RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

B.Tech III Semester End Examinations, December 2024

ADVANCED DATA STRUCTURES & ALGORITHMS ANALYSIS (23APC0503T)

(Common for AI and CSE)

Time: 3 Hours **MODEL PAPER** Max. Marks: 70

PART-A **(10 X 2 = 20 M)**

(Compulsory Question)

Answer the following.			**Unit**	**Marks**
1	a)	What is meant by asymptotic notation?	I	(2 M)
	b)	Define Time and space complexity.	I	(2 M)
	c)	Explain min and max heaps.	II	(2 M)
	d)	What is biconnected component?	II	(2 M)
	e)	What are the applications of Graph?	III	(2 M)
	f)	What are backtracking techniques?	III	(2 M)
	g)	What is the worst case complexity of quicksort?	IV	(2 M)
	h)	What is the difference between 0/1 knapsack and ordinary knapsack?	IV	(2 M)
	i)	Define Strassen's matrix multiplication.	V	(2 M)
	j)	What is NP hard and NP complete?	V	(2 M)

PART-B **(5X 10 = 50 M)**

(Answer One FULL Question from each Unit; All questions carry EQUAL marks)		
	UNIT-I	
2	Write Insertion and Deletion process of B-Trees with examples.	(10 M)
	(OR)	
3	Explain in detail about AVL trees insertion, deletion with examples.	(10 M)
	UNIT-II	
4	Discuss the Graph traversal techniques with examples.	(10 M)
	(OR)	
5	Explain the concept of divide and conquer.	(10 M)
	UNIT-III	
6	Discuss the minimum cost spanning tree with greedy method in detail.	(10 M)
	(OR)	
7	Explain in detail about Bellman Ford Algorithm.	(10 M)
	UNIT-IV	
8	Discuss about 8-queens problem with examples.	(10 M)
	(OR)	
9	Discuss about Branch and bound method.	(10 M)
	UNIT-V	
10	Discuss about Cook's theorem in detail.	(10 M)
	(OR)	
11	What is NP hard scheduling problem? Explain it with an example.	(10 M)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

B.Tech III Semester End Examinations, December 2024

DIGITAL LOGIC & COMPUTER ORGANIZATION (23AES0504)

(CSE)

Time: 3 Hours **MODEL PAPER** Max. Marks: 70

PART-A **(10 X 2 = 20 M)**

(Compulsory Question)

Answer the following.			**Unit**	**Marks**
1	a)	Explain the difference between one's complement and two's complement.	I	(2 M)
	b)	State De Morgan's Theorem.	I	(2 M)
	c)	What the Difference between Combinational circuit and sequential circuit?	II	(2 M)
	d)	What is a bus in a computer system?	II	(2 M)
	e)	What is the difference between integer division and floating-point division?	III	(2 M)
	f)	What is the purpose of a multiple-bus organization in a processor?	III	(2 M)
	g)	Define cache memory.	IV	(2 M)
	h)	What is a page in the context of virtual memory?	IV	(2 M)
	i)	What is an interrupt?	V	(2 M)
	j)	What is the role of a bus arbiter in a bus-based system?	V	(2 M)

PART-B **(5X 10 = 50 M)**

(Answer One FULL Question from each Unit; All questions carry EQUAL marks)		
UNIT-I		
2	(a) Convert the following numbers i. $(10101100111.0101)_2$ to Base 10 ii. $(153.513)_{10}$ to base 16 (b) Implement a XNOR gate and an XOR gate using only NAND gates & NOR gates.	(10 M)
(OR)		
3	(a) Design and draw a Full Adder Circuit Using 2 Half adder Circuits. (b) Explain 2 to 4 Decoder & 4 to 1 Multiplexers.	(10 M)
UNIT-II		
4	(a) Draw a neat diagram of Positive edge triggered D flip-flop and explain its operation. (b) Design a mode-11 ripple counter using T flip flops and explain its operation with the help of state diagram.	(10 M)
(OR)		
5	(a) Explain the functional units of a computer in detail. (b) What is the significance of the Von Neumann bottleneck?	(10 M)
UNIT-III		
6	(a) Explain how addition and subtraction of signed numbers are performed using two's complement representation. (b) Explain Booth's multiplication algorithm for signed-operand multiplication.	(10 M)
(OR)		
7	(a) Describe the execution of a complete instruction cycle in a processor. (b) What is a multiple-bus organization?	(10 M)

	UNIT-IV	
8	(a) Explain the basic concepts of memory organization in a computer system. (b) Explain the concept of virtual memory in detail.	(10 M)
	(OR)	
9	(a) Describe the role of memory management in a modern operating system. (b) Compare and contrast SRAM and DRAM.	(10 M)
	UNIT-V	
10	(a) Explain the DMA transfer process in detail. (b) Explain the different types of buses used in a computer system.	(10 M)
	(OR)	
11	(a) Discuss standard I/O interfaces in computer systems (b) Explain the concept of bus arbitration in bus-based systems.	(10 M)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

B.Tech III Semester End Examinations, December 2024

DISCRETE MATHEMATICS & GRAPH THEORY (23ASH9909)

(Common for AI and CSE)

Time: 3 Hours **MODEL PAPER** Max. Marks: 70

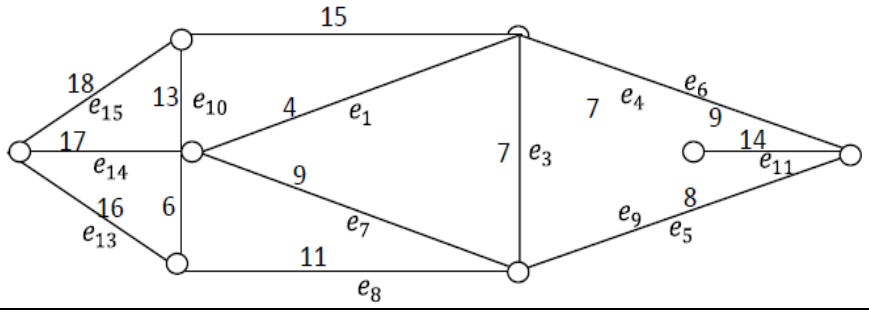
PART-A **(10 X 2 = 20 M)**

(Compulsory Question)

Answer the following.			**Unit**	**Marks**
1	a)	What are basic logical operations? Define them.	I	(2 M)
	b)	Without using truth table show that: $P \to (Q \to P) \Rightarrow \neg P \to (P \to Q)$	I	(2 M)
	c)	State pigeonhole principal.	II	(2 M)
	d)	State any two properties of a group.	II	(2 M)
	e)	Find the minimum number of persons selected so that at least eight of them will have birthdays on the same day of week.	III	(2 M)
	f)	What is the coefficient of?	III	(2 M)
	g)	Show that f <x,y> = x^y is a primitive recursive function.	IV	(2 M)
	h)	Find the generating function of the sequence a_n = n, n>=m.	IV	(2 M)
	i)	Find a chromatic number of a bipartite graph.	V	(2 M)
	j)	Define planar graph.	V	(2 M)

PART-B **(5X 10 = 50 M)**

(Answer One FULL Question from each Unit; All questions carry EQUAL marks)		
	UNIT-I	
2	Show that $p \vee (q \wedge r)$ and $(p \vee q) \wedge (p \vee r)$ logically equivalent.	(10 M)
	(OR)	
3	Obtain the principal disjunctive normal form: i) ~P ∨ Q. ii) (P ∧ Q) ∨ (~P ∧ R) ∨ (Q ∧ R).	(10 M)
	UNIT-II	
4	**(a)** Use the principle of inclusion–exclusion to find the number of positive integers less than 10,000 that are not divisible by either 4 or by 6. **(b)** Write the principle of inclusion–Exclusion. From a group of 10 Professors how many ways can committees of 5 members are formed so that at least one Professor A and Professor B will be included.	(10 M)
	(OR)	
5	Draw a POSET diagram for [D6; /] and examine whether it is meet-semi lattice or not.	(10 M)
	UNIT-III	
6	A person writes letters to five friends and addresses on the corresponding envelops. In how many ways can the letters be placed in the envelops so that: (i) All the letters are in the wrong envelops. (ii) At least two of them are in the wrong envelops.	(10 M)
	(OR)	
7	**(a)** How many arrangements can be made out of the letters of the word 'ENGINEERING'? **(b)** 25 buses are running between two places P and Q. In how many ways can a person go from P to Q and return by a different bus?	(10 M)

	UNIT-IV	
8	Solve the recurrence relation, S(n) = S(n-1) + 2 (n-1) with S(0) = 3, S(1) = 1 by finding its generating function.	
	(OR)	
9	Using Generating function solve the recurrence relation $\mathbf{a_n - a_{n-1} - 6a_{n-2} = 0}$ given $\mathbf{a_0 = 2, a_1 = 1}$.	(10 M)
	UNIT-V	
10	Using Kruskal's algorithm, obtain a minimal tree for the graph given in below. 	(10 M)
	(OR)	
11	Differentiate between Eulerian graph & Hamiltonian graph with example. And also give an example of a graph which is Eulerian but not Hamiltonian.	(10 M)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

B.Tech III Semester (RU23) End Examinations, December 2024

OBJECT ORIENTED PROGRAMMING THROUGH JAVA (23APC0504T)

(Computer Science & Engineering)

Time: 3 Hours **MODEL PAPER** Max. Marks: 70

PART-A **(10 X 2 = 20 M)**

(Compulsory Question)

Answer the following.			**Unit**	**Marks**
1	a)	Explain about History of JAVA.	I	(2 M)
	b)	How many types Variables in java with examples.	I	(2 M)
	c)	Define Ternary operator (?:) with example.	II	(2 M)
	d)	Explain about THIS Keyword with example.	II	(2 M)
	e)	Explain about Super Keyword with example.	III	(2 M)
	f)	Define Interface with example.	III	(2 M)
	g)	Define Package.	IV	(2 M)
	h)	Explain about class Throwable.	IV	(2 M)
	i)	What is the class string Buffer?	V	(2 M)
	j)	Explain about JDBC Architecture.	V	(2 M)

PART-B **(5 X 10 = 50 M)**

(Answer One FULL Question from each Unit; All questions carry EQUAL marks)		
	UNIT-I	
2	Explain about Type casting and Data Types with example.	(10 M)
	(OR)	
3	Explain about IF Statements and LOOP Concepts with program.	(10 M)
	UNIT-II	
4	Explain about Method Overloading and Over riding with example.	(10 M)
	(OR)	
5	Explain about Constructor and Recursion with suitable example.	(10 M)
	UNIT-III	
6	What is an Array? Explain Two-dimensional Array with example program.	(10 M)
	(OR)	
7	Discuss the types of Inheritance with example program.	(10 M)
	UNIT-IV	
8	Explain about Exception Handling with program.	(10 M)
	(OR)	
9	Explain about Java standard I/O streams and its types.	(10 M)
	UNIT-V	
10	What is Thread? Explain Life cycle of threading.	(10 M)
	(OR)	
11	Explain about Establishing JDBC Data Base Connections.	(10 M)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

B.Tech III Semester End Examinations, _____ 2024

UNIVERSAL HUMAN VALUES- (23ASH9913)

(COMMON TO ALL)

Time: 3 Hours **MODEL PAPER** Max. Marks: 70

PART-A **(10 X 2 = 20 M)**

(Compulsory Question)

Answer the following.			**Unit**	**Marks**
1	a)	What do you mean by human values?	I	(2 M)
	b)	What is self exploration?	I	(2 M)
	c)	What is the difference between prosperity and wealth?	II	(2 M)
	d)	What do the abbreviations given as SVDD, SSDD and SSSS signify?	II	(2 M)
	e)	What do you understand by term Respect?	III	(2 M)
	f)	What do you mean by Universal Human Order?	III	(2 M)
	g)	Define space.	IV	(2 M)
	h)	What do you mean by sustainable development?	IV	(2 M)
	i)	What is Humanistic Education?	V	(2 M)
	j)	What is Humanistic constitution?	V	(2 M)

PART-B **(5 X 10 = 50 M)**

(Answer One FULL Question from each Unit; All questions carry EQUAL marks)		
	UNIT-I	
2	What is value education? Explain the need, basic guidelines of value education.	(10 M)
	(OR)	
3	What are the basic requirements to fulfill human aspirations? Draw flow chart for right understanding, relationship and physical facility.	(10 M)
	UNIT-II	
4	Differentiate between the needs of 'Self' and the needs of 'Body'.	(10 M)
	(OR)	
5	How do sensations and preconditioning influence our imagination?	(10 M)
	UNIT-III	
6	Explain the nine universal human values in relationships.	(10 M)
	(OR)	
7	Explain respect. How we are generally making differentiation in the name of respect?	(10 M.
	UNIT-IV	
8	Explain the four orders existing in nature? How are they inter-linked to one another?	(10 M)
	(OR)	
9	Describe briefly the criteria for evaluation of Holistic technology. Support your answer with an example.	(10 M)
	UNIT-V	
10	Define Professional Ethics. What do you mean by competence in professional ethics?	(10 M)
	(OR)	
11	What are the reasons for unethical practices in the profession today? What is the real solution to the above problems? Give your opinion.	(10 M)