NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

(R20) 2021 BATCH I MCA I SEMESTER REGULAR & SUPPLE END EXAMINATIONS MAY - 2022

TIME TABLE

TIME : 01.30 PM TO 04.30 PM

DATE	SUBJECT CODE	SUBJECT NAME
16.05.2022	R20MCA101	C PROGRAMMING AND DATA STRUCTURES
18.05.2022	R20MCA102	COMPUTER ORGANIZATION
20.05.2022	R20MCA103	DATA BASE MANAGEMENT SYSTEMS
23.05.2022	R20MCA104	OPERATING SYSTEMS
25.05.2022	R20MCA105	MATHEMATICAL AND STATISTICAL FOUNDATIONS

NOTE:

I.ANY OMISSION OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS, IMMEDIATELY.

II.EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES,THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.

III.THE HOD'S ARE REQUESTED TO INFORM THE EXAMINATION SECTION (AUTONOMOUS) ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

CHIEF CONTROLLER OF EXAMINATIONS

Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R20MCA105

MCA - I Semester Regular & Supple Examinations, May-2022

MATHEMATICAL AND STATISTICAL FOUNDATIONS

Time: 3 hours **Max Marks: 60M**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory
Four Questions should be answered from Part-B

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PART-A

1. (a) Construct the truth table for $(p \vee q) \vee \neg p$. [CO1,K3,2M]

(b) Solve the recurrence relation $a_{n+1} = 4a_n$ for $n \geq 0$, given that $a_0 = 3$. [CO2,K3,2M]

(c) Explain a complete graph with a suitable example. [CO3,K2,2M]

(d) If the maximum error with probability 0.95 is 1.2 and the standard deviation of population is 10 then find the sample size. [CO4,K1,2M]

(e) Explain Type-I error with suitable example. [CO5,K2,2M]

(f) Define F-statistic [CO6,K1,2M]

PART-B

4X 12 = 48

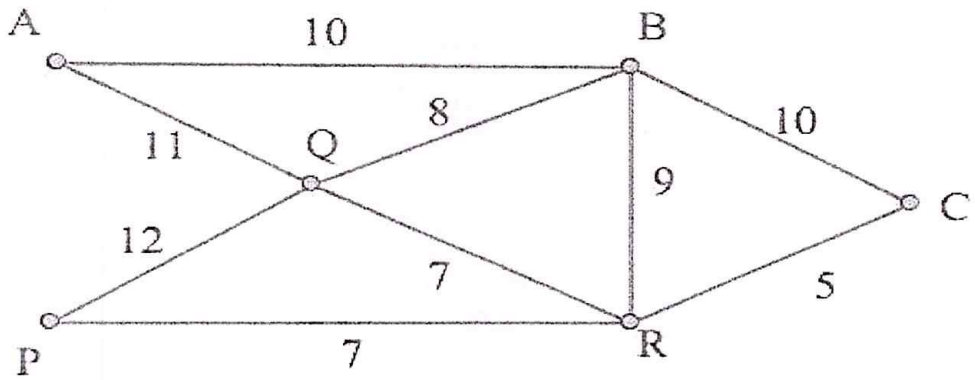
2. (a) Prove that, for any three propositions p, q, r, $[(p \vee q) \rightarrow r] \Leftrightarrow [(p \rightarrow r) \wedge (q \rightarrow r)]$. [CO1,K5,6M]

(b) Define argument and conclusion. Describe the rules of inference. [CO1,K1,6M]

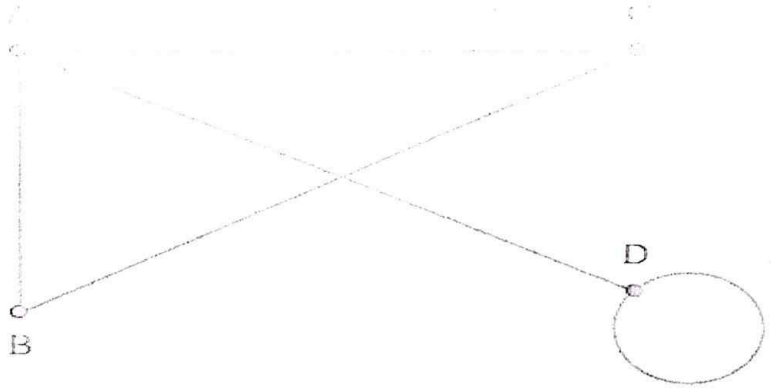
3. (a) Solve the recurrence relation $a_n - 6a_{n-1} + 9a_{n-2} = 0$ for $n \geq 2$, given that $a_0 = 5$ and $a_1 = 12$. [CO2,K3,6M]

(b) Solve the recurrence relation $a_{n+2}^2 - 5a_{n+1}^2 + 6a_n^2 = 7n$ for $n \geq 0$, given that $a_0 = a_1 = 1$. [CO2,K3,6M]

4. (a) Using Kruskal's algorithm, find a minimal spanning tree for the weighted graph shown below: [CO3,K3,6M]



(b) Find the degrees of all the vertices of a graph shown below. Also verify hand shaking property of the same graph. [CO3,K1,6M]



5. (a) A population consists of five members 2, 3, 6, 8 and 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find
   i) The mean of the population.
   ii) The standard deviation of the population.
   iii) The mean of the sampling distribution of means. [CO4,K1,6M]

(b) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence. [CO4,K1,6M]

6. (a) A sample of 64 students have a mean weight of 70 kgs. Can this be regarded as a sample from a population with a mean weight 56 kgs and standard deviation 25 kgs. [CO5,K2,6M]

(b) In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers? [CO5,K2,6M]

7. A former applies three types of fertilizers on 4 separate plots. The figure on yield per acre are tabulated below

Plots	YIELD				Total
Fertilizers	A	B	C	D	T
Nitrogen	6	4	8	6	24
Potash	7	6	6	9	28
Phosphates	8	5	10	9	32
Total	21	15	24	24	84
					Grand total

Find out the plots are materially different in fertility, as also, if three fertilizers make any material different in yields. [CO5,K3,12M]

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R20MCA101

MCA - I Semester Regular and Supple Examinations, May-2022

C PROGRAMMING AND DATA STRUCTURES

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B,** Answering the question in **Part-A** is Compulsory
Four Questions should be answered from Part-B

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PART-A

1. (a) Mention atleast one advantage and drawback of "GO TO" statement.(K2,CO2,2M)

(b) Show the process of initializing a 2-Dimensional array at the time of its declaration with an example. (K1,CO2,2M)

(c) Write the difference between 'Local Variable' and 'Global Variable'. (K2,CO2,2M)

(d) What do you mean by "self referential structure"? Give an example.(K2,CO2,2M)

(e) Mention the Best case and Worst case runtime complexity of Linear Search and Binary Search techniques. (K1,CO5,2M)

(f) Mention any four applications of a STACK. (K1,CO5,2M)

PART-B

2. (a) Write short notes on various Data Types available in C-Language (K1,CO2,6M)

(b) Write a C Program to convert the given single digit positive integer into its equivalent word using SWITCH statement and also emphasize the use of 'Break' statement in SWITCH structure. (K1,CO2,6M)

3. (a) Explain the difference among 'While' , 'Do-While' and 'FOR' loops. Can we replace FOR loop with WHILE loop in all the situations ? Justify your answer. (K2,CO2,6M)

(b) Write a C language program to perform the following operations on Strings without using the String handling library functions: i) Reversing the string (K3,CO2,6M)

4. (a) Explain the difference between 'Call-by-Value' and 'Call-by-Reference' with an example program. (K3,CO3,6M)

(b) Define Recursion. And, justify the following statement with suitable justification and example c language code: "There should be proper termination condition for recursion" (K3,CO3,6M)

5. Define 'Structure'. How does a structure be a member of another structure? Illustrate the process of accessing the members of inner structure with an example program. (K2,CO2,12M)

6. (a) Explain the Time Complexity and Space Complexity. (K2,CO5,4M)

(b) Trace the 'Selection Sort' procedure on the following list of numbers : 12, 45, 8, 10, 15, 9, 2, 33, 6, 20 (K3,CO5,8M)

7. Discuss the role of STACK in i) converting Infix expression into Postfix form and ii) to evaluate postfix expression. (K3,CO5,12M)

Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R20MCA103

MCA - I Semester Regular &Supple Examinations, May-2022

DATA BASE MANAGEMENT SYSTEMS

Time: 3 hours **Max Marks: 60M**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory
Four Questions should be answered from Part-B

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PART-A

1. (a) Write differences between data model and schema. [CO2,K1,2M]
   (b) Write short notes on Aggregate Operators. [CO3,K1,2M]
   (c) Describe briefly about decomposition. [CO4,K1,2M]
   (d) Write short notes on Serializability. [CO4,K1,2M]
   (e) Write briefly about primary index. [CO5,K1,2M]
   (f) Explain the computation of disk access time. [CO5,K1,2M]

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PART-B

4X 12 = 48

2. (a) What is data model? Explain different data models in-detail. [CO1,K1,6M]
   (b) What is data independence? Explain how you implement data independence in DBMS. [CO1,K1,6M]

3. (a) Discuss in-detail about properties of relational algebra. [CO2,K2,6M]
   (b) Explain the way to convert relationship sets with key constraints into tables.[CO2,K2,6M]

4. (a) Explain BCNF with suitable example. [CO4,K2,6M]
   (b) Consider schema R = (A, B, C, G, H, I) and the set F of functional dependencies {A → B, A→ C, CG → H, CG → I, B → H}. Compute the candidate keys of the schema. Compute the closure of the same. [CO4,K3,6M]

5. (a) Discuss various anomalies that arise due to interleaved execution of transactions with suitable examples. [CO4,K2,6M]
   (b) Discuss in-detail about ARIES. [CO4,K2,6M]

6. (a) What is an index? Explain its role in improving database access. [CO5,K1,6M]
   (b) Explain different RAID levels.[CO5,K2,6M]

7. (a) Explain insertion and deletion operations in ISAM [CO5,K2,6M]
   (b) How does extendable hashing use a directory of buckets and explain how it handles insert and delete operations. [CO5,K1,6M]

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Subject Code: R20MCA104

MCA - I Semester Regular & Supple Examinations, May-2022

OPERATING SYSTEMS

Time: 3 hours **Max Marks: 60M**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory
Four Questions should be answered from Part-B

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PART-A

1. (a) What do you mean by Virtual Memory? [CO1,K1,2M]
   (b) How are processes managed in LINUX? [CO2,K1,2M]
   (c) What is preemptive Scheduling?[CO2,K1,2M]
   (d) What is critical section problem? [CO3,K1,2M]
   (e) What is file system mounting? [CO4 ,K1,2M]
   (f) What are the various methods for protection and access control? [CO5,K1,2M]

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PART-B

4X 12 = 48

2. (a) Define Essential properties of Distributed Operating Systems? [CO1,K1,6M]
   (b) Explain briefly about virtual machines? [CO1,K2,6M]

3. (a) Explain process states? [CO2,K2,6M]
   (b) Write a short note on Inter process Communication? [CO2,K1,6M]

4. Explain FCFS, RR and SJF scheduling algorithm with illustrations? [CO2,K3,12M]

5. Explain how producer-consumer problem is solved using semaphores with example pseudo code? [CO3,K3,12M]

6. (a) Explain about the free space management? [CO4,K2,6M]
   (b) Explain briefly about LFU Page replacement algorithm? [CO3,K2,6M]

7. (a) Write about Swap space management? [CO5,K1,6M]
   (b) Discuss about revocation of access rights? [CO5,K2,6M]

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