



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution – UGC, Govt. of India)

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DEPARTMENT OF INFORMATION TECHNOLOGY II B.TECH I SEMESTER R18 SUPPLEMENTARY PREVIOUS QUESTION PAPERS



LIST OF SUBJECTS

CODE	NAME OF THE SUBJECT
R18A0461	Analog and Digital Electronics
R18A1201	Computer Organization and Architecture
R18A0506	Discrete Mathematics
R18A0503	Data Structures
R18A0504	Operating Systems
R18A0024	Probability and Statistics

R18

Code No: R18A0461

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, October 2020

Analog and Digital Electronics

(CSE & IT)

Roll No									
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Time: 2 hours

Max. Marks: 70

Answer Any **Four** Questions
All Questions carries equal marks.

- 1a) Explain P-N diode in detail.
- 1b) What is the advantage of Zener diode?
- 2 Compare the characteristics of PN junction diode, Zener diode.
- 3 Compare the characteristics of CB, CE and CC Transistor. Which one is better.
- 4a) What is NPN and PNP transistor?
- 4b) Explain the relationship between α , β and γ parameters.
- 5a) Using Boolean theorem simplify the following
- 5b) i) $(A+B)(B+C')+(B+C)(A+C')$ ii) $(A+B')(A'+B)(A+B)$
Why AND, OR, NOT are not called universal gates.
- 6 Write the properties of XNOR gates and explain about them.
- 7 Explain the variable Maps with Four & Five.
- 8 Explain the design procedure for Multiplexers & De Multiplexers.

Code No: **R18A1201****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, October 2020**Computer Organization and Architecture****(IT)**

Roll No									
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Time: 2 hours**Max. Marks: 70**

Answer Any **Four** Questions
All Questions carries equal marks.

- 1 (a) What are the different functional units of a computer and explain
(b) Explain with a diagram the design of a fast multiplier using carry save adder Circuit.
- 2 (a) Perform the subtraction with the following unsigned binary numbers by taking the 2's complement of the subtrahend
i) 11010-10000 ii) 100-110000
(b) Draw the circuit diagram of 4-bit adder-subtractor circuit and explain its operation
(c) Explain the Hardware implementation for signed magnitude data multiplication
- 3 (a) Evaluate $(A-B)/(C+D)$ using 2, 1, 0 address instructions.
(b) Explain the Stack organization in a system
- 4 (a) List the various types of registers used in a basic computer and explain
(b) List and explain all the memory reference instructions?
- 5 (a) Compare and contrast between Asynchronous DRAM and Synchronous DRAM
(b) What is virtual memory? With the help of neat sketch explain the method of virtual to physical address translation.
- 6 (a) Write short note on Magnetic tapes
(b) Explain Memory management using segmentation in detail
(c) Implement LRU algorithm for the following page trace with the frame size 4.
0 1 3 6 2 4 5 2 5 0 3 1 2 5 4 1 0
- 7 (a) Distinguish between synchronous and asynchronous methods of data transfer
(b) Explain following methods of handling interrupts from multiple devices.
i). daisy chaining technique. ii). Parallel priority Interrupt method
- 8 (a) Briefly Explain about Attached Array Processors
(b) Explain pipeline conflicts and discuss the remedies for those conflicts

Code No: R18A0506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, October 2020

Discrete Mathematics

(CSE & IT)

Roll No									
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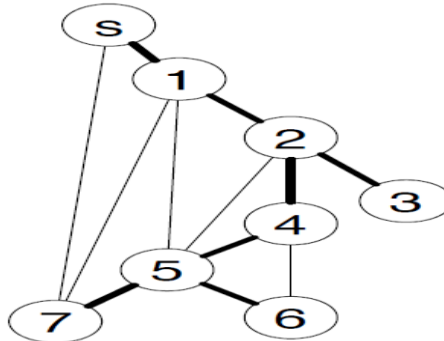
Time: 2 hours

Max. Marks: 70

Answer Any **Four** Questions
All Questions carries equal marks.

- 1
 - a) Prove that the proposition: $(P \rightarrow Q) \rightarrow (P \wedge Q)$ is a contingency.
 - b) Obtain the disjunctive normal form of:
 - i) $P \wedge (P \rightarrow Q)$
 - ii) $\neg(P \vee Q) \square (P \wedge Q)$
- 2
 - a) Obtain the Principle Disjunctive Normal Form(PDNF) of $(\neg P \vee Q)$
 - b) Write the converse, contra positive and inverse of the following predicates
 - i. $\forall x(P(x) \rightarrow Q(x))$
 - ii. $\forall x(P(x) \wedge \neg Q(x))$
- 3
 - a) $R: A \rightarrow A$, $A = \{1, 2, 3, 4\}$, $R = \{(1, 4), (2, 3), (4, 2), (3, 3), (1, 1)\}$ find inverse relation of R and complement of R.
 - b) What is the partial order relation? Let $X = \{2, 3, 6, 12, 24, 36\}$, $x^R y$ if $(x+1)$ divides y . Verify whether the R is a partial order relation over set X.
 - c) How many reflexive and symmetric relations are there on a set with n elements?
- 4
 - a) Define a lattice. Show that $(D_{105}, /)$ is a lattice
 - b) Verify the following relations are functions or not If $f: R \rightarrow R$
 - i) $f(x) = \frac{1}{x}$ $f(x) = 1/x$
 - ii) $f(x) = |x|$
 - iii) $f(x) = \text{sqrt}(x)$
 - iv) $f(x) = \pm \text{sqrt}(x^2 + 1)$
- 5
 - a) Find the number of rectangles in a 8×8 chess board
 - b) A group of 8 scientists is composed of 5 psychologists and 3 sociologists.
 - i) In how many ways can a committee of 5 be formed?
 - ii) In how many ways can a committee of 5 be formed that has 3 psychologists and 2 sociologists?
 - iii) In how many ways can a committee of 6 be formed that has at least one psychologists and one sociologist?

- 6 a) How many different passwords a computer can have with 10 characters length, where the first character is not a digit and the allowed special characters are {#, @, *}.
- b) Prove that $G = \{1, 2, 3, 4, 5, 6\}$ is a finite abelian group of order 6 under multiplication
- 7 a) Write the characteristic roots equation of recurrence relation for towers of Hanoi problem.
- b) Find the generation function of the following sequence
 $0, 2, 6, 12, 20, 30, 42, \dots$
- 8 a) Find the DFS and BFS sequence of the following graph by using appropriate data structures and adjacency list (S is the starting vertex).



- b) Verify the following degree sequence represent the simple non directed graph or not $\{1, 3, 3, 4, 5, 6, 6\}$.

Code No: **R18A0503****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

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II B.Tech I Semester Supplementary Examinations, October 2020**Data Structures****(CSE & IT)**

Roll No									
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Time: 2 hours**Max. Marks: 70**

Answer Any **Four** Questions
All Questions carries equal marks.

- 1 Write a C++ program to implement Circular linked list ADT.
- 2 Write a C++ program to implement Doubly linked list ADT
- 3.a What is a heap? Explain various types of heaps with example.
.b Implement priority Queue using heap.
- 4 Write C++ program to implement Queues using Linked list.
- 5 Explain the technique of Bubble Sort. Sort the following elements using Bubble Sort. 78, 86, 2, 29, 8, 99, 62, 43, 57. and Write a C++ program to implement Bubble Sort.
- 6 Explain the technique of Selection Sort. Sort the following elements using Selection Sort. 78, 46, 42, 9, 18, 67, 22, 93, 17 and Write a C++ program to implement Selection Sort.
- 7 What is Dictionary? Explain the ways of implementing dictionaries and give applications of dictionaries.
- 8 Explain insertion, deletion and searching in AVL tree.

Code No: **R18A0504****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

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II B.Tech I Semester Supplementary Examinations, October 2020**Operating Systems****(CSE & IT)**

Roll No									
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Time: 2 hours**Max. Marks: 70**

Answer Any **Four** Questions
All Questions carries equal marks.

- 1 a) Define the essential properties of the following types of operating systems:
 - i. Batch
 - ii. Interactive
 - iii. Time sharing
 - iv. Real time
 - v. Network
 - vi. Parallel
 - vii. Distributed
 - viii. Clustered
 - ix. Handheld
- b) What are differences between Monolithic, Microkernel Operating Systems.
- 2 a) Describe the services an operating system provides to users, processes, and other systems.
- b) List different types of system calls.
- 3 a) Discuss how the following pairs of scheduling criteria conflict in certain settings.
 - i. CPU utilization and response time
 - ii. Average turnaround time and maximum waiting time
 - iii. I/O device utilization and CPU utilization
- b) What is difference between preemptive and non-preemptive scheduling?
- 4 a) Construct the Gantt chart for i) Shortest job first ii) Round Robin with $q=3$ iii) Round robin with $q=4$ iv) shortest remaining time first scheduling algorithms for the following.

Process	Arrival Time	CPU Burst Time
P1	0	10
P2	1	6
P3	2	12
P4	3	8
P5	4	5

- b) Compare various inter-process communication mechanisms.
- 5 a) Explain First fit, Best fit and Worst fit strategies.
- b) Consider the following segment table

Segment	Base	Length
0	219	600
1	230	014
2	90	100
3	1327	580

4	1952	96
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What are the physical addresses for the following logical addresses? Explain

i) 0,430 ii) 1,10 iii) 2,500 iv) 3,400 v) 4,112

- 6**
- a) Describe the benefits of a virtual memory system.
 - b) Discuss the principles of the working-set model.
 - c) Explain address translation in a Two-Level paging system with diagram.
- 7**
- a) What is File? Explain file attributes.
 - b) Explain about common file types.
 - c) Explain in detail about free space management.
- 8**
- a) Explain the Banker's algorithm for detection and avoidance of deadlock with the help of suitable example.(10M)
 - b) Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is: 86,1470,913,1774,948,1509,1022,1750,130
Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for FCFS disk-scheduling algorithm?

Code No: R18A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, October 2020

Probability and Statistics

(CSE & IT)

Roll No									
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Time: 2 hours

Max. Marks: 70

Answer Any **Four** Questions
All Questions carries equal marks.

- 1 a) Define discrete and continuous random variable by giving example each.
b) A random variable X has the following probability distribution

X:	0	1	2	3	4	5	6	7
P(x):	0	k	2k	2k	3k	k ²	2k ²	7k ² +k

 Find (i) constant k (ii) P(X ≤ 6) (iii) P(X > 6) (iv) if P(X ≤ c) > 1/2 find the minimum value of c.

- 2 a) Define mathematical expectation and state its properties
b) A random variable X has the following probability distribution

X	-3	6	9
P(X=x)	1/6	1/2	1/3

 Find (1) Mean and variance (2) Find E[Y], Var[Y], given that Y=2X+1

- 3 Fit a Poisson distribution to the following data

No. of accidents(x):	0	1	2	3	4	5	6
No. of days(f) :	150	65	45	34	10	6	2

- 4 a) State all the properties of normal distribution
b) X is a normally distributed with mean 30 and SD 5. Find the probabilities that (i) 26 ≤ X ≤ 40 (ii) X ≥ 45

- 5 a) What is correlation? Explain the types of correlation with an example
b) Find the spearman rank correlation coefficient to the following data:

Series X:	11	12	43	84	15
Series Y:	8	15	30	60	12

- 6 For a set of 10 pairs of values of x and y, the regression line of x on y is x - 2y + 12 = 0; mean and standard deviation of y being 8 and 2 respectively. Later it is observed that a pair (x = 3, y = 8) was wrongly recorded and the correct pair detected is (x = 8, y = 3). Find the correct regression line of x on y.

- 7 a) Explain in brief one tailed and two tailed tests
b) A random sample of 400 students is found to have a mean height of 171.38 cms. Can it be reasonably regarded as a sample from a large population with mean height 171.17 cms. and standard deviation 3.30 cms. Test at 5% level of significance

- 8 A survey of 320 families with 5 children each, revealed the following distribution. Is the result consistent with the hypothesis that male and female births are equally probable at 0.01 significance level?

(table value=12.832)

No. of Boys:	5	4	3	2	1	0
No. of Girls:	0	1	2	3	4	5
No. of families:	14	56	110	88	40	12
