

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-IMarks CO Blooms
Level

1. a) Define Managerial Economics and explain its nature. 7 1 K2
- b) Explain various determinants of demand 7 1 K2

(OR)

2. a) Briefly explain the scope of managerial economics. 7 1 K2
- b) Discuss law of demand and its exceptions. 7 1 K2

UNIT-II

3. a) Explain price Elasticity of Demand and its types. 7 2 K2
- b) Discuss the survey methods of demand forecasting. 7 2 K2

(OR)

4. a) Discuss the factors governing demand forecasting 7 2 K2
- b) Explain Statistical methods of demand forecasting methods. 7 2 K2

UNIT-III

5. a) Illustrate the law of variable proportions with table and diagram 7 3 K2
- b) From the following information of a company, calculate (a) P/V Ratio and (b) BEP 7 3 K3

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

(OR)

6. a) Explain the Cobb-Douglas production function 7 3 K2
- b) From the following information of a company, calculate the break-even quantity and break even sales. Fixed overheads are Rs.2,00,000; selling price per unit is Rs.20, and variable cost per unit is Rs.10. If the company is earning a profit of Rs.40,000, find the margin of safety available to it. 7 3 K3

UNIT-IV

7. a) Define Monopoly and explain its features 7 4 K2
- b) Calculate the pay back periods of the following projects each requiring a cast outlay of Rs. 10,000/-. Suggest which ones are acceptable. 7 4 K3

Year	Project - X	Project - Y
1	2,500	4,000
2	2,500	3,000
3	2,500	2,500
4	2,500	1,000
5	2,500	5,000

(OR)

- | | | | | | |
|----|----|--|---|---|----|
| 8. | a) | Discuss price output determination under perfect competition in short-run. | 7 | 4 | K2 |
| | b) | Explain accounting rate of return method, pertaining to capital budgeting with an example. | 7 | 4 | K3 |

UNIT-V

- | | | | | | |
|----|----|---|---|---|----|
| 9. | a) | Journalise the following transactions in the books of Ram trading company.
Jan 1. Ram invests Rs.10000 in cash
Jan 2. he bought goods worth Rs.2000 from shyam
Jan 3. he bought a machine for Rs.5000 from Lakshman on account
Jan 4. he paid to Lakshman Rs.2000
Jan 5. he sold good for cash Rs.3000
Jan 6. he sold good to A on account Rs.4000
Jan 7. he paid to Shyam Rs.1000 | 7 | 5 | K3 |
| | b) | Discuss types and rules of accounts. | 7 | 5 | K2 |

(OR)

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|-----|----|---|---|---|----|
| 10. | a) | Explain ratio analysis and any two types of ratios with examples. | 7 | 5 | K3 |
| | b) | Explain the advantages and disadvantages of ratio analysis. | 7 | 5 | K3 |

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

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UNIT-I

- | | Marks | CO | BTL |
|--|-------|----|-----|
| 1. a) What is meant by surveying? Explain the principle of surveying? | 7 | 1 | 1 |
| b) The length of a Survey line was measured with a 20m chain and was found to be equal to 1200m. As a check the length was again measured with a 25m chain and was found to be 1212m. On comparing the 20m chain with the test gauge, it was found to be 1 decimeter too long. Find the actual length of the 25m chain used. | 7 | 1 | 4 |

(OR)

- | | | | |
|--|---|---|---|
| 2. a) What are the objects of plane surveying? | 7 | 1 | 1 |
| b) What are the types of error in surveying | 7 | 1 | 1 |

UNIT-II

- | | | | |
|--|---|---|---|
| 3. a) Define Meridian. What are the different types of meridian? | 6 | 2 | 2 |
| b) The following are the fore bearing and back bearings of the sides of a closed traverse. Calculate the interior angles of the traverse | 8 | 2 | 4 |

Line	FB	BB
AB	150° 15'	330° 15'
BC	20° 30'	200° 30'
CD	295° 45'	115° 45'
DE	218° 00'	38° 00'
EA	120° 30'	300° 30'

(OR)

- | | | | |
|---|---|---|---|
| 4. a) The bearings of the sides of a closed traverse ABCDEA are as follows: | 8 | 2 | 4 |
|---|---|---|---|

Line	FB	BB
AB	107° 15'	287° 15'
BC	22° 00'	202° 00'
CD	281° 30'	101° 30'
DE	189° 15'	9° 15'
EA	124° 45'	304° 45'

Compute the Interior angles of the traverse and apply necessary checks.

- | | | | |
|---|---|---|---|
| b) Define azimuth, bearing and explain the types of bearings. | 6 | 2 | 1 |
|---|---|---|---|

UNIT-III

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|----|----|--|---|---|---|
| 5. | a) | Describe the methods of levelling. | 6 | 3 | 1 |
| | b) | The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eighth reading readings 2.248, 1.606, 0.988, 2.390, 2.864, 1.242, 0.612, 1.982, 1.044, 2.644m. Enter the above readings in a page of a level book and calculate R.L of points, if the first was taken with a staff held on a B.M of 432.374 m. | 8 | 3 | 4 |

(OR)

- | | | | | | |
|----|----|--|---|---|---|
| 6. | a) | Explain in brief about the temporary adjustments of the Leveling | 7 | 3 | 1 |
| | b) | Briefly explain the characteristics of contours. | 7 | 3 | 2 |

UNIT-IV

- | | | | | | |
|----|----|--|---|---|---|
| 7. | a) | Explain the importance of total station as Civil Engineer. | 7 | 4 | 1 |
| | b) | State the errors eliminated by reiteration method? Explain how to set out a horizontal angle by method of reiteration? | 7 | 4 | 2 |

(OR)

- | | | | | | |
|----|----|---|---|---|---|
| 8. | a) | Define curve and Explain the types of curves. | 7 | 4 | 2 |
| | b) | Explain about methods of setting out of a simple curve. | 7 | 4 | 1 |

UNIT-V

- | | | | | | |
|----|----|---|---|---|---|
| 9. | a) | What is photogrammetric surveying? Discuss types of photogrammetry and types of aerial Photographs? | 7 | 5 | 1 |
| | b) | List out the components of drones and explain in detail | 7 | 5 | 2 |

(OR)

- | | | | | | |
|-----|----|--|---|---|---|
| 10. | a) | Discuss in detail about perspective geometry of aerial photograph. | 7 | 5 | 1 |
| | b) | What are the application of drone for Surveying Construction, Engineering Land Survey and Transportation | 7 | 5 | 2 |

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UNIT-I

- | | | Marks | CO | BTL |
|-------|--|-------|----|------------|
| 1. a) | Explain the structure of an Operating System. Discuss different types of operating systems with suitable examples. | 7 | 1 | Understand |
| b) | Consider the following processes with arrival and burst times: | 7 | 1 | Evaluate |

Process	Arrival Time	Burst Time
P1	0	7
P2	2	4
P3	4	1
P4	5	4

- i) Draw Gantt charts for FCFS and SJF (non-preemptive)
ii) Calculate average waiting time and turnaround time

(OR)

- | | | | | |
|-------|---|---|---|----------|
| 2. a) | Explain system calls and their types with examples. | 7 | 1 | Apply |
| b) | For the following processes, apply Round Robin scheduling (Time Quantum = 2 ms): | 7 | 1 | Evaluate |

Process	Burst Time
P1	5
P2	4
P3	2
P4	1

- i) Draw the Gantt chart
ii) Calculate average waiting time and turnaround time

UNIT-II

- | | | | | |
|-------|---|---|---|------------|
| 3. a) | Explain the critical section problem and Peterson's solution with neat diagram. | 7 | 2 | Understand |
| b) | Write a semaphore-based solution for the Producer-Consumer problem. Additionally, consider a system with 3 processes and 1 shared resource. Show how mutual exclusion is maintained using semaphores. | 7 | 2 | Apply |

(OR)

- | | | | | |
|-------|---|---|---|----------|
| 4. a) | Explain deadlock characterization and necessary conditions. | 7 | 2 | Analyse |
| b) | Consider the following system snapshot: | 7 | 2 | Evaluate |

Process	Allocation	Max	Available
P0	1	3	2
P1	1	2	
P2	1	2	

- i) Determine whether the system is in a safe state using Banker's Algorithm
ii) Find the safe sequence (if any)

UNIT-III

5. a) Explain contiguous memory allocation and fragmentation issues. 5 3 Apply
b) Consider a system with page reference string: 9 3 Evaluate
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2
Number of frames = 3
i) Apply FIFO page replacement algorithm
ii) Calculate number of page faults
iii) Compare with LRU algorithm
(OR)
6. a) Explain demand paging and thrashing. 5 3 Apply
b) For the page reference string: 9 3 Evaluate
1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5
Frames = 3
i) Apply Optimal page replacement
ii) Calculate page faults
iii) Compare with FIFO results

UNIT-IV

7. a) Explain file concepts and file access methods. 6 4 Understand
b) A disk has 100 blocks. File A requires 10 blocks, File B requires 8 4 Apply
15 blocks.
i) Show allocation using contiguous, linked, and indexed allocation
ii) Compare efficiency and fragmentation issues in each method
(OR)
8. a) Explain directory structures with types. 6 4 Apply
b) Given a file system with block size = 1 KB and file size = 1 MB: 8 4 Analyse
i) Calculate number of blocks required
ii) Compare indexed allocation vs contiguous allocation for this file
iii) Discuss free space management using bit vector

UNIT-V

9. a) Explain disk structure and disk management. 6 5 Apply
b) A disk has 200 tracks (0–199). The disk head is initially at 50. 8 5 Analyse
Request queue: 82, 170, 43, 140, 24, 16, 190
i) Apply FCFS scheduling and calculate total head movement
ii) Apply SSTF scheduling and calculate total head movement
(OR)
10. a) Explain I/O devices and device controllers. 5 5 Analyse
b) For the same disk queue in Q9: 9 5 Evaluate
i) Apply SCAN scheduling (initial direction towards 0)
ii) Apply C-SCAN scheduling
iii) Compare total head movements and efficiency

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

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- | | | <u>UNIT-I</u> | Marks | CO | BTL |
|-----------------|----|---|-------|----|---------------|
| 1. | a) | Derive the expression for AM wave in both time and frequency domain with necessary waveforms | 7M | 1 | Apply |
| | b) | Compare DSB-SC, SSB, and VSB in terms of bandwidth and power efficiency. | 7M | 1 | Analyze |
| (OR) | | | | | |
| 2. | a) | Explain switching modulator for AM generation. | 7M | 1 | Understanding |
| | b) | Explain need for modulation and classification of modulation techniques. | 7M | 1 | Understanding |
| UNIT-II | | | | | |
| 3. | a) | Distinguish between FM and PM by giving its mathematical analysis | 7M | 2 | Understanding |
| | b) | Describe the generation of FM carrier by transistor reactance modulator with necessary diagrams. | 7M | 2 | Understanding |
| (OR) | | | | | |
| 4. | a) | A single tone modulating signal $\cos(2\pi \cdot 10^3 t)$ frequency modulates a carrier of 10MHz and produces a frequency deviation of 75kHz. Find
i. the modulation index and
ii. Bandwidth of FM wave.
iii) Phase deviation produced in the FM wave. | 7M | 2 | Apply |
| | b) | Explain Armstrong method of FM generation with block diagram. | 7M | 2 | Understanding |
| UNIT-III | | | | | |
| 5. | a) | Describe why delta modulation is a special case of DPCM. | 7M | 3 | Understanding |
| | b) | Explain quantization error and derive an expression for maximum SNR in a PCM system that uses linear quantization. | 7M | 3 | Apply |
| (OR) | | | | | |
| 6. | a) | Explain PAM, PWM and PPM modulation techniques with neat waveforms. | 7M | 3 | Understanding |
| | b) | Explain companding in PCM systems. | 7M | 3 | Understanding |
| UNIT-IV | | | | | |
| 7. | a) | Draw and explain constellation diagram for QPSK. | 5M | 4 | Apply |
| | b) | Explain DPSK modulation and demodulation. | 9M | 4 | Understanding |
| (OR) | | | | | |
| 8. | a) | A bit stream 110101 is transmitted using ASK. Sketch waveform and determine bandwidth | 5M | 4 | Apply |
| | b) | Explain generation and detection of BPSK with block diagram. | 9M | 4 | Understanding |
| UNIT-V | | | | | |
| 9. | a) | Explain matched filter and derive its probability of bit error. | 7M | 5 | Apply |
| | b) | With neat sketch explain the significance of Pre-emphasis and De-emphasis. | 7M | 5 | Understanding |
| (OR) | | | | | |
| 10. | a) | Explain TRF receiver and its limitations. | 5M | 5 | Understanding |
| | b) | Explain the operation of superhetrodyne receiver with a neat block diagram. | 9M | 5 | Understanding |

Time: 3 Hours

Max Marks: 70

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		Marks	CO	BTL
UNIT-I				
1.	a) Explain the operation of a DC generator with neat diagram	8	1	Understand
	b) What is armature reaction? Explain with neat sketch	6	1	Remember
(OR)				
2.	a) What are the different methods of excitation of a DC generator	4	1	Remember
	b) A dc compound generator supplies 150 A at 100 V. The resistance of armature, series field and shunt field windings are 0.04, 0.02 and 65 Ω respectively. Determine the e.m.f generated for both long and short connections. (Neglect armature reaction effect)	10	1	Apply
UNIT-II				
3.	a) Explain about classification of DC motors.	10	2	Understand
	b) What are the applications of a DC motor?	4	2	Remember
(OR)				
4.	a) Explain the speed torque characteristics of a DC shunt and series motors.	7	2	Understand
	b) What is Back emf? Explain in detail	7	2	Understand
UNIT-III				
5.	a) Explain with diagram how Hopkinson's test is performed on dc machines. What are the advantages and disadvantages of this test?	7	3	Understand
	b) Explain field control method for speed control of a DC shunt machine?	7	3	Understand
(OR)				
6.	a) Explain Swineburne's test and its importance	7	3	Understand
	b) With neat sketch explain about field test.	7	3	Apply
UNIT-IV				
7.	a) Discuss the principle of operation of transformer and derive the emf equation	7	4	Understand
	b) A single-phase transformer supplies a load of 20 kVA at a p.f. of 0.85 (lagging). The iron loss of the transformer is 200 W and the copper losses at this load is 200 W. Calculate (i) the efficiency (ii) the new efficiency if the load is now changed to 15 kVA at a p.f. of 0.9 (lagging).	7	4	Apply
(OR)				
8.	a) Distinguish between core-type and shell-type transformer. Why is the low voltage winding placed near the core? Why is the core of a transformer laminated?	7	4	Remember
	b) Draw the phasor diagram of single-phase transformer with leading p.f	7	4	Understand
UNIT-V				
9.	A 4 kVA, 200/400V, 50 Hz, single phase transformer gave the following test results: O.C. test: 200V, 0.7A, 70 W on LV side S.C. test: 15V, 10A, 80 W on HV side Obtain i) Full load efficiency at 0.8p.f leading. ii) Half load efficiency at 0.8p.f leading. iii) Full load regulation at 0.9 p.f lading and lagging Iv). Equivalent circuit parameter.	14	5	Apply
(OR)				
10.	a) Discuss about Sumpner's test on a single-phase transformer.	7	5	Understand
	b) What is auto-transformer? Explain with a neat sketch. Mention few applications of auto transformer	7	5	Understand

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		<u>UNIT-I</u>	Marks	CO	BTL
1.	a)	Explain the overview of an Operating System and its main functions.	7	CO1	K2
	b)	Explain different types of Operating Systems with examples.	7	CO1	K2
		(OR)			
2.	a)	What are System Calls? Explain different types of system calls.	7	CO1	K1
	b)	Describe process scheduling and scheduling criteria	7	CO1	K2
		<u>UNIT-II</u>			
3.	a)	Discuss deadlock in synchronization problems.	7	CO2	K2
	b)	Explain Peterson's solution for critical-section problem.	7	CO2	K2
		(OR)			
4.	a)	Describe synchronization hardware mechanisms.	7	CO2	K2
	b)	Illustrate the Bounded Buffer (Producer-Consumer) problem using semaphores.	7	CO2	K4
		<u>UNIT-III</u>			
5.	a)	Describe deadlock characterization with necessary conditions.	7	CO3	K2
	b)	Explain swapping in memory management.	7	CO3	K2
		(OR)			
6.	a)	Explain FIFO and Optimal page replacement algorithms.	7	CO3	K2
	b)	Explain virtual memory and demand paging.	7	CO3	K2
		<u>UNIT-IV</u>			
7.	a)	Explain the concept of a file and its attributes.	7	CO4	K2
	b)	Explain file sharing and protection mechanisms.	7	CO4	K2
		(OR)			
8.	a)	Explain free-space management techniques.	7	CO4	K2
	b)	Explain contiguous allocation method.	7	CO4	K2
		<u>UNIT-V</u>			
9.	a)	Explain the overview of mass-storage structure.	7	CO5	K2
	b)	Illustrate FCFS and SSTF disk scheduling algorithms.	7	CO5	K4
		(OR)			
10.	a)	Compare all disk scheduling algorithms.	7	CO5	K2
	b)	Differentiate between block devices and character devices.	7	CO5	K2

Python Programming**(Common to CIVIL, EEE & MECH Branches)****Time: 3 Hours****Max Marks: 60**

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		Marks	CO	Blooms Level
	<u>UNIT-I</u>			
1.	a) Explain the major features of Python that make it a popular programming language. Provide suitable examples?	5M	CO1	L2
	b) Describe the steps involved in installing Python on Windows and explain different ways to run a Python program?	5M	CO1	L3
	(OR)			
2.	a) What are Python operators? Explain different categories of operators with examples?	5M	CO1	L2
	b) Explain conditional statements and looping constructs in Python with syntax and examples?	5M	CO1	L3
	<u>UNIT-II</u>			
3.	a) Explain mutable and immutable data types in Python with suitable examples. Why is immutability important?	5M	CO2	L4
	b) Describe different numeric data types in Python—integers, floating-point numbers, and complex numbers. Explain built-in functions and operators used with numbers?	5M	CO2	L3
	(OR)			
4.	a) What are Python sequences? Discuss strings, lists, and tuples in detail with syntax and examples?	5M	CO2	L2
	b) Explain dictionaries and sets in Python. Describe their properties, operations, and common built-in methods with examples?	5M	CO2	L3
	<u>UNIT-III</u>			
5.	a) Define a function in Python. Explain function declaration, parameter passing methods, and calling a function with suitable examples?	5M	CO3	L3
	b) Explain different types of parameters in Python functions (positional, keyword, default, variable-length) with examples?	5M	CO3	L2
	(OR)			
6.	a) What are the steps involved in creating, opening, reading, writing, appending, and closing a file in Python? Explain with code examples?	5M	CO3	L3
	b) Discuss different file handling modes in Python and describe various file I/O methods such as read(), readline(), write(), and append() with examples?	5M	CO3	L3

UNIT-IV

7. a) What is a Python module? Explain modules, files, and namespaces in Python with suitable examples? 5M CO4 L2
- b) Describe different ways of importing modules in Python. Explain importing complete modules, specific attributes, and using aliases with examples? 5M CO4 L3

(OR)

8. a) Explain module built-in functions such as dir(), help(), globals(), and locals(). Discuss how they are used in working with modules? 5M CO4 L2
- b) What are Python packages? Explain the structure of a package, the role of __init__.py, and demonstrate how to create and import packages with examples? 5M CO4 L3

UNIT-V

9. a) Explain the principles of Object-Oriented Programming (OOP) in Python. Describe encapsulation, inheritance, and polymorphism with examples? 5M CO5 L2
- b) How are classes created in Python? Write the syntax of a class and explain instance methods and special methods (__init__, __str__) with examples? 5M CO5 L3

(OR)

10. a) What are class variables and instance variables in Python? Compare both and illustrate their usage with a suitable program? 5M CO5 L4
- b) Explain different types of inheritance in Python. Write a program to demonstrate single and multilevel inheritance. Also mention how method overriding works? 5M CO5 L3

UNIT-VI

11. a) What are Regular Expressions? Explain their purpose and advantages in pattern matching with examples? 5M CO6 L2
- b) Describe the special symbols and characters used in Regular Expressions (like., *, +, [], ^, \$). Explain each with suitable examples? 5M CO6 L2

(OR)

12. a) Explain how the re module in Python works. Discuss key functions such as match(), search(), findall(), and sub() with examples? 5M CO6 L3
- b) Write a short note on using Regular Expressions for text processing in Python. Demonstrate with examples for validating patterns such as email or mobile numbers? 5M CO6 L3

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<u>UNIT-I</u>				
1.	a) Explain the operation of a Low Pass RC circuit.	5M	1	K2
	b) Derive the transfer function of a High Pass RC circuit.	5M	1	K2
(OR)				
2.	a) Explain the RC circuit as an Attenuator.	5M	1	K2
	b) Explain the response of a High Pass RC circuit to a step input.	5M	1	K2
<u>UNIT-II</u>				
3.	a) Explain the operation of positive diode clipper.	5M	2	K2
	b) Explain the transfer characteristics of diode clippers.	5M	2	K2
(OR)				
4.	a) Explain the working principle of a comparator circuit.	5M	2	K2
	b) Explain the Clamping Circuit Theorem in detail.	5M	2	K2
<u>UNIT-III</u>				
5.	a) Explain the operation of a diode as a switch.	5M	3	K2
	b) Design a transistor switch circuit for a given load.	5M	3	K2
(OR)				
6.	a) Explain the basic principle of bistable multivibrators.	5M	3	K2
	b) Explain self-biased transistor binary circuits.	5M	3	K2
<u>UNIT-IV</u>				
7.	a) Explain the basic principle of a monostable multivibrator.	5M	4	K2
	b) Design transistorized monostable multivibrator.	5M	4	K2
(OR)				
8.	a) Explain the waveform generation process in an astable multivibrator.	5M	4	K2
	b) Explain the design considerations for an astable multivibrator.	5M	4	K2
<u>UNIT-V</u>				
9.	a) Explain the concept of a time base generator.	5M	5	K2
	b) Explain the working of a transistor Miller time base generator.	5M	5	K2
(OR)				
10.	a) Explain the characteristics of UJT used in relaxation oscillators.	5M	5	K2
	b) Explain the basic principle of a Bootstrap time base generator.	5M	5	K2
<u>UNIT-VI</u>				
11.	a) Explain the basic operating principle of sampling gates.	5M	6	K2
	b) Explain the requirements of an ideal sampling gate.	5M	6	K2
(OR)				
12.	a) Explain the working of a bidirectional sampling gate.	5M	6	K2
	b) Explain the use of sampling gates in pulse modulation systems.	5M	6	K2

II B.Tech.II Semester Supplementary Examinations, April,2026
DESIGN AND ANALYSIS OF ALGORITHMS
(COMMON TO CSE & IT)

Time: 3 Hours

Max Marks: 60

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<u>UNIT-I</u>			Marks	CO	BTL
1.	a)	Illustrate briefly on Big oh Notation, Big Omega Notation and Theta Notations	5	1	3
	b)	Differentiate performance measurement and performance estimation of algorithms.	5	1	3
(OR)					
2.		Explain Amortized analysis with example	10	1	2
<u>UNIT-II</u>					
3.		Explain the merge sort algorithm with an example. Design an algorithm for merge sort.	10	2	2
(OR)					
4.		Write an algorithm for stressan's matrix multiplication and analyze the complexity of your algorithm.	10	2	3
<u>UNIT-III</u>					
5.	a)	Explain Job sequencing within deadlines	5	3	2
	b)	Discuss Knapsack problem in Greedy method	5	3	2
(OR)					
6.		Differentiate between prim's algorithm and krushkals algorithm for finding the minimum cost spanning tree.	10	3	3
<u>UNIT-IV</u>					
7.	a)	Write and explain an algorithm to compute the all pairs shortest path using dynamic programming and prove that it is optimal	5	4	3
	b)	What is meant by bottom-up dynamic programming?	5	4	2
(OR)					
8.	a)	Differentiate between divide-and-conquer and dynamic programming	5	4	3
	b)	Solve the following instance of 0/1 KNAPSACK problem using Dynamic programming $n = 3$, $(W1, W2, W3) = (2, 3, 4)$, $(P1, P2, P3) = (1, 2, 5)$, and $m = 6$	5	4	3
<u>UNIT-V</u>					
9.	a)	Compare and contrast BFS and DFS	5	5	3
	b)	Define strongly connected components. Explain the properties of strongly connected components.	5	5	2
(OR)					
10.		Write the backtracking algorithm for the sum of subsets problem using the state space tree corresponding to $m=35$, $w=(20,18,15,12,10,7,5)$	10	5	3
<u>UNIT-VI</u>					
11.	a)	How to search an answer node in branch and bound using Least Cost Search? Explain.	5	6	2
	b)	Explain about 0/1 Knapsack Problem using branch and bound with example.	5	6	2
(OR)					
12.	a)	Give the relation between NP Hard and NP Complete.	5	6	2
	b)	Explain Cook's theorem.	5	6	2

**PULSE AND DIGITAL CIRCUITS
(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) Obtain the response of an RC low-pass circuit to a square wave input for long, medium and short time constants. 6M
b) Explain the operation of attenuators. 6M

(OR)

2. a) Explain about RLC ringing circuit? 6M
b) Calculate the lowest square wave frequency that can be passed by an amplifier with a lower 3-db frequency of 5 Hz. If the maximum allowable tilt in the Output is 2%. 6M

UNIT-II

3. a) Give the circuits of any two types of shunt clippers and explain their operation with the help of their transfer characteristics 6M
b) State and prove clamping circuit theorem. 6M

(OR)

4. a) Draw the circuit diagram and explain the working of transistor clippers. 6M
b) Draw the basic circuit diagram of negative peak clamper circuit and explain its operation 6M

UNIT-III

5. a) Explain how transistor acts as switch. Draw base and collector waveforms and indicate all the time intervals. 6M
b) Explain the method of unsymmetrical triggering of the binary with relevant circuit diagram. 6M

(OR)

6. a) Explain the following i) Collector Catching Diodes ii) Commutating Capacitors 6M
b) Explain applications of Schmitt trigger. 6M

UNIT-IV

7. a) Explain how astable multivibrator is used as a voltage to frequency convertor. 6M
b) Design an astable multivibrator to meet the following specifications: $V_{CC}=12V$, $I_C=3mA$, $h_{FE}=30$. The output should be a square wave of 1 kHz with 50% duty cycle. 6M

(OR)

8. A collector coupled monostable multivibrator using n-p-n silicon transistors has the following parameters: $V_{CC} = 12V$, $V_{BB} = 3V$, $R_C = 2k\Omega$, $R_1 = R_2 = R = 20k\Omega$, $h_{FE} = 30$, $r_{bb} = 200\Omega$, and $C = 1000 PF$. Neglect I_{CBO} . Calculate and plot to scale the wave shapes at each base and collector. Find the width of the output pulse. 12M

UNIT-V

9. a) What are the different methods of generating time-base waveforms? Explain about each briefly. 6M
b) Explain the working of Transistor Miller sweep circuit. What are its advantages over Bootstrap sweep circuits? 6M

(OR)

10. a) Explain how the loading of the control signal is reduced when the number of inputs increases in a sampling gate. 6M
b) Explain the function of a sampling gate used in Sampling Scopes also explain how sampling gate is used in chopping amplifiers. 6M