



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 R17 SUPPLEMENTARY PREVIOUS QUESTION PAPERS



LIST OF SUBJECTS

CODE	NAME OF THE SUBJECT
R17A0510	Computer Organization
R17A0461	Digital Logic Design
R17A0504	Data Structures using C++
R17A0401	Electronic Devices and Circuits
R17A0503	Mathematical Foundation of Computer Science
R17A0024	Probability and Statistics

Code No: **R17A0510****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021**Computer Organization****(CSE & IT)**

Roll No									
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Time: 2 hours 30 min**Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

- 1 a) Explain various number systems and number representations used in system. [7M]
b) Dividend A=01110 Divisor B=10001. Explain flowchart for divide operation. [7M]
- 2 a) Convert the $(256)_{10}$ into following codes [7M]
i) Binary Coded Decimal (BCD) ii) Excess 3 codes [7M]
iii) Gray code iv) Reflected Code
b) Explain addition and subtraction algorithms for data represented in signed magnitude and signed 2's complement.
- 3 a) What are the different phases a basic computer instruction cycle consists? Explain instruction cycle with flowchart. [7M]
b) a) Explain the design of control unit. How to decode the micro operation fields? Explain the process. [7M]
- 4 a) Write the format of the micro instruction and micro operations for the control memory. [7M]
b) With neat sketch explain the design of control unit of basic computer. [7M]
- 5 a) What are the different types of addressing modes and explain with examples [7M]
b) Write the multiplication algorithm and explain with an example [7M]
- 6 a) Draw the circuit for 4-Bit BCD Adder and explain its operations. [7M]
b) Explain the STACK Organization [7M]
- 7 a) Differentiate parallel processing and pipeline processing and explain them. [7M]
b) Explain arithmetic pipeline with example [7M]
- 8 a) What is virtual memory? With the help of neat sketch explain the method of virtual to physical address translation. [7M]
b) Explain the READ and WRITE operations in Associative Memory [7M]

Code No: **R17A0461****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021**Digital Logic Design**

(IT)

Roll No									
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Time: 2 hours 30 min**Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

- 1 a) Perform the arithmetic operation using 1s and 2s complement subtraction of $(54)_{10}$ from $(231)_{10}$ [8M]
b) What do you mean by error correcting code. Write briefly about hamming code. [6M]
- 2 a) Draw the circuit diagram of $((AB)'(CD)')'$ using AND, OR, NOT gates and then Realize the expression using NAND gates only. [8M]
b) Prove the Boolean expression
 $XYZ + XYZ' + XY'Z + X'Y'Z + X'YZ' = Y'Z + XY + X'YZ'$ [6M]
- 3 a) Simplify using K-map i) $XY + WXYZ' + X'Y$ ii) $X' + Y' + XYZ'$ [6M]
b) Draw the multi-level NOR circuit for the following expression [8M]
 $w=(x+y+z)+xyz$
- 4 Minimize the expression $F(a,b,c,d) = (1,3,5,7,14,15) + d(9,11)$ using the input NOR gates implementation of the minimized function. [14M]
- 5 a) Explain about 3 to 8 decoder using its block diagram and logic diagram. [8M]
b) Design a BCD to Excess-3 code converter [6M]
- 6 a) Draw the block diagram of a 4-bit parallel adder & explain its operation. [8M]
b) Distinguish between decoder and an encoder with relevant example [6M]
- 7 a) Comparison between Combinational and Sequential logic circuits. [8M]
b) Draw the characteristic table of JK Flip Flop and obtain its characteristic equation. [6M]
- 8 a) Give the PLA realization of the following Functions. [8M]
 $F1 = \sum m (0,1,3,5,7,8,9,11,13,14)$ $F2 = \sum m (1,3,5,7,9,11,13,15)$
b) Write the differences between ROM, PAL and PLA. [6M]

Code No: **R17A0504****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021**Data Structures using C++****(CSE & IT)**

Roll No									
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Time: 2 hours 30 min**Max. Marks: 70**

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

- 1 a) Explain & Differentiate between time and space complexity [7M]
b) Explain binary search with the help of a Program. [7M]
- 2 (a) Form and solve the recurrence relation for the running time of factorial method and hence determine its big-O complexity [7M]


```

long factorial (int n) {
    if (n == 0)
        return 1;
    else
        return n * factorial (n - 1);
}

```
- (b) Sort the sequence 3, 1, 4, 1, 5, 9, 2, 6, 5 using insertion sort. Analyse the running time of Insertion Sort, if the input is sorted [7M]
- 3 (a) Develop PUSH() and POP() routines of stack-linked implementation [7M]
Perform following operations on stack using linked list with the assumption of top=NULL, (push(3) push(6) push(2) pop() push(7) push(1)).
(b). write an algorithm to convert an expression from infix to postfix notation.
Convert $((A + B) * C - (D - E)) ^ (F + G)$ to postfix expression [7M]
- 4 a).Explain how to insert and delete elements in a circular linked list with an example [7M]
b).Develop routines insert(), delete() for queue using linked list implementation. [7M]
- 5 Examine about any one External Sorting Model with an example [14M]
- 6 Explain minimum and maximum heap with example. [14M]
- 7 Explain different collision resolution techniques in data structures. [14M]
- 8 Define the Graph. Explain the BFS and DFS algorithms with an example [14M]

Code No: **R17A0401****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021**Electronic Devices and Circuits****(EEE, ECE, CSE & IT)**

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Time: 2 hours 30 min**Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

- 1 a) Illustrate different equivalent circuits of a Diode. **[6M]**
b) What are the different breakdown mechanisms occur in semiconductor diodes? **[8M]**
Explain them.
- 2 a) Describe the principle of operation and characteristics of Tunnel with the help **[8M]**
of neat diagrams. **[6M]**
b) Explain the principle of operation and characteristics of a Varactor Diode.
- 3 a) Draw the Full wave Rectifier circuit and then explain its operation with a neat **[5M]**
equivalent circuits and waveforms. **[9M]**
b) Derive the expressions of V_{avg} , V_{rms} , Ripple factor, Conversion Efficiency
and PIV for Bridge Rectifier without filter.
- 4 a) With mathematical expressions, discuss different harmonic components **[6M]**
present at the output of rectifier. **[8M]**
b) Design Centre-tapped full-wave rectifier circuit using capacitor filter and then
derive its ripple factor expression.
- 5 a) Describe the construction and operation of BJT. **[6M]**
b) Draw and explain the input and output characteristics of common emitter **[8M]**
configuration.
- 6 By analysing single-stage CE amplifier using h-parameter model derive the **[14M]**
expressions of current gain, voltage gain, input impedance and output impedance.
- 7 Draw the self bias circuit with BJT and derive expressions for all the three stability **[14M]**
factors.
- 8 a) Discuss the construction and operation of n-channel JFET. **[8M]**
b) Draw and explain the drain and transfer characteristics of JFET. **[6M]**

Code No: R17A0503

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021

Mathematical Foundation of Computer Science

(CSE & IT)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 70

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

1 a) Identify whether the following sentences are propositions or not. If proposition, write its truth value. [7M]

(i) $2+3=5$.

(ii) $5+7=10$.

(iii) $x + 2 = 11$

(iv) Answer this question.

(v) Do not pass go.

(vi) What time is it?

(vii) Read this carefully.

(viii) $2n \geq 100$.

b) Construct truth tables for the following: [7M]

(i) $(p \vee q) \wedge r$

(ii) $(p \vee \sim q) \rightarrow r$

(iii) $(p \downarrow q) \wedge (p \downarrow r)$

2 a) Identify whether the following Inference is valid or Invalid. If Invalid, state the fallacy [5M]

$C \vee D$

$(C \vee D) \rightarrow \sim H$

$\sim H \rightarrow (A \wedge \sim B)$

$(A \wedge \sim B) \rightarrow (R \vee S)$

$R \vee S$

b) Prove that the following are equivalent [9M]

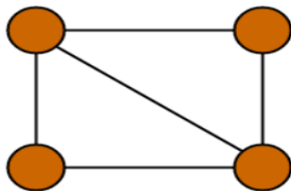
(i) $p \vee (\sim p \wedge q) \equiv (p \vee q)$ (ii) $p \wedge (\sim p \vee q) \equiv (p \wedge q)$

3 a) Consider the relation $R = \{(a,a),(b,b),(c, c),(d,d),(a,b),(b,a)\}$ on set $A = \{a,b,c,d\}$. [7M]

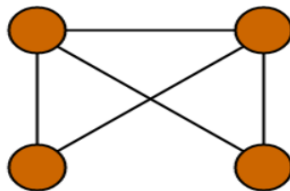
Predict whether R is reflexive or Symmetric or Transitive? If any property does not satisfy, state the reason. [7M]

b)

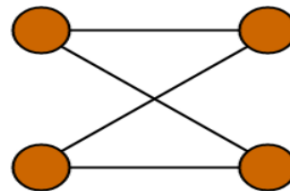
Which of the following graphs are isomorphic?



G1

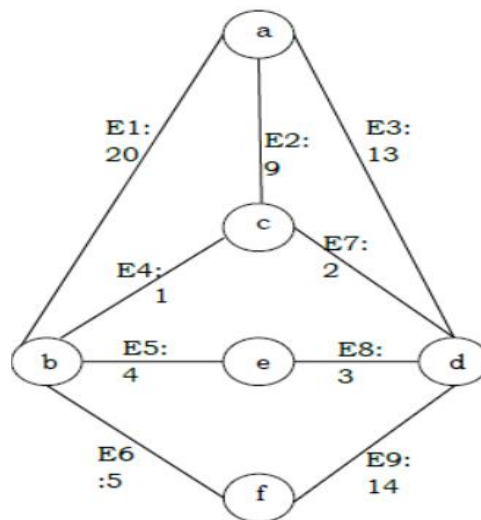


G2



G3

- 4 a) Let $a=\{1,2,3,4,5\}$ and $R=\{(1,1), (1,3), (1,4), (1,5), (1,1), (2,2), (2,3), (2,4), (2,5), (3,3), (3,4),(3,5),(4,4),(5,5)\}$ Show that the relation R is a partial order and draw its hasse diasgram [7M]
- b) When R is called a Equivalence relation , what are the conditions and give an example for the relation [7M]
- 5 a)In how many ways can the letters be arranged so that all the vowels come together? Word is “IMPOSSIBLE.” [7M]
- b)In how many ways of 4 girls and 7 boys, can be chosen out of 10 girls and 12 boys to make the team? [7M]
- 6 (a)From a group of 8 women and 6 men, a committee consisting of 3 men and 3 women is to be formed. In how many ways can the committee be formed if two of the women refuses to serve together [7M]
- (b) How many words with or without meaning, can be formed by using all the letters of the word 'AMARAVATHI' using each letter exactly once? [7M]
- 7 Solve the recurrence relation [14M]
- 8 Explain Kruskal's Algorithm in detail and mention how minimum spanning tree for the following graph G for the below diagram [14M]



Code No: R17A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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II B.Tech I Semester Supplementary Examinations, February 2021

Probability and Statistics

(CSE & IT)

Roll No										
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Time: 2 hours 30 min

Max. Marks: 70

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

- 1** A random variable X has the following probability distribution **[14M]**

Value of x	0	1	2	3	4	5	6	7	8
P(x)	0	3a	5a	7a	9a	11a	13a	15a	17a

- (i) Determine the value of a (ii) Find $p(x < 3)$ (iii) Find $p(x > 3)$
(iv) Find the distribution function F(x)

- 2** 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random **[14M]**

- (i) None is defective (ii) one is defective (iii) $p(1 < x < 4)$ (iv) Mean
(v) Variance

- 3** Find the Karl Pearson's coefficient of correlation from the following data **[14M]**

Wages	100	101	102	102	100	99	97	98	96	95
Cost of living	98	99	99	97	95	92	95	94	90	91

- 4** Price indices of cotton and wool are given below for the 12 months of a year. Obtain the equations of lines of regression between indices. **[14M]**

Price index of cotton(X)	78	77	85	88	87	82	81	77	76	83	97	93
Price index of wool (Y)	84	82	82	85	89	90	88	92	83	89	98	99

- 5** In sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice eaters and wheat eaters are equally popular in this state of Karnataka. **[14M]**

- 6** A random sample of size 64 is taken from a normal population with mean 51.4 and variance 68. What is the probability that the mean of the sample will (i) exceed 52.9 (ii) fall between 50.5 and 52.3 (iii) be less than 50.6 **[14M]**

- 7** A random sample from a company's very extensive files shows that the orders for a certain kind of machinery were filled, respectively in 10,12,19,14,15,18,11 and 13 days. Use the level of significance 0.01 to test the claim that on the average such orders are filled in 10.5 days. Choose the alternative hypothesis so that **[14M]**

rejection of null hypothesis $\mu = 10.5$ days implies that it takes longer than indicated.

- 8** A bank plans to open a single server drive-in banking facility at a certain centre. [14M]
It is estimated that 20 customers will arrive each hour on average. If on average, it requires 2 minutes to process a customer's transaction, determine
- (i) The proportion of time that the system will be idle,
 - (ii) On the average, how long a customer will have to wait before reaching the server,
 - (iii) The fraction of customers who will have to wait.
