Crop	Base period (days)	Duty at field (Ha/cumec)	Intensity of irrigation
Wheat	120	1800	20%
Sugar cane	360	1600	20%
Cotton	180	1400	15%
Rice	120	800	20%
Vegetable	120	700	20%

UNIT-V

9. a) Explain in detail the comparisons between Kennedy's theory and Lacey's regime theory. 6M
- b) Design an irrigation channel to carry a discharge of $50 \text{ m}^3/\text{sec}$. assume $N=0.0225$, $m=1$, and the channel has a bed slope of $0.15\text{m}/\text{km}$. 8M

(OR)

10. a) Why canal lining is necessary and explain different types of canal lining. 6M
- b) Design a trapezoidal shaped concrete lined channel to carry a discharge of $400\text{m}^3/\text{s}$ at a slope of $25 \text{ cm}/\text{km}$. The side slopes of the channel are $1.5\text{H}:1\text{V}$. The value of 'N' may be taken as 0.015 . Assume limiting velocity in the channel as $2.5\text{m}/\text{sec}$. 8M