K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
Model Question Paper
(1805303) DATASTRUCTURES
B.Tech. III Semester (CSE) (R18) Degree Examinations

Time: 3 hrs. **Max. Marks: 70**

Note: Answer any FIVE questions choosing one question from each unit
All questions carry Equal Marks

UNIT-I

1. a) Differentiate linear and non-linear data structures. (7M)
   b) Write short notes on doubly linked list. (7M)

(OR)

2. What is linked list? Explain various operations of linked list. (14M)

UNIT-II

3. What is Stack? Write and explain the algorithms of Push and Pop operations. (14M)

(OR)

4. Explain about the following.
   a) Array & Linked representations of a Queue (7M)
   b) Circular Queues (7M)

UNIT-III

5. a) What is Binary Tree? Explainthe properties of Binary Tree. (8M)
   b) Construct the Binary Tree with the following inorder and preorder traversals. (6M)

   Inorder: EACKFHDBG Preorder: FAEKCDHGB

(OR)

6. a) What is BST? Explain insertion and deletion operations with suitable examples. (10M)
   b) Write short notes on Leftist Trees. (4M)

UNIT-IV

7. Write short notes about the following.
   a) AVL Tree (7M)
   b) Red-Black Tree (7M)

(OR)

8. Briefly explain about Breadth First Search (BFS) with suitable example. (14M)

UNIT-V

9. a) Write an algorithm for Bubble sort and explain with suitable example. (7M)
   b) Write an algorithm for Binary search and explain with an example. (7M)

(OR)

10). a) Explain about various hash functions with suitable example. (7M)
   b) Compare B trees with B+ trees. (7M)

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
Model Question Paper
(1805304) DISCRETE MATHEMATICS
B.Tech. III Semester (CSE) (R18) Degree Examinations

Time: 3 hrs. **Max. Marks: 70**

Note: - Answer any FIVE questions choosing ONE question from each unit.
All questions carry Equal marks.

UNIT – I

1. a) Define Tautology and Contradiction? Determine given statement is tautology or contradiction $((P\rightarrow(Q\rightarrow R))\rightarrow((P\rightarrow Q)\rightarrow(P\rightarrow R))$ (7M)

   b) Show that $(\sim P\wedge(\sim Q\wedge R))\vee(Q\wedge R)\vee(P\wedge R)\Leftrightarrow R$. without using truth tables (7M)

(OR)

2. a) Define a Principal Disjunctive Normal Form. Obtain the Principal Disjunctive Normal Form of $(P\wedge Q)\vee(\sim P\wedge R)\vee(Q\wedge R)$ (7M)

   b) Show that R (P V Q) is a valid conclusion from the premises P V Q, $Q\rightarrow R$, $P\rightarrow M$ and $\sim M$ (7M)

UNIT-II

3. a) What is a binary relation? Explain the properties of binary relation? (7M)
   b) Define Equivalence Relation. Let X={1,2,3,4,5,6,7}and R R= {(x,y) / x-y is divisible by 3}show that R is equivalence relation and draw the graph of R . (7M)

(OR)

4 a) Define a partially ordered set. Draw the Hasse diagram (X, ≤) where X is the set of positive divisors of 45 and the relation ≤ be such that x≤y if x divides y. (7M)

   b) Define compositio. Let relations R={(1,2) (3,4), (2,2) } S ={ (4,2) ,(2,5) ,(3,1), (1,3) }
   find RoR , RoS , SoR, Ro(SoR), (RoS)oR (7M)

UNIT-III

5. a) Explain binomial and Multinomial theorem (7M)
   b) Determine the coefficient of x^3y^7 in $(x+y)^{10}$ and in $(2x-9y)^{10}$ (7M)

(OR)

6. a) There are 6 men and 5 women in a group. In how many ways we can choose 3 men and 2 women from the group? (7M)
   b) In how many ways can the letters of the word 'READER' be arranged so that the consonants occupy only the even positions? (7M)

UNIT-IV

7. What is Generating function? Give an Example to calculate coefficients of generating function? (14 M)

(OR)

8. a) Explain Recurrence Relations with an Example? (4 M)
   b) Explain with an example solving recurrence relations by substitution and generating functions (10 M)

UNIT-V

9. a) Show that number of odd degree vertices in a simple graph is even. (7M)
   b) Define terms graph, planar graphs, sub graphs and multi graphs. Explain them with examples. (7M)

(OR)

10. a) Define isomorphism of graphs. Explain with example. (7M)
    b) Explain BFS algorithm with example (7M)

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
Model Question Paper
(1805305) DIGITAL LOGIC DESIGN
B.Tech. III Semester (CSE) (R18) Degree Examinations

Time:3 hours **Max.marks: 70**

Note: Answer all five Unit.s All questions carry equal marks. 5*14=70

UNIT-I

1. a) Show how the bases are equal.
   41 / 3 = 13
   b) Interpret the following subtraction using 2's complement.
   i) $(11111)_2 - (10101)_2$ ii) $(1101)_2 - (1110)_2$
   c) Identify minimum number of literals for the following Boolean functions using Boolean Algebra theorems and properties
   i) xy + x(wz + wz') ii) A'B (D' + C'D) + B(A+A'CD)

(OR)

2. Explain the following
   i) BCD codes ii) Gray code iii) Excess – 3 code
   iv)Error Detection and Correction codes v)ASCII code

UNIT- II

3. a) Reduce the following Boolean function using K-map.
   $F(A,B,C,D) = \sum(0,2,3,8,9,10,12,15)$
   b) Explain don't – care condition of a digital system in detail with example.

(OR)

4. Simplify the following Boolean expression and implement them with two levels of NAND gate circuit.
   $F(A,B,C,D,E) = \sum m(0,2,4,6,9,13,21,23,24,29,31)$

UNIT-III

5. a) Explain about half adder and full adder in detail.
   b) With a neat sketch explain BCD to Excess-3 Code converter.

(OR)

6. a) Explain the significance of multiplexer. Implement the following Boolean function using 4X1 MUX.
   $F(A,B,C,D) = \sum m(0,1,2,4,6,9,12,14)$
   b) Define an encoder. Design octal to binary encoder.

UNIT-IV

7. a) Write the differences between Latches and FlipFlops.
   b) Define FlipFlop and explain the following.
   i) RS FlipFlop ii) JK FlipFlop iii) D FlipFlop

(OR)

8. What is sequential circuit? Explain about sate reduction and state assignment with an example.

UNIT-V

9. a) Define register and explain about Universal shift register.
   b) In detail explain about BCD Ripple counter.

(OR)

10. Implement the following two Boolean functions with a PLA.
    $F_1(A,B,C)=\sum (0,1,2,4)$
    $F_2 (A,B,C)=\sum (0,5,6,7)$

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

Model Question Paper

(1805306) PYTHON PROGRAMMING

B.Tech. III Semester (CSE) (R18) Degree Examinations

Time: 3 hrs **Max. Marks: 70**

Note: Answer any FIVE questions choosing one question from each unit

All questions carry Equal Marks

UNIT-I

1.a) Briefly explain salient features of python. (7M)

b) Explain different data types in python. (7M)

(OR)

2. a) Explain input and output statements in python. (7M)

b) Explain the operator precedence of arithmetic operators in python. (7M)

UNIT-II

3. a) Write a python program to find Sum of digits of given number using while loop. (7M)

b) Define an array. Explain indexing and slicing operations on arrays with suitable examples. (7M)

(OR)

4.a) Write a python program to design arithmetic calculator based on user choice like

1. Addition 2. Subtraction 3. Multiplication 4. Division (7M)

b) Explain break, continue and pass statements with suitable python programs. (7M)

UNIT-III

5. a) Define Function. Explain different types of arguments used on functions through suitable programs. (8 M)

b) Write a python program to find the factorial of given number with and without using recursion. (6 M)

(OR)

6. a) Explain how to return multiple values from a function through suitable python program. (9 M)

b) Explain local and global variables in python. (5 M)

UNIT-IV

7. a) Define a list. Explain basic methods to process lists with suitable examples. (7M)

b) What is difference between list and tuple? (7M)

(OR)

8. a) What is Dictionary? Perform at least five operations on the following dictionary dict={'a':10,'b':20,'c':30} (7 M)

b) What are the different types of files in python? Write a python program to write some content in to the file and read, display contents in the file. (7 M)

UNIT-V

9. a) Create a student class with a constructer and display 6-student details. (6 M)

b) Explain single level inheritance with suitable python program (8 M)

(OR)

10. a) Explain instance and class variables through python program. (6 M)

b) Explain the following. (8 M)

i) method overloading ii) method overriding

Code: 1814302

KSRM College of Engineering (AUTONOMOUS), KADAPA

B.Tech. III Semester (R18) Regular Examinations of 2021

Sub: Electronic Devices & Circuits

Time: 3 Hrs Max. Marks: 70

Answer any Five Questions choosing one from each Unit
All Questions Carry Equal Marks

Q. No.	Questions	Marks	CO	BL
	Unit I			
1.	a) Explain the construction, working and application of the PN junction diode.	8		
	b) Give voltage- current characteristics of the PN junction diode.	6		
	(OR)			
2.	a) Draw the firing characteristics of SCR and briefly explain it.	6		
	b) Define the following with respect to SCR 1. Forward break over voltage 2. Reverse break over voltage 3. Holding current 4. Gate trigger current	8		
	Unit II			
3.	Draw the circuit diagram of NPN transistor in Common Emitter (CE) configuration. With neat sketches and necessary equations, describe its static input-output characteristics and clearly indicate the cut-off, saturation & active regions on the output characteristics?	14		
	(OR)			
4.	(a) What is a biasing circuit? Explain the fixed bias circuit in detail	7		
	(b) Derive the expression for stability factor S of Voltage divider bias circuit.	7		
	Unit III			
5.	a) Explain the field effect transistor action and different regions in which a FET operates.	7		
	b) Distinguish between BJT and FETs.	7		
	(OR)			
6.	Explain the construction & operation of a P-channel MOSFET in enhancement and depletion modes with the help of static drain characteristics and transfer characteristics?	14		
	Unit IV			
7.	(a)What is Oscillator? What are the necessary conditions for Oscillations?	4		
	b) Describe the frequency in Colpitt's Oscillator.	10		
	(OR)			
8.	What is power amplifier? Discuss types of power amplifier and mention its applications.	14		
	Unit V			
9.	a)Design a Transistor using AND Gate.	7		
	b)Describe the function of ECL family	7		
	(OR)			
10.	(a)Compare the parameters of different Logic families.	7		
	(b)Describe the operation of Emitter Coupled Logic family with a neat sketch.	7		

K.S.R.M. COLLEGE OF ENGINEERING (Autonomous), KADAPA.

Model Question paper

B.Tech III Sem (R18)

Mathematics – III

(ECE Branch)

Time: 3 Hrs. **Max Marks : 70**

Note : Answer any **FIVE** questions by choosing one from each unit.
All questions carry equal marks.

UNIT - I

1 Prove that (i) $J_n(x) = \frac{x}{2n}\,[J_{n-1}(x) + J_{n+1}(x)]$ (7M)

(ii) $J_n^1(x) = \frac{n}{x}J_n(x) - J_{n+1}(x)$ (7M)

(OR)

2 State and prove Rodrigue's formula. (14M)

UNIT – II

3 Prove that the function $f(z)$ defined by $f(z) = \frac{x^3\,(1+i)-y^3(1-i)}{x^2+y^2}$, $z \neq 0\ and\ f(0) = 0$ is continuous and Cauchy – Riemann equations are satisfied at the origin, yet $f'(0)$ does not exist. (14M)

(OR)

4 Determine the analytic function $f(z) = u + iv$, if $u - v = \frac{\cos x + \sin x - e^{-y}}{2(\cos x - \cos hy)}$ and $f\left(\frac{\pi}{2}\right) = 0$. (14M)

UNIT – III

5. Find the bilinear transformation which maps the points z=1, i, -1 onto the points w= i, 0, -i. Hence find the invariant points of this transformation. (14M)

(OR)

6. Discuss the transformation $w = e^z$.

UNIT – IV

7 a) Evaluate $\int_0^{2+i} (\bar{z})^2\, dz$, along the line $y = \frac{x}{2}$. (7M)

b) Evaluate , using Cauchy's Integral Formula $\oint_c \frac{\sin\pi z^2 + \cos\pi z^2}{(z-1)(z-2)}\, dz$ where c is the circle $|z| = 3$.

(OR)

8 Evaluate $\oint_c \frac{e^z}{(z^2+\pi^2)^2}\, dz$, where c is the circle $|z| = 4$ (14M)

UNIT – V

9. a) State and prove Cauchy's residue theorem (7M)

b) Evaluate $\oint_c tan\ z\ dz$ where 'c' is the circle $|z| = 2$ (7M)

(OR)

10. Show that $\int_0^{2\pi} \frac{\cos 2\theta\, d\theta}{1-2a\cos\theta+a^2} = \frac{2\pi a^2}{1-a^2}$, $a^2 < 1$ (14M)

K.S.R.M. COLLEGE OF ENGINEERING (Autonomous),KADAPA.

Model Question paper

B.Tech., III Sem (R18)

NUMERICAL METHODS, PROBABILITY & STATISTICS

(Common to CE & ME Branches)

Time: 3 Hrs. **Max Marks: 70**

Note: Answer any **FIVE** questions by choosing one from each unit.
All questions carry equal marks.

Unit - I

1. (a) Solve the equation $x^3 - 9x + 1 = 0$ by using the bisection method. (7M)
   (b) Solve the equation $cosx = xe^x$ by using the Regula - falsi method. (7M)

(OR)

2. Solve the system of equations $83x + 11y - 4z = 95$, $7x + 52y + 13z = 104$, $3x + 8y + 29z = 71$ by Gauss-Seidel iteration method. (14M)

Unit- II

3. Calculate the values of f(22) and f(42) from the following data. (14M)

x	20	25	30	35	40	45
f*(x)*	354	332	291	260	231	204

(OR)

4. Construct $y(x)$ from the following data and hence find $y(3)$. (14M)

x	0	1	2	5
$y(x)$	2	3	12	147

Unit-III

5. (a) Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys (ii) either 2 or 3 boys? Assume equal probabilities for boys and girls. (7M)
   (b) A car-hire firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the proportion of days (i) on which there is no demand, (ii) on which demand is refused. ($e^{-1.5} = 0.2231$) (7M)

(OR)

6. Fit a normal curve to the following distribution. (14M)

x	2	4	6	8	10
f	1	4	6	4	1

Unit- IV

7. (a) An intelligence test was administered to a large group of boys who score on the average of 64.5 marks. The same test was given to a group of 400 boys they score an average of 62.5 marks with a standard deviation of 12.5 marks. Examine if the difference is significant. (7M)

(b) Random samples of 400 men and 600 women were asked whether they would like to have a fly over near their residency. 200 men and 325 women were in favour of the proposals. Test the hypothesis that proportions of men and women in favour of the proposal are same at 5% level. (7M)

8. (a)The research investigator is interested in studying whether there is a significant difference in the salaries of MBA grades in two metropolitan cities. A random sample of size 100 form Mumbai yields on average income of Rs 20,150.Another random sample of 60 from Chennai results in an average income of Rs 20,250. If the variances of both the populations are given as $\sigma_1^2 = Rs\ 40{,}000\ and\ \sigma_2^2 = Rs\ 32{,}400$ respectively. (7M)

(b) An examination of the works of particular author in Tamil reveals that 3% of the words used were of Sanskrit origin. A passage containing 10,000 words. In one of the later works of the same author 250 words were found to be of Sanskrit origin. Does this indicate any significant change to the author's attitude about the use of Sanskrit words. (7M)

Unit-V

9. (a) The means of two random samples of sizes 9 and 7 are 196.42 and 198.82 respectively. The sums of the squares of the deviations from the mean are 26.94 and 18.73 respectively. Can the samples be considered to have been drawn from the same normal population? (7M)

(b)Two sample of sizes 9 and 8 given the sum of squares of deviations from their respective means equals to 160 inches square and 91 inches square respectively. Can they be regarded as drawn from the same normal population. (7M)

(OR)

10. (a) A sample analysis of examination results of 500 students was made. It was found that 220 students had failed, 170 had secured a third class, 90 were placed in second class and 20 got a first class. Do these figures commensurate with the general examination result which is in the ratio of 4:3:2:1 for the various categories respectively. (7M)

(b) Given the following contingency table for hair colour and eye colour. Find the value of χ^2. Is there good association between the two? (7M)

Hair colour / Eye colour	Fair	Brown	Black	Total
Blue	15	5	20	40
Grey	20	10	20	50
Brown	25	15	20	60
Total	60	30	60	150

Code: 1823301

KSRM College of Engineering (AUTONOMOUS), KADAPA

B.Tech., III Semester (R18) Regular Examinations of 2021

Sub: BIOLOGY FOR ENGINEERS

Time: 3 Hrs Max. Marks: 70

Answer any Five Questions choosing one from each Unit
All Questions Carry Equal Marks

Q. No.	Questions	Marks	CO	BL
	Unit I			
1.	(a) Describe process of Cell Cycle.	7	CO1	L2
	(b) Write about differences between Prokaryotic and Eukaryotic cells	7	CO5	L3
	(OR)			
2.	(a) Write short notes on Plant tissues.	7	CO3	L2, L4
	(b) Write about Five kingdom classification.	7	CO2,3	L3
	Unit II			
3.	(a) What are essential and non essential amino acids.	7	CO3	L2
	(b) Explain about classes of carbohydrates.	7	CO5	L3
	(OR)			
4.	(a) Write about Nucleic acids and their chemical composition.	7	CO3	L3,L4
	(b) Explain about the applications of enzymes in Industries.	7	CO3	L3
	Unit III			
5.	(a) Explain about physiology of human digestive system.	7	CO5	L2
	(b) Write about classes of Nutrition.	7	CO5	L2
	(OR)			
6.	(a) Describe the physiology of human respiratory system.	7	CO5	L2
	(b) Write short notes on (i) aerobic respiration (ii) anerobic respiration	7	CO5	
	Unit IV			
7.	(a)Explain the structure of gene.	7	CO4	L2,L3
	(b) Explain about process of Transcription in prokaryotes.	7	CO4	L3
	(OR)			
8.	Describe the process of DNA replication process.	7	CO4	L2,L3
		7	CO4	L3
	Unit V			
9.	(a) What are vaccines? Explain its production process.	7	CO2	L2,L3
	(b) Write about the production of monoclonal antibodies.	7	CO2	L2
	(OR)			
10.	(a) Write Explain about transgenic plants and animals	7	CO2	L2
	(b) What is Bioengineering ?Explain few applications of Bioengineering	7	CO5	L3

R - 18 **Code: 1825301**

KSRM COLLEGE OF ENGINEERING, (AUTONOMOUS) KADAPA

B.Tech III SEMESTER END EXAMINATIONS, JANUARY- 2021

(ELECTRONICS AND COMMUNICATIONS ENGINEERING)

Paper: MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Time: Three Hours Maximum: 70 Marks

Answer FIVE questions, choosing ONE question from each Unit.

All questions carry equal marks.

UNIT – I

1. Define Managerial Economics? Explain it helps in solving business problems? (14)M

(Or)

2. (a) Define the law of Demand. What are its exceptions? Explain. (5)M
   (b) Explain Law of Supply with graphical presentation? (9)M

UNIT – II

3. (a) Explain COBB-DOUGLAS production function. (7)M
   (b) Explain about law of returns to scale. (7)M

(Or)

4. (a) Define Break Even Analysis. Explain its significance and limitations. (7)M
   (b) Find BEP and Margin of safety from the following information. (7) M
   Selling Price per unit Rs.10, Variable cost per unit Rs. 6, Fixed costs are Rs. 40,000.
   Actual sales in units are 25,000.

UNIT – III

5. How to determine the price under Monopoly competition market. (14)M

(Or)

6. (a) Define market. Explain any five methods of pricing based on strategy. (7)M
   (b) Explain price rigidity under Oligopoly? (7)M

UNIT – IV

7. (a) What are the methods and sources of raising capital? (7)M
   (b) Distinguish between Partnership and Joint Stock Company (7)M

(Or)

8. From the following information of two projects of each costing Rs.300000 each, rank the projects under the following methods if the company is about to yield 10% per annum. (14M)
   a) Payback period b) Average rate of return c) Net present value

Cash flows after taxes plus depreciation

Year	1	2	3	4	5
Project-I	80,000	1,50,000	1,10,000	60,000	50,000

UNIT – V

9. Prepare Journal from the following transactions in the books of MHT Ltd. (14)M

Date	Particulars	Amount
2015 Jan 1.	Business started with Capital of	30,000
,, 2.	Goods Purchased from Ramesh	5,000
,, 3.	Sale of goods for cash	2,000
,, 4.	Sold goods to Jagan	3,000
,, 5.	Purchased goods for cash	1,500
,, 12.	Machine bought for cash	5,000
,, 20.	Cash received from Jagan	2,950
,, 24.	Cash paid to Ramesh	2,000
,, 28.	Salary paid	1,500
,, 31.	Electricity expenses paid	500

(Or)

10. a). What are the Financial ratios? Explain its Merits and Demerits. (7)M
    b). Classify the ratios and explain them. (7)M