





MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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DEPARTMENT OF

COMPUTER SCIENCE AND ENGINEERING

II B.TECH I SEMESTER QUESTION BANK

<u>2017-18</u>



LIST OF SUBJECTS

CODE	NAME OF THE SUBJECT
R15A0503	Mathematical Foundation of Computer Science
R15A0504	Data Structures using C++
R15A0505	Principles of Programming Languages
R15A0024	Probability and Statistics
R15A0401	Electronic Devices and Circuits
R15A0461	Digital Logic Design

R15A0503

Mathematical Foundation of

Computer Science

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year I Semester Examinations MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (Common to Computer Science and IT)

PART-A

Time: 3 hours

Max Marks: 75

1. a) Explain different logical connectives in mathematical logicb) Verify the following formulas are well formed formulas are not?	[2m]
(i) $P \rightarrow (PVQ)$ (ii) $(P \rightarrow (^P)) \rightarrow ^P$ (iii) $((^Q \Lambda P) \Lambda Q)$	[3m]
C) II $A=\{1,2,3\}, B=\{4,5\}$ III (1) AXB II) BXA	[2m]
d) Prove that A-(B∩C)=(A-B)U(A-C)	[3m]
e) How many different arrangements are there of the letters a,a,a,b,c ?	[2m]
f) Explain the principle of inclusion – exclusion?	[3m]
g) Find the coefficient x^9 in $(1+x^3+x^8)^{10}$	[2m]
h) Solve the recurrence relation $a_{n+1}=8a_n$ for $n\geq 0$ where $a_0=4$	[3m]
i) Define complete bipartite Graph	[2m]
j) Draw a diagram for four dimensional hypercube Q ₄	[3m]

PART-B

2. Show that ~p follows from the set of premises $(r \rightarrow ~q)$, rVs, s $\rightarrow ~q$, p $\rightarrow q$ using indirect method of proof

OR

3. Obtain POS of the following formulas

(i) (P \land Q \land R) V (~P \land R \land Q) V(~P \land ~Q \land ~R)

(ii) $PV(\sim P \rightarrow (QV(\sim Q \rightarrow R)))$

4. Define the following terms (i) Group (ii) Abelion Group (iii) Semi Group (iv) Sub Group OR

5. Find all the properties that satisfies for the following algebraic systems under the binary operations 'X' and '+'.(a) Odd integer(b) All positive integers

6. a) Find the number of non negative integral solutions to $X_1+X_2+X_3+X_4+X_5=10$

b) Find the number of arrangements of letters "MISSISSIPPI".

OR

7. a) In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and other 3 will have 5 books each.

b) Using multinomial theorem, expand (2X-3Y+4Z)³

8. Solve the recurrence relation a_n -7 a_{n-1} +12 a_{n-2} =0 for n≥2 where a_0 =1, a_1 =2

OR

- **9**. Find the general expression for a solution to the recurrence relation $a_n-5a_{n-1}+6a_{n-2}=n(n-1)$ for $n\geq 2$
- 10. Find the Chromatic number of the following graphs

(a) Complete Graph (K_3) (b) Complete Bipartite Graph ($K_{2,3}$) (c) Regular Graphs (K_3)

OR

11. Explain and illustrate BFS and DFS with examples?

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year I Semester Examinations MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (Common to Computer Science and IT)

PART-A

Max Marks: 75

1. a) Define bound and free variable with one example.	[2m]	
b) Define predicate with one example	[3m]	
c) Verify and Explain the following relation R on X={1,2,3,4} is equivalence relation o	r not	
R={(1,1),(1,4)(4,1),(2,2),(3,4),(3,3),(3,2),(4,3),(4,4)}	[2m]	
d) Let X= {1,2,3,4} Define a function f:X→X. such that f≠I _x and is One – One Find f ² , f ³ , f ¹ , fOf ¹	[3m]	
e) Explain Multinomial Theorem?	[2m]	
f) Find the coefficient of $X_1^2 X_2^2 X_3^2$ in (2X-3Y+5Z) ¹⁰	[3m]	
g) Find the generating functions for a _r = the number of non negative integral solution	ns of e₁+e₂+e₃=r where 0≤e₁≤	ś
3, $2 \le e_2 \le 6$, e_3 is odd and $1 \le e_3 \le 9$	[2m]	
h) Solve the recurrence relation a _n = na _{n-1} for n≥1 where a₀=1	[3m]	
i) Define Spanning tree?	[2m]	
j) Is K _{2,3} is a complete bipartite Graph ?	[3m]	
PART-B		

2 Using automatic theorem (PVQ) $\Lambda(Q \rightarrow R) \Lambda(P \rightarrow M) \Rightarrow (RVM)$

OR

3. Show that the following implication without constructing truth table

(i) $(p \rightarrow q) \rightarrow q \Rightarrow (p \lor q)$

Time: 3 hours

- (ii) $p \rightarrow q \Rightarrow p \rightarrow p \land q$
- 4. Find all the properties that satisfies for the following algebraic systems under the binary operations 'X' and '+'.
 (a) Odd integer
 (b) All positive integers

OR

- **5.** Draw the Hasse diagram for $X = \{2,3,6,24,36,48\}$ and relation \leq be such that $x \leq y$, if x divides y.
- **6** What is the coefficient of $x^{3}y^{7}$ in (a) $(x+10)^{10}$ (b) $(2x-9y)^{10}$

OR

- 7. Illustrate pigeon hole principle and its applications
- **8.** Solve the recurrence relation using generating function $a_n-6a_{n-1}=0$ for $n\geq 1$ where $a_0=1$

OR

- 9. Solve the recurrence relation of Fibonacci series
- 10. (a) Define Cycle?
 - (b) Apply DFS algorithm to form the spanning tree by taking own graph.

OR

- **11** Explain the following
 - (a) Isomorphism and sub graphs
 - (b) Hamilton Paths
 - (c) Planar Graph
 - (d) Dual of a planar graph

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year I Semester Examinations MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (Common to Computer Science and IT)

Time: 3 hours	Max Marks: 75
PART-A	
 1. a) Explain different logical connectives in mathematical logic b) Verify the following formulas are well formed formulas are not? 	[2m]
(i) $P \rightarrow (PVQ)$ (ii) $(P \rightarrow (^P)) \rightarrow ^P$ (iii) $((^Q \land P) \land Q)$ c) If A={1,2,3}, B= {4,5} find i) AXB ii) BXA	[3m] [2m]
d) Let A={1,2,3} Determine all Partitions of A?	[3m]
e) How many different arrangements of the word MISSIPPI ?	[2m]
f) Explain the principle of inclusion – exclusion?	[3m]
g) Find the coefficient x ⁹ in (1+x ³ +x ⁸) ¹⁰	[2m]
h) Solve the recurrence relation a _{n+1} =8a _n for n≥0 where a₀=4 i) Define Chromatic number of Graph	[3m] [2m]
j) Draw a diagram for four dimensional hypercube Q_4	[3m]
PART-B	
2. Show that ~p follows from the set of premises $(r \rightarrow ~q), rVs, s \rightarrow ~q, p \rightarrow q$ us OR	sing indirect method of proof
3. Obtain POS of the following formulas (i) (P \land Q \land R) V (~P \land R \land Q) V(~P \land ~Q \land ~R) (ii) PV(~P \rightarrow (QV(~Q \rightarrow R)))	
4. Define the following terms (i) Group (ii) Abelion Group (iii) Semi G	Group (iv) Sub Group OR
5. Let X={1,2,3} and f,g,h & s are the functions from X to X given by f= {<1,2>,<2,3>,<3,1>} g= {<1,2>,<2,1>,<3,3>} h= {<1,1>,<2,2>,<3,1>} s= {<1,1>,<2,2>,<3,3>}	,

Find fOg, gOf, fOhOg, sOg, gOs, sOs, fOs, fOh, fOsOh, fOf

6. a) Find the number of non negative integral solutions to $X_1+X_2+X_3+X_4+X_5=10$

b) In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and other 3 will have 5 books each?

c) Using multinomial theorem, expand (2X-3Y+4Z)³

OR

7. a) In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and other 3 will have 5 books each.

b) Find the number of arrangements of letters "SAIRAMRAM".

8. Find the recurrence relation and initial condition for the sequence 2,10,50,250 and also find general term

OR

9. Find the general expression for a solution to the recurrence relation $a_n-5a_{n-1}+6a_{n-2}=n(n-1)$ for $n\geq 2$

10. Define Minimal Spanning Tree? Using Kruskal's Algorithm find a minimal spanning tree for the weighted graph as shown below (Figure)



OR
11. Explain and illustrate BFS and DFS with examples?

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year I Semester Examinations MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (Common to CSE and IT)

Max Marks: 75

PART-A	
1. a) . Write the following statement into symbolic form	[2]
All men are mortal	
Socrates is a men	
Therefore Socrates is a mortal	[3]
b) Verify the following formulas are well formed formulas are not?	
(i) $P \rightarrow (PVQ)$ (ii) $(P \rightarrow (\sim P)) \rightarrow \sim P$ (iii) $((\sim Q \land P) \land Q)$	
c) Construct Truth Table for (P \rightarrow Q) \land (R \rightarrow Q)	[2]
d) . Negate each of the following	[3]
(i) \sim (x)(y) R(x,y) (ii) \sim (x) \exists (y) R(x,y) (iii) \sim (\exists x \exists y \sim R(x,y) $\land \forall x \forall y p(x,y)$	
e) What is permutation group? Explain with example?	[2]
f) Is K _{2,3} is a complete bipartite Graph ?	[3]
g) Define Spanning tree?	[2]
h) Find the coefficient x^9 in $(1+x^3+x^8)^{10}$	[3]
i) Solve the recurrence relation $a_n = na_{n-1}$ for $n \ge 1$ where $a_0 = 1$	[2]
j) Explain Binomial Theorem?	[3]
PART-B	
2) Obtain POS of the following formulas	
(i) (P AQ AR) V (~P ARAQ) V(~P A~Q A~R)	
(ii) $P V(\sim P \rightarrow (QV(\sim Q \rightarrow R)))$	
OR	
3) Using automatic theorem (PVQ) $\Lambda(Q \rightarrow R) \Lambda(P \rightarrow M) \Rightarrow (RVM)$	
4) Draw the Hasse diagram for X={2,3,6,24,36,48} and relation ≤ be such that x≤y, if x divides y.	

OR

5) Define the following terms (i) Group (ii) Abelian Group (iii) Semi Group (iv) Sub Group

6) Using binomial theorem prove that $3^n = \sum_{i=0}^n n_{cr}(2^r)$

OR

7) In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and other 3 will have 5 books each?

b) Using multinomial theorem, expand (2X-3Y+4Z)³

8) Solve the recurrence relation a_n -7 a_{n-1} +12 a_{n-2} =0 for $n \ge 2$ where a_0 =1, a_1 =2

OR

9) Solve the recurrence relation of Fibonacci series

OR

10) Find the Chromatic number of the following graphs

(a) Complete Graph (K₃)

Time: 3 hours

(b) Complete Bipartite Graph (K_{2,3})

(c) Regular Graphs (K₃)

11) Define Minimal Spanning Tree? Using Kruskal's Algorithm find a minimal spanning tree for the weighted graph as shown below Figure



MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year I Semester Examinations MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (Common to CSE and IT)

PART-A

Max Marks: 75

1. a) Define Proposition with one example.	[2m]
b) Write Short notes on normal forms.	[3m]
c) Let F:R \rightarrow R be given by f(x) = x ³ -2 find f ⁻¹	[2m]
d) Let X= {1,2,3,4} Define a function f:X→X. such that f≠I _x and is One – One Find f ² , f ³ , f ¹ , fOf ¹	[3m]
e) Explain Binomial Theorem?	[2m]
f) Find the coefficient of $X_1^2 X_2^2 X_3^2$ in $(2X-3Y+5Z)^{10}$	[3m]
g) Find the generating functions for a _r = the number of non negative integral solution	ons of $e_1 + e_2 + e_3 = r$ where $0 \le e_1 \le 1$
3, $2 \le e_2 \le 6$, e_3 is odd and $1 \le e_3 \le 9$ [2]	!m]
h) Solve the recurrence relation a _n = na _{n-1} for n≥1 where a₀=1	[3m]
i) Define the following (a) Multi Graph (b) Complete Graph	[2m]
j) Is K _{2,3} is a complete bipartite Graph ?	[3m]

PART-B

2. Show that 't' is a valid conclusion from the following premises $p \rightarrow q$, $q \rightarrow r$, $r \rightarrow s$, $\sim s$ and $p \wedge t$

OR

3. Show that the following implication without constructing truth table

(i) $(p \rightarrow q) \rightarrow q \Rightarrow (p \lor q)$ (ii) $p \rightarrow q \Rightarrow p \rightarrow p \land q$

Time: 3 hours

4. Let X={1,2,3} and f,g,h & s are the functions from X to X given by

f= {<1,2>,<2,3>,<3,1>} g= {<1,2>,<2,1>,<3,3>} h= {<1,1>,<2,2>,<3,1>} s= {<1,1>,<2,2>,<3,1>} Find fOg, gOf, fOhOg, sOg, gOs, sOs, fOs, fOh, fOsOh, fOf.

OR

5. Draw Hasse diagram represent the partial order $\{(A,B): A \le B\}$ on the power set p(s) where $s = \{a,b,c\}$ where \le represent subset relation

6. a) Determine the number of integer between 1 and 10,000,000 have the sum of digits equal to 18b) Determine the number of ways possible to wear 5 rings on 4 fingers.

OR

7. Illustrate pigeon hole principle and its applications

8. Solve the recurrence relation using generating function $a_n-6a_{n-1}=0$ for $n\geq 1$ where $a_0=1$

OR

- 9. Solve the recurrence relation of Fibonacci series
- 10. (a) Define Cycle? (b) Apply BFS algorithm to form the spanning tree? (Figure)







Code	No: R1540503	R15				
coue	MALLA REDDY COLLEGE OF ENGINEERING & TI	ECHNOLOGY				
	(Autonomous Institution – UGC, Govt. of Ind	ia)				
	II B.Tech I Semester supplementary Examinations, May 2017					
(CSE)						
	Roll No					
Time	2 hours					
Note:	This question paper contains two parts A and B	Max. Marks: 75				
	Part A is compulsory which carriers 25 marks and Answer all c	juestions.				
	Part B Consists of 5 SECTIONS (One SECTION for each Ouestions Choosing ONE Question from each SECTION and	UNIT). Answer FIVI				
	10 marks.	r each Question earne				
	PART - A	(25 Marks)				
1.	a) Define the dual of a Compound statement.	[2m]				
	b) Find the negative of $\forall x \in D, \ p(x) \rightarrow q(x)$	[3m]				
	c) The relation R is defined by 'aRb if and only if $a + 3b$ is divisible by that R is a reflexive relation on the set Z.	4, for a, b \in Z. Show [2m]				
	d) Define a lattice.	[3m]				
	e) Find the number of permutations of the word THAT.	[2m]				
	f) Find the coefficient of x^2y^6 in the expansion of $(x-y)^8$	[3m]				
	g) Find the generating function of the sequence 1, 3, 3^2 , 3^3	[2m]				
	h) Solve the recurrence relation $u_n - u_{n-1} + 2u_{n-2} = 0$	[3m]				
	i) Find the number of edges of a complete graph with 6 vertices.	[2m]				
	j) Define Euler circuit, Hamiltonian circuit and Planar graph	[3m]				
	PART - B	(50 Marks)				
2	SECTION - I					
۷.	a) very the proposition (p $^{\prime\prime}$ q) $^{\prime\prime}$ (\neg (p V q)) is a contradiction or Ta	utology.				

b)Prove that the following is a valid argument

$$p \to (q \land r), s \to r, r \to p, \therefore s \to q$$
 [5+5]

3.

a) Find the conjunctive normal form of $q \lor (p \land \neg q) \lor (\neg p \land \neg q)$

b) Prove that the following is a valid argument

$$\neg \exists [p(x) \lor q(x)], \ \neg p(x) \to r(x), \ \therefore r(a).$$

[5+5]

SECTION -II

4.	a) A={1,2,3,4}is a Relation R from A to A. R={(1,1),(1,2),(2,3), (3,4),}. S=[(3, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1), (4, 1),	, 4), (2, 4),
	(1, 4)] Determine RoS , SoR, R ² , S ²	
	b) Show that the set of integers is a group under addition.	[5+5]
5.	a) If A={1,2,3,4}is a Relation R from A to A. R={(1,1),(1,2),	
	(2,1),(2,2),(2,4), (3,3),(4,4)}. Find whether R is an Equivalence relation?	
	b) Prove that intersection of two sub monoids is a submonoid <u>SECTION -III</u>	[5+5]
6.	a) Find the number of positive integer solutions of $x_1 + x_2 + x_3 + x_4 + x_5 + x_6$	<10
	b) Find the coefficient of x^{10} in the expansion of $\frac{1}{(1-x)^3}$	[5+5]
7.	a) If 4 men and 4 women are to be seated in a row.Find the number of ways	
	i) If any person can sit to any person.	
	ii) Men and women to be seated alternately.	
	b) Suppose 14 students in a class appear at a university examination. Prove that t least two among them whose seat number differ by a multiple of 13.	here exists at [5+5]
	SECTION -IV	
8.	Solve the following difference equation $u_n - 2u_{n-1} - 3u_{n-2} = 5^n$, $u_0 = 1, u_1 = 1$	[10 m]
9.	Find the generating function of $n^2 + n$	[10m]
	SECTION -V	
10.	a) State and prove Euler's formula	
	b) Prove that K_4 is planar.	[5+5]
11.	Find the minimum spanning tree for the graph.	[10]
	a 2 b	
	1 13 /12 9	

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1 \\
10 \\
10 \\
g \\
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6 \\
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e \\
e \\
\end{array}$

f

11/16

Code No: R15DA0503-161 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution – UGC, Govt. of India) B.Tech. III Semester Regular Examinations, NOV 2016 MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE (CSE) 3 N 5 Roll No 1 Max. Marks: 75 **Time: 3 hours** Note: This question paper contains two parts A and B Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks. (25 Marks) PART - A [2m] a) Find the negative of $p \downarrow q$ 1. b) The universe is the set of real numbers.. The open statements are P (x): x + 7 is even q(x): x divides 24, r(x): $x^2 + 5 > 14$ Find the truth value of [3 m] $\neg(p(5)) \land q(8)$ c) If A=(2, 3, 4, 5, 16, 25) R=[(a, b)/a, $b \in A$, $b = a^2$] Find R [2 m]d) Given that G=[i, -i, 1, -1] is a group. Find the inverse of -i. [3 m] e) How many 4 digits pin numbers are possible, which are greater than 4000 with the [2 m] digits 4, 5, 6 f) Find the number of positive integer solutions of x + y + z = 8[3m] g) If $u_n = 2^n$ then find the recurrence relation [2m][3 m] h) Solve the recurrence relation $u_{n+2} - 8u_{n+1} + 7u_n = 0$ [2 m] i) Write the adjacency matrix of the Graph

i) Can there be a 3 regular graph with 11 vertices.

[3 m]

R15

PART - B(50 Marks) **SECTION - I**

a) Show that $\neg (p \land q) \rightarrow (\neg p \lor (\neg p \lor q)) \Leftrightarrow \neg p \lor q$ b) Test the validity of the following argument

 $p \lor q, \neg p \lor r, \neg r \lor s \therefore q \lor s$

[5+5]

OR

a) Obtain the principal conjunctive normal form. $p \to [(p \to q) \land \neg(\neg q \lor \neg p)]$ b) "If there was a ball game, then travelling was difficult. If they arrived on time, then travelling was no difficult. They arrived on time. Therefore, there was no ball game." Show that these statements constitute a valid argument. [5+5]

SECTION - II

a) If f:A \rightarrow B and g:B \rightarrow C are bijections, prove that gof:A \rightarrow C is a bijection. b) If the set Q of all rational numbers, the operation is defined by $a^*b = a+b-ab$.Show that under this operation Q forms a commutative monoid. [5+5]

OR

a) Draw the Hasse diagram for [3, 4, 12, 24, 48, 72] the relation "divides" b) Prove that the set of positive integers is a semi group, but not a monoid under [5+5] addition.

SECTION -III

a) Prove that if 11 integers are selected from among $\{1, 2, ..., 20\}$, then 6. the selection includes integer a and b such that a - b = 2.

b) Find the number of solutions of $x_1 + x_2 + x_3 = 19$ with the condition $x_1 > 1, x_2 > 2, x_3 > 1$

[5+5]

OR

a) Find the number of positive integer solutions of $x_1 + x_2 + x_3 = 20$ 7. b) Show that among any 4 numbers we can find 2 numbers so that their difference is [5+5] divisible by 3.

SECTION - IV

Solve the recurrence relation of f(n)=f(n-1)+f(n-2), f(0)=0, f(1)=1 [10m] 8. OR

Solve the following difference equation using generating function. 9. $u_{n+2} - 2u_{n+1} + u_n = 2^n$, $u_0 = 2, u_1 = 1$

SECTION - V

[10m]

[10m]

iii) tree iv) Chromatic number. ii) Bipartite Graph Define i) k-regular Graph

OR

a) Show that the maximum number of edges in a complete bipartite graph with n 11. vertices is $\frac{n^2}{A}$

b) Prove that a graph G with atleast one edge is two chromatic if and only if G has no [5+5]cycle of odd length. *****

4.

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R15A0504

Data Structures using C++

Code No: R15A0504

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, May 2017





Time: 3 hours

Note: This question paper contains two parts A and B Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART - A	25 Marks)
(a) When is a binary search best applied?	[2M]
(b) What is the average number of comparisons needed in a sequer	tial search to
determine the position of an element in an array of 100 elements, if the	e elements are
ordered from largest to smallest?	[3M]
(c) What is LIFO?	[2M]
(d) What are binary trees?	[3M]
(e) What are the parts of a linked list?	[2M]
(f) What is the Hashing technique which allocates fixed number of buckets	? [3M]
(g) What is an ordered list?	[2M]
(h) Give a basic algorithm for searching a binary search tree.	[3M]
(i) How do you insert a new item in a binary search tree?	[3M]
(j) What is a graph?	[2M]

(i) What is a graph?

PART - B **SECTION - I**

(50 Marks)

2.a) Write a program for Linear Search.

b) Write a program for Merge sort with an example.

OR

3. a) Explain about internal sorting with suitable example

b) What is heap? Sort the following list L in ascending order using heap sort L={56,65,92,38,44,90,61,16,73,37}

SECTION – II

4. a) Describe the following briefly with two examples each 1) Abstract DTs

2) Non Linear DSs

b) Write the linked list operations of stacks and write the applications of stacks.



R15

OR

5. a) What are threaded binary trees. Discuss with some examples.b) Discuss briefly about the binary trees traversals.

SECTION – III

6. What is Binary Tree and explain the various tree traversal algorithms in detail.

OR

7. a) Briefly explain the ADT queue.b) Explain the application of machine shop simulation.

SECTION - IV

8. a) Explain with suitable examples double hashing, rehashing and extendible hashing?

b) What is the structure to represent node in a skip list. Write the constructor for skipList.

OR

- 9. a) What is a dictionary? Define the abstract data type for it? Write the abstract class for the dictionary?
 - b) Explain the linear probing method in Hashing? Explain its performance analysis?

SECTION - V

10. Explain AVL rotations ? Construct AVL tree for the given sequence 30, 31, 28, 23, 22, 28, 24, 29, 26, 27.

OR

* * * * * * * *

11. Write an algorithm for BFS algorithm and explain with example.

Code No: R15A0504-161

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

B.Tech. III Semester Regular Examinations, NOV 2016

DATA STRUCTURES USING C++ (COD)

Roll No	N	3	123 1	1.0
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Time: 3 hours

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

	PART - A	(25 Marks)
1.	(a) Which sort show the best average behavior?	[2M]
	(b) What is the average number of comparisons in a sequential search?	[3M]
	(c) What is a queue?	[2M]
	(d) What is the minimum number of nodes that a binary tree can have?	[3M]
	(e) What are doubly linked lists?	[2M]
	(f) Differentiate STACK from ARRAY.	[3M]
	(g) Explain linear hashing.	[2M]
	(h) Give a basic algorithm for searching a binary search tree.	[3M]
	(i) Explain Binary Search Tree	[3M]
	(j) What is a graph?	[2M]

PART - B

(50 Marks)

SECTION - I

2. a) Write a program for Binary search.

- b) Write a program for Quick Sort with an example. Write the complexities of quick sort OR
- 3. a) Write a program for selection sort and mention the time and space complexity of Selection sort.
- b) Write a program to find maximum element in array.

SECTION - II

- 4. a) Write the array a representation of Queue. Write Queues Applications.
 - b) Describe the following briefly with two examples each

2) Linear data structures

OR

5. a) Discuss briefly about the representation of binary trees

b) Explain the array representation of stacks.

1) Primitive Data types

SECTION – III

- 6. a) What is a priority QUEUE? Discuss two of their applications and mention how they are represented in memory?
 - b) Differentiate between multiway merge and polyphase merge.

OR

7. a) Describe the model for external sorting using merge sort



SECTION - IV

- 8. a) What are the applications of dictionary with duplicates and without duplicates?
 - b) Explain the linear probing method in Hashing? Explain its performance analysis?

OR

- 9. a) Discuss various types of collision resolution strategies
 - b) Write a method in C++ to erase a pair in the dictionary with key in a skip list representation. What is the complexity of this method?

SECTION - V

10.a) What is a Balanced Tree? List out and write the algorithms for rotations in AVL Trees.b) List out the operations on B trees. Explain with the help of algorithms.

OR

the space top

* *

11. a) What are all different types of graph representations? Explain each with examplesb) Specify the applications of Graphs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year I Semester Examinations Data Structures Through C++ (Common to Computer Science and IT)

Time: 3 hours

Max Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

SET-1

R 15

Question Bank

PART-I

1. a. Define Time Complexity?

b. What is space complexity? Find out the Time Complexity of following code

```
int sum = 0;
int num = 35;
for (int i=1; i<=2*n; i++) {
    for (int j=1; j<=n; j++) {
        num += j*3;
        sum += num;
    }
}
for (int k=1; k<=n; k++) {
    sum++;
}
```

- c. Define binary tree?
- d. Inorder traversal = 4,2,5,1,3,6

Preorder traversal = 1,2,4,5,3,6

Find the post order traversal?

e. What is priority queue? Give an example?

f. Define heap data structure?

g. What is skip list? Explain with an example?

h. What is external sorting mechanism?

i. Explain quadratic probing with an example?

j. Define

i. DFS ii. BFS

PART-II

2. Explain the technique of bubble sort. Sort the following elements using bubble sort.

98 56 12 23 86 29 42 34 67 (OR)

3. What is Binary search? Write a C++ Program to implement binary search technique?

4. Write a C++ program to implement stack ADT with templates?

(OR)

5. Write a C++ program to implement Queue using linked list?

6. Define heap data structure and explain with an example?

(OR)

7. Explain multiway merge concept with an example?

8. What is the structure to represent node in a skip list. Write the constructor for skipList.

(OR)

9. What is a dictionary? Define the abstract data type for it? Write the abstract class for the dictionary?

10. What is an AVL search tree? How do we define the height of it? Explain about the balancefactor associated with a node of an AVL tree.

(OR)

11. Explain DFS with an example?

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year I Semester Examinations Data Structures Through C++ (Common to Computer Science and IT)

Time: 3 hours

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

SET-2

Max Marks: 75

Data Structures Through C++

Question Bank

PART-I

- 1. a. Briefly explain binary search technique?
 - b. Write logic construct for bubble sort?
 - c. Define threaded binary tree?
 - d. Write a C++ construct to insert into binary tree.
 - e. Write about priority queue?
 - f. Write a C++ construct to delete an element from heap?
 - g. What is the structure to represent node in a skip list.
 - h. Briefly explain about double hashing?
 - i. Write the properties of AVL tree?
 - j. Write the advantages of linked representation of binary search trees?

PART-II

2. Explain the technique of quick sort and sort the following list using quick sort?

23 12 98 56 34 99 65 34 75 81

(OR)

3. Write a C++ program to implement heap sort?

4. What is a Circular List? Write a C++ program to search in a circular linked list that has a header node?

R 15

(OR)

5. Write a C++ program to implement Queue using Arrays?

6. Define heap data structure? Construct Min heap and max heap for the following list

22 43 12 65 34 32 44 98 56 87 78 (OR)

7. Explain Multiway merge with an example?

8. Write a construct in C++ to erase a pair in the dictionary with key theKey in a skip list representation. What is the complexity of this method?

(OR)

9. Explain collision resolution techniques

i. Chaining

ii. Quadratic probing

10. Draw the sequence of rotations required to perform a single right rotation and a double LR rotation in an AVL tree?

(OR)

11. Write a construct to implement insertion into and deletion from Binary search tree?

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year I Semester Examinations Data Structures Through C++ (Common to Computer Science and IT)

Time: 3 hours

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

SET-3

Max Marks: 75

Data Structures Through C++

Question Bank

PART-I

- 1. a. Briefly explain about time complexity?
 - b. Write logic construct for merge sort.
 - c. Write the ADT of Binary tree?
 - d. Write the pseudo code for inorder traversal?
 - e. Define the types of priority queue?
 - f. Write the applications of priority queue?
 - g. Write the ADT of dictionary?
 - h. What is rehashing?
 - i. What is the height of B Tree?
 - j. Explain LR rotation with an example?

PART-II

2. Explain selection sort with an example and write a C++ program to implement selection sort?

(OR)

3. Explain Binary search with example and write a C++ program to implement binary search?

R 15

4. Define the Abstract data type for Queue. Write a C ++ program to implement Queue ADT using arrays.

(OR)

5. Write a C ++ program using stack ADT that reads an infix expression, converts the expression to postfix form.

6. Write a C++ construct to insert and delete from heap?

(OR)

7. Explain polyphase merge with an example?

8. Explain collision resolution techniques

i. Linear probing

ii. Double hashing

(OR)

9. What is hashing with Chains? Explain? Compare this with Linear Probing?

10. Write a C++ program to implement BFS?

(OR)

11. Write a C++ construct to insert into and delete from AVL tree?

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year I Semester Examinations Data Structures Through C++ (Common to Computer Science and IT)

Time: 3 hours

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

SET-4

Max Marks: 75

Data Structures Through C++

Question Bank

PART-I

1. a. What is frequency factor? Explain with an example?

b. Write a C++ construct for logic of insertion sort?

c. Write a C++ construct for push operation?

d. Write a C++ construct for queue delete operation?

e. Write ADT for priority queue?

f. Define external sorting?

g. What is collision resolution?

h. Compare hashing and skip lists?

i. Explain RL rotation?

j. Define balance factor?

PART-II

2. Explain all asymptotic notations with examples?

(OR)

3. Explain Merge sort with an example and write a C++ program to implement Merge sort.

4. Explain Binary tree traversals with an example?

R 15

- 5. Explain threaded binary trees?
- 6. . Define heap data structure? Construct Min heap and max heap for the following list

77 23 43 67 45 33 90 76 55 65 (OR)

7. Write a C++ program to implement heap data structure?

8. What is the structure to represent node in a skip list. Write the constructor for skipList.

(OR)

9. Explain collision resolution techniques?

10. Write a C++ construct for LR and RL rotation.

(OR)

11. Write a C++ program to implement binary search tree?

R15A0505

Principles of Programming Languages



MALLAREDDY COLLEGE OF ENGINEERING & TECHNOLOGY



B. Tech III Year I Semester Examinations Principles of Programming Languages (Computer Science and Engineering)



Time: 3 hours	Model Paper-I	Max Marks: 75
PART-A(Answer all the Question	ns 25 Marks)	
a) Explain about the process o	f compilation.	M (2)
b) Compute the weakest precord	ndition for the following assignment.	
a = 2 * M (b - 1)	$1 - 1 \{a > 0\}$	M (3)
c) Distinguish between explic	it and implicit heap dynamic variables.	M (2)
d) Explain the problems with	unconditional branching.	M (3)
e) Explain types of parameters	S.	M (2)
f) Explain the generic function	ns in C++ with examples.	M (3)
g) What is Tombstone? Expla	in with neat diagram.	M (2)
h) Can we pass sub programs	as parameters? Justify your answer.	M (3)
I) List down the primitive dat	a types in Python.	M (2)
j) Find the factorial of a giver	n number in ML	M (3)
PAPT-B (Answer ony Five Quest	ions 5¥10-50 Marks)	
2 a) Explain in detail about various	language evaluation criteria and the characteristic	es that affect them
2. a) Explain in detail about various	s language evaluation enterna and the characteristic	M(7)
h) Distinguish between language	generators and language recognizers	M(3)
b) Distinguish between lunguage	or	W (5)
3 a) What are the factors that influe	ence the basic design of programming languages?	M (6)
b) Give BNF and EBNF versions	s of an expression grammar.	M (4)
-)	с	
4. a) Explain comparisons between	unions and records.	M (5)
b) Differentiate between Ada der	ived type and Ada subtype. Give examples.	M (3)
c) How does C support relational	and boolean expressions	M (2)
	or	
5. Define static, fixed stack-dynami	ic, stack-dynamic, fixed heap dynamic and heap dy	/namic
arrays. What are the advantages of	of each?	M (10)
		//
6. Explain various parameter passin	g techniques with examples?	M (10)
	or	
7. a) Illustrate Co-routines with exa	imple.	M (5)
b) Explain overloaded subprogra	ms in java. Explain with an example program.	M (5)
8 a) Euclain have avaantian a ana h	andlad in Ada	$\mathbf{M}(5)$
b) Discuss how producer consum	andled in Ada.	M (5)
b) Discuss now producer-consum	ar problem are solved using concurrency in ADA.	. M (3)
9 a) Discuss about any four basic a	Jements of prolog?	M (6)
b) Write a short note on OOP cor	acent in C#	$\mathbf{M}(0)$ $\mathbf{M}(4)$
b) while a short hole on OOT col		IVI (4)
10. a) Write a short note on ML fun	actions.	M (7)
b) What are the applications of	logic programming (PROLOG)?	M(3)
c) are the upprovisitions of	or	
11. a) Compare the functional progr	ramming languages with imperative languages.	M (5)
b) Write about the variable decl	aration and memory management in python.	M (5)



MALLAREDDY COLLEGE OF ENGINEERING & TECHNOLOGY



B. Tech III Year I Semester Examinations Principles of Programming Languages (Computer Science and Engineering)



M (3+3+4)

Time: 3 hours	Model Paper-II	Max Marks: 75
PART-A(Answer all the Q	uestions 25 Marks)	
a) Give an unambiguous gra	mmar for if-then-else.	M (2)
b) What is the difference bet	ween synthesized and inherited attributes?	M (3)
c) Define narrowing and wid	lening conversions	M (2)
d) What is a short-circuit eva	aluation.	M (3)
e) What do you meant by typ	be coercion?	M (2)
f) What are the three semant	ic models of parameter passing?	M (3)
g) Write short notes on Java	Thread?	M (2)
h) What is the relationship b	etween resolution and unification in Prolog?	M (3)
i) Explain CAR and CDR in	LISP with examples.	M (2)
j) Explain strings in Python	with operations.	M (3)
PART-B (Answer any Five Qu	estions 5X10=50 Marks)	
2. a) Explain in detail about varie	ous language implementation methods.	M (7)
b) Give grammar for simple as	ssignment statements.	M (3)
	or	
3. a) Explain about various progr	ramming domains.	M (4)
b) What do you mean by axion	matic semantics? Give the weakest precondition	for a sequence of
statements.		M (6)
4) a) Differentiate the for loop st	atement between the C, C++ and Java	M (2)
b) What is a dangling pointer?	Explain solutions for dangling pointer.	M (8)
_	or	
5) Compare procedure oriented a	and object oriented programming. Explain the object	ject oriented features
supported by C++.		M (10)

6. a) Define shallow and deep binding for referencing environments of subprogram	is, that have been
passed as parameters.	M (5)
b) Define scope? Explain the static scope and dynamic scope with examples.	M (5)
or	
7. Explain using swapping example the call by value, call by result, call by reference	ce, call by name and
call by value-result parameter passing techniques.	M (10)
8. Define Abstract data type. Explain C++ parameterized data types.	M (10)
or	
9. What are Exceptions? Explain the exception handling and propagation mechanis	sm in JAVA.
	M (10)
10. a) Discuss various data types supported in Python.	M (6)
b) List the applications of functional programming languages.	M (4)
or	

- 11. Write short notes on the following.
 - A) Associative arrays
 - B) Semaphores
 - C) Guarded commands



MALLAREDDY COLLEGE OF ENGINEERING & TECHNOLOGY



B. Tech III Year I Semester Examinations Principles of Programming Languages (Computer Science and Engineering)



Time: 3 hours	Model Paper-III	Max Marks: 75
PART-A (25 Marks)		
a) Write about the Von-J	Neumann Architecture.	(3M)
b) Define axiomatic ser	nantics.	(2M)
c) Write the differences	between union and enumeration.	(3M)
d) What are the side effe	ects of the evaluation of the expressions?	(2M)
e) Write a short note abo	but Actual parameters and positional parameters.	(3M)
f) Explain the concept o	f generic functions and their application in C++.	(2M)
g) What is an ADT? Nat	me the languages that support ADT's.	(2M)
h) Explain about the fac	t statements and rule statements in PROLOG.	(3M)
i) Explain advantages ar	d disadvantages of Scripting Language.	(3M)
j) What is exception han	dling? What are the uses of exception handling?	(2M)
PART-B (Answer the following	g 5X10=50 Marks)	
2. Write in detail about the langu	lage evaluation criteria.	(10M)
e	or	· · · · ·
3. What are the formal methods	of describing syntax? Differentiate between BNF a	nd EBNF.
		(10M)
4. Define union. What is the diff	erence between record and union? Explain how un	ion is supported by
different programming langua	iges.	(10M)
	or	· · · · ·
5. a) Explain the conditional exp	pressions of C language.	(6M)
b) What are the design issues	of character string type?	(4M)
(a) Evenlain the company systems		(514)
b) What is a black? Eurlain h	gram characteristics.	(5N)
b) what is a block? Explain h	ow the scope of a variable is dependent on block w	ith an example. (SNI)
	Uľ	
7. a) Explain how multi-dimensi	onal arrays are passed as parameters?	(5M)
b) What is a co-routine? Expla	ain about the overloaded subprograms.	(5M)
, , , , , , , , , , , , , , , , , , ,	1 0	
8) a) What is data abstraction an	d explain how it is implemented in Ada?	(5M)
b) How can exceptions be exp	plicitly raised in C++? Explain.	(5M)
	or	
9) a) Define a task. What are the	different states of task? Explain.	(5M)
b) Write about the cooperation	on synchronization and competition in message pass	sing. (5M)
.,		()
10) a) Write the differences betw	veen functional programming languages and Imperative	ative programming
languages.		(5M)
b) Write a LISP program seg	gment that generates factorial of 'n'.	(5M)
	or	
11) a) Describe briefly about exp	pressions and functions in meta language.	(5M)
b) Discuss briefly about data	types of LISP.	(5M)

R 15

MALLAREDDY COLLEGE OF ENGINEERING & TECHNOLOGY



B. Tech III Year I Semester Examinations Principles of Programming Languages (Computer Science and Engineering)



Time: 3 hours	Model Paper-IV	Max Marks: 75
PART-A (25 Marks)		
a) What is an imperative	e programming language? Give a few examples	(2M)
b) Write are the differen	ces between synthesized and inherited attributes?	(2M) (3M)
c) Define a datatype. Wh	hat are the design issues of character strings?	(2M)
d) Explain the side effec	ts related to evaluation of expression?	(3M)
e) What is a block? How	v scope of a variable is dependent on block?	(3M)
f) What is parametric po	lymorphism?	(2M)
g) Discuss about binary	semaphores.	(3M)
h) Write the uses of exce	eption handling in programming languages.	(2M)
i) Write the LISP function	on reverse (L) which reverses a given list L.	(3M)
j) Write neatly about the	scoping rules in LISP, ML, Haskell.	(2M)
DADT D (A new on the following	$\mathbf{z} = \mathbf{\overline{V}} 10 - 50 \mathbf{M} \mathbf{o} \mathbf{w} \mathbf{k} \mathbf{s}$	
2. a) Explain the fundamental t b) Give the BNF notation for	features of object-oriented programming languages with or identifier, for loop, while loop in C. Also give the cor	n examples. (5M) responding
syntax graph.		(5M)
	or	. (0.0
3. a) Write the differences betw	ween denotational semantics and the operational semant	1cs. (4M)
b) Explain the language eva	iluation criteria and characteristics that affect them.	(6M)
4. Define record. How can we	access different fields of a record? Explain the operatio	ns that can be
performed on the record w	ith examples.	(10M)
	or	
5. a) What is selection statement	nt? Explain different types of selection statements.	(6M)
b) Write short notes on coerc	cion, type error, type checking and strong typing.	(4M)
6. a) Explain type checking in	parameter passing.	(5M)
b) Write in detail about the s	subprogram overloading.	(5M)
	or	
7. a) Discuss in detail about co	-routines.	(4M)
b) Write a note on different	parameter passing techniques. Give Examples.	(6M)
8. a) Explain data abstraction i	n ADA.	(5M)
b) Explain Java Threads wi	ith examples.	(5M)
	or	(••••)
9. a) Give an abstract specifica	tion of a stack in ADA.	(5M)
b) Explain the PROLOG in	iferencing process.	(5M)
10 Explain various operations	that can be performed on atoms and lists in LISP. Give	examples (10M)
10. Explain various operations	or	e
11. a) Explain Lists and Lazy F	Evaluation in Haskell?	(2M)
b) Explain Predicate function	ons and Input output functions in LISP.	(3M)

c) Write a LISP program segment that generates Fibonacci series of 'n' numbers. (5M)

Code No: R15A0505

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, May 2017

Principles of Programming Languages

Roll No			

Time: 3 hours

1.

Max. Marks: 75

R15

Note: This question paper contains two parts A and B
 Part A is compulsory which carriers 25 marks and Answer all questions.
 Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE
 Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART - A	(25 Marks)
(a) Discuss Orthogonality.	[2M]
(b) What are the reasons for studying the concepts of programming lang	guage? [3M]
(c) What are the advantages and disadvantages of decimal data types?	[2M]
(d) Define union, free union and discriminated union.	[3M]
(e) What is short circuit evaluation?	[2M]
(f) What are the design issues for subprograms?	[3M]
(g) What advantage do monitors have over semaphores?.	[2M]
(h) What are the language design issues for abstract data type?	[3M]
(i) What are the three primary uses of symbolic logic in formal logic.	[2M]
(j) What data types were part of the original LISP.	[3M]

PART - B

(50 Marks)

SECTION - I

2.a) Demonstrate the language evaluation criteria and the characteristics that affect them.b) Explicate extended BNF.

OR

3. a) Illustrate the basic process of operational semantics and it's evaluation.b) Explain logical pretest loops.

SECTION – II

- 4. a) Explicate Associative arrays.
 - b) What are the arguments for and against representing Boolean values as single bits in memory?

OR

5. a) Discuss type conversions.

b) Illustrate the implementation of array types.

SECTION – III

- 6. a) Describe situations in which the add operator in a programming language would not be commutative and associative.
 - b) Discuss generic subprograms in Ada.

OR

- 7. a) Discuss relational and Boolean expressions.
 - b) Illustrate multidimensional arrays as parameters.

SECTION – IV

- 8. a) Demonstrate abstract data types in C++.
 - b) Discuss the Ada synchronous message passing model.

OR

9. a) Explain oop concepts in Java?.b) Illustrate exception handling in Java.

SECTION - V

* * * * * * * *

10.a) What are the applications of functional languages.b) Explain how backtracking works in Prolog.

OR

11. a) Demonstrate the inferencing process of Prolog.b) Write short notes on Haskell.

9/11/16

Code No: R15DA0505-161

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India) B.Tech. III Semester Regular Examinations, NOV 2016 PRINCIPLES OF PROGRAMMING LANGUAGES

Roll No	1	5	N	3		11		h.e.	100	-
					1		1		1	1

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART - A	(25 Marks)
(a) Discuss BNF.	[2M]
(b) Illustrate sequences and selection with example.	[3M]
(c) What are the design issues for union.	[2M]
(d) Define ordinal, enumeration and subrange types.	[3M]
(e) What is mixed mode expression?	[2M]
(f) What are the three general characteristics of subprograms?	[3M]
(g) What are the design issues for exception handling?	[2M]
(h) Describe the five different states in which a task can be.	[3M]
(i) What are the two parts of a compound term.?	[2M]
(j) What does lazy evaluation mean?	[3M]
	 (a) Discuss BNF. (b) Illustrate sequences and selection with example. (c) What are the design issues for union. (d) Define ordinal, enumeration and subrange types. (e) What is mixed mode expression? (f) What are the three general characteristics of subprograms? (g) What are the design issues for exception handling? (h) Describe the five different states in which a task can be. (i) What are the two parts of a compound term.? (j) What does lazy evaluation mean?

PART - B

(50 Marks)

SECTION - I

2. a) Explain the language categories.b) Discuss attribute grammars.

OR

3.a)The two mathematical models of language description are generation and recognition.

Describe how each can define the syntax of a programming language.

b) Explain parse trees.

SECTION – II

4. a) Why does a decimal value waste memory space.b) Discuss the problems with pointers.

OR

5. a) Explain ADA union types.

b) Write short notes on record types.

R15
SECTION – III

- 6. a) Present one argument against providing both static and dynamic local variables in subprograms.
 - b) Discuss assignments as an expression.

OR

7. a) Why are coroutines needed?

b) Illustrate the implementation models of parameter passing.

SECTION – IV

8. a) What is exception? Explain how it can be handled.b) Demonstrate abstract data types in Java.

OR

9. a) What is the relationship of monitors to Ada tasks for competition synchronization.b) Illustrate exception handling in C++.

SECTION - V

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10.a) Discuss List functions.

b) Explain why Prolog systems must do backtracking.

OR

11. a) Discuss the rule statements and goal statements of Prolog..b) Compare and contrast functional and imperative languages.

R15A0024

Probability and Statistics

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous Institution – UGC, Govt.of India) **II B.Tech I Semester Model Paper -1 PROBALITY & STATISTICS** (CSE, IT)

Time: 3 hours

Max .Marks :75

NOTE: This Question Paper contains two parts A & B Part A is compulsory which carries 25 marks and Answer all questions Part B consists of 5 sections (One SECTION for each UNIT) .Answer FIVE Question, choosing ONE question from each SECTION and each Question carries 10 Marks.

PART-A [25 marks]

1. a . Write the Properties of binomial distribution	[2m]
b. Define Joint probability density function	[3m]
c. Explain Positive and negative correlation	[2m]
d. Define Regression lines	[3m]
e. Explain one tailed and two tailed test	[3m]
f. what is a Standard error	[2m]
g. Give the Properties of t-distribution	[3m]
h. Define degrees of freedom	[2m]
i.Write the Characteristics of the queuing system	[2m]
j.What is a Markov chain	[3m]

PART-B [50 marks]

2. a) A continous r.v has the p.d.f $f(x) = \begin{cases} \frac{\text{SECTION} - \mathbf{I}}{kxe^{-\alpha x}, & \text{if } x \ge 0 \text{ and } \alpha \ge 0 \\ 0, & \text{else where} \end{cases}$ [5m]

Determine i)k ii) mean iii) variance

b) Suppose the weights of 800 male students are normally distributed with 28.8kg and SD of 2.06 kg. Find the number of students whose weights are i) between 28.4 kg and 30.4 kg ii) more than 31.3 kg [5m] (**OR**)

3.For the following bivariate(two dimensional) probability distribution of X and Y find i) $P(X \le 2, Y = 2)$ ii) $F_X(2)$ iii) P(Y=3) iv) P(X<3,Y\leq4) v) $F_Y(3)$ [10m]

X/Y	1	2	3	4	Ī				
1	0.1	0	0.2	0.1	Ī				
2	0.05	0.12	0.08	0.01					
3	0.1	0.05	0.1	0.09	I				
SECTION –II									

4. Find the karlpearson's coefficient of correlation for the paired data:

wages	100	101	102	100	99	97	98	96	95	102
Cost of living	98	99	99	95	92	95	94	90	91	97
(OR)										

[10m]

5. The heights of mothers and daughters are given in the following table. From the two tables of regression estimate average height of daughter when the height of the mother is 64.5 inches [10m]

Height of mother	62	63	64	64	65	66	68	70
Height of daughter	64	65	61	69	67	68	71	65

SECTION -III

- 6. a) A sample of size 64 and mean 70 was taken from a population whose standard deviation is 10.Construct 95% confidence interval for the mean.[5m]
 - b) A coin is tossed 960 times .Head turned up 184 times. Find whether the coin is unbiased. [5m]

(**OR**)

- 7. a) A lady stenographer claims that the she can take the dictation at the rate of 120 words per minute. Can we reject the claim on the basis of 100 trials in which she demonstrates a mean of 116 words with a SD of 15 words. [5m]
 - b) Explain the procedure for Testing of Hypothesis

SECTION -IV

8. A survey of 320 families with 4children each revealed the following distribution

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

Is this result consistent with the hypothesis that male and female births are equally popular?

(**OR**)

9. The following are the average weekly losses of worker hours due to accidents in 10 industrial plant before and after a certain safety programme was put into operation:

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Test whether the safety programme is effective in reducing the number of accidents at 5%LOS [10m]

SECTION -V

- 10. Patients arrive at a clinic according to a Poisson distribution at the rate of 30 patients per hour. The waiting room does not accommodate more than 13 patients not including the one i.e, examine. Examination time per patient is exponential with mean rate 20 per hour. [10m]
 - i) Find the effective arrival rate at the clinicii) What is the probability that an arriving patient will not wait
 - iii) What is the expected waiting until the patient is discharged from the clinic.

(**OR**)

0.1

11. The transition probability matrix is given by $P = \begin{bmatrix} 0.1 & 0.4 & 0.5 \\ 0.2 & 0.2 & 0.6 \end{bmatrix}$ and $p_0 = \begin{bmatrix} 0.4 & 0.4 & 0.2 \end{bmatrix}$

L0.7 0.2

i) Find the distribution after three transitions

ii)Find the limiting probabilities

[10m]

[5m]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous Institution – UGC, Govt.of India) II B.Tech I Semester Model Paper -2 PROBALITY & STATISTICS (CSE, IT)

Time : 3 hours

Max .Marks :75

[50 marks]

NOTE: This Question Paper contains two parts A & B Part A is compulsory which carries 25 marks and Answer all questions Part B consists of 5 sections (One SECTION for each UNIT) .Answer FIVE Question, choosing ONE question from each SECTION and each Question carries 10 Marks.

PART-A [25 marks]

1. a) Define Mathematical Expectation	[2m]
b) List the properties of Poisson distribution	[3 m]
c)Differentiate Correlation and Regression	[2m]
d)Derive Angle between two Regression lines	[3 m]
e)A random sample of size 100 has a standard deviation of 5. What can you say about the	he maximum
error with 95% confidence.	[3 m]
f) State Central limit theorem	[2m]
g)Write the applications of χ^2 distribution	[3 m]
h)Find the value of $F_{0.95}$ for 12 and 15 d.o.f	[2m]
i) what is a Pure birth process	[3 m]
k) Define Transition matrix	[3 m]

PART-B <u>SECTION –I</u>

2 a) If the p.d.f of a r.v xis given by $f(x) = \begin{cases} k(1-x^2), & 0 < x < 1 \\ 0, & otherwise \end{cases}$ [5m]

find i) k and ii) the cumulative distribution function of x

b) The average number of phone calls /minute coming into a switch board between 2pm and 4pm is 2.5.Determine the probability the probability that one particular minute there will be i) 4 or fewer ii) more than 6 calls [5m]

(**OR**)

3. A sales tax officer has reported that the average sales of the 500 business that he has to deal with during a year is Rs.36,000 with a standard deviation of Rs.10,000. Assuming that the sales in these business are normally distributed ,find :

i) The number of business as the sales of which are greater than Rs.40,000

ii)The percentage of business the sales of which are likely to range between Rs.30,000 and Rs.40,000

SECTION –II

4 a) Fit a straight line $Y = a_0 + a_1 X$ for the following data and estimate the value of Y when X=25 [5m]

Х	0	2	10	15	20
Y	7	11	16	20	26

b) Show that the maximum value of rank correlation coefficient is 1

[5m]

[10m]

5. The marks obtained by 10 students in mathematics and statistics are given below. Find the rank correlation coefficient between the two subjects [10m]

Marks in mathematics	25	28	30	32	35	36	38	42	45	39
Marks in Statistics	20	26	29	30	25	18	26	35	46	35

SECTION –III

6. In an investigation on the machine performance the following results are obtained:

	No# of units inspected	No# of defectives
Machine 1	375	17
Machine 2	450	22

Test whether there is any significant performance of two machines at 5%LOS

(\mathbf{OR})

7. The average income of 100 people of a city is Rs 210 with a standard deviation of Rs 10. For another sample of 150 people the average income is Rs 220 with a standard deviation of Rs 12. Test significance between the difference of two means at 5% LOS [10m]

SECTION – IV

8. The following is the distribution of the daily number power failures reported in a city No# of power failures 0 1 2 3 4 5 6 7 8 9

No# of power failures	U	1	2	5	4	5	0	/	0	7	
No# 0f days	9	43	64	62	42	36	22	14	6	2	

Test the goodness of fit of Poisson distribution at 5% LOS

(**OR**)

9. Prices of shares of a company on the different day in a month were found to be 66,65,69,70,69,71,70,63,63,64 and 68. Determine whether the mean price of the share in the month is 65 [10m]

SECTION -- V

10. A fast food restaurant has one drive in window. It is estimated that cars arrive according to a Poisson distribution at the rate of 2 every 5 minutes and that there is enough space to accommodate a line of 10 cars. Other arriving cars can wait outside this space, if necessary. It takes 15 minutes on the average to fill an order, but the service time actually varies according to an exponential distribution. Determine the following [10m]

a) The probability that the facility is idle

b) The expected number of customers waiting to be served

(**OR**)

11.a) A training process is considered as a two state markov chain. If it rains, it is considered to be in state 0. If it does not rain, the chain is in the state of 1. The transition probability of the markov chain is defined by $P = \begin{bmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{bmatrix}$. Find the probability of state 0 or 1 as 0.4 and 0.6 respectively. [5m]

b) Which of the following matrices are regular?

г1/ 3	01	r1	1 01		1/2	1/4		
i) $\begin{vmatrix} 1/3 \\ 1/3 \end{vmatrix}$	1	ii)		iii)	0	1/2	1	
[1/3	T]	L	11		LΟ	0	1	

[10m]

[10m]

[5m]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous Institution – UGC, Govt.of India) **II B.Tech I Semester Model Paper -3 PROBALITY & STATISTICS** (CSE, IT)

Time: 3 hours Max .Marks :75 **NOTE:** This Question Paper contains two parts A & B Part A is compulsory which carries 25 marks and Answer all questions Part B consists of 5 sections (One SECTION for each UNIT) .Answer FIVE Question, choosing ONE question from each SECTION and each Question carries 10 Marks.

PART-A [25 marks]

1.	a) Define Probability density function	[2m]
	b) write three properties of normal distribution	[3m]
	c) Write Spearman's Correlation coefficient for repeated data	[2m]
	d)If θ is the angle between two regression lines and SD of Y is twice the SD of X and r=0.25	
	Find $tan \theta$	[3m]
	e)Define Critical region	[2m]
	f)Define i) point estimation and ii) interval estimation	[3m]
	g)write the properties of F- distribution	[2m]
	h)Find the values of $t_{0.05}$ when $artheta$ =16, $t_{-0.01}$ when $artheta$ =10, $t_{0.995}$ when $artheta$ =7	[3m]
	i)Write about (M/M/1) : (∞ / <i>FIFO</i>) model	[2m]
	j) Justify your answer whether the matrix $\begin{bmatrix} 1 & 0 \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$ is stochastic or not	[3m]

PART-B

[50 marks]

SECTION -I

2 a) If F(x) is the distribution function of x is given by $F(X) = \begin{cases} 0 & \text{if } x \le 1 \\ k(x-1)^4 & \text{if } 1 < x \le 3 \\ 1 & \text{if } x > 3 \end{cases}$ [7m]

Determine i) f(x) ii) k iii)mean

b) Average number of accidents on any day on a national highway is 1.8. Determine the probability that the number of accidents are i) atleast one ii) atmost one iii) exactly one [3m]

(OR)

3 a) If X is a continuous r.v and Y=aX+b prove that E(Y)=aE(X)+b and $V(Y)=a^2V(X)$, where V stands for Variance [5m]

b) In a normal distribution,7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution [5m]

SECTION -II

4. Obtai	n <u>the</u>	rank	corre	elatio	n coe	efficie	ent fo	or the	follo	wing	, data	[10m]
	Х	68	64	75	50	64	80	75	40	55	64	
	Y	62	58	68	44	81	60	68	48	50	70	

(OR)

5. A panel of two judges P and Q graded seven dramatic performances by independently awarding marks as follows:

Performance	1	2	3	4	5	6	7
Marks by P	46	42	44	40	43	41	45
Marks by Q	40	38	36	35	39	37	41

The eight performance, which judge Q would not attend, was awarded 37 marks by judge P. If judge Q had also been present, how many marks would be expected to have been awarded by him to the eighth performance. [10m]

SECTION –III

6.A population consists of 5,10,14,18,13,24.Consider all possible samples of size 2 which can be drawn without replacement from the population. Find

i) The mean of the population ii) Standard deviation of the population

iii) The mean of the sampling distribution of means

iv) Standard deviation of the sampling distribution of means

(OR)

7. a) A normal population has a mean of 0.1 and standard deviation of 2.1. Find the probability that the mean of a sample of size 900 will be negative. [5m]

b) 20 people were attacked by a disease and only 18 survived .Will you reject the hypothesis that the survival rate if attacked by this disease is 85% in favor of the hypothesis that is more at 5% LOS. **[5m]**

SECTION -IV

8. a) A random sample of size 16 values from a normal population showed a mean of 53 and a sum of squares of deviations from the mean equals to 150. Can this sample be regarded as taken from the population having 56 as mean ? Obtain 95% confidence limits of the mean of the population .[7m]
b) Write step procedure for difference of means of two independent samples [3m]

(OR)

9. a) Explain χ^2 test for independence of attributes.

b) The measurements of the output of two units have given the following results. Assuming that both Samples have been obtained from the normal distribution at 10% LOS.Test whether the two

Populations have the same variance.

Unit –A	14.1	10.1	14.7	13.7	14.0
Unit -B	14.0	14.5	13.7	12.7	14.1

SECTION -- V

10.a) Assume that both arrival and service rate following Poisson distribution. The arrival rate and service rate are 25 and 25 customers /hour respectively ,at a single window in RTC reservation counter. Find i) ρ ii) L_s iii) L_q iv) W_q v) W_s [5m]
b) In a colour T.V manufacturing plant, a loading unit takes exactly 10 min to load 2 T.V sets into a wagon and again comes back to the position to load another set of T.V. If the arrival rate is 2 T. V sets

per 20 min. Calculate the average time of T.V sets in a stationary state [5m]

(OR)

11. A professor has three pet questions, one of which occurs on every test he gives. He never uses the same question twice in successive examinations. If he used the question no#1, he tosses a coin and uses the question no# 2, if head appears. If he uses the question no# 2, he tosses two coins and use the question no#3, if both are heads. If he uses the question no#3, he tosses three coins and use the question no#1, if all are heads. In long run which question does he use most often and with how much frequency is it used.

[5m]

[10m]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous Institution – UGC, Govt.of India) **II B.Tech I Semester Model Paper -4 PROBALITY & STATISTICS** (CSE, IT)

Time: 3 hours

Max .Marks :75

NOTE: This Question Paper contains two parts A & B Part A is compulsory which carries 25 marks and Answer all questions Part B consists of 5 sections (One SECTION for each UNIT) .Answer FIVE Question, choosing ONE question from each SECTION and each Question carries 10 Marks.

PART-A [25 marks]

1.a. Define continuous and discrete random variable	[2m]
b. Describe Distribution Function.	[3m]
c. Write the formula for karlpearson's coefficient of correlation	[2m]
d. Describe J.P.D.F and M.P.D.F	[2m]
e. Write the Procedure for testing of hypothesis.	[2m]
f. Write the properties of t-Distribution.	[3m]
g. Define characteristics of Infinite Queue Model.	[2m]
h . Describe the Service pattern in queuing system.	[3m]
i. Define Markov chain?	[2m]
j. what is a Transition Matrix?	[3m]

PART-B **SECTION -I**

[50 marks]

[7m]

2. a)A continuous r.v has the p.d.f $f(x) = \{ke^{-|x|} - \infty \le x \le \infty\}$ Determine i)k ii) mean iii) variance

b) The average number of phone calls /minute coming into a switch board between 2pm and 4pm is 2.5. Determine the probability the probability that one particular minute there will be i) 4 or fewer ii) more than 6 calls

 (\mathbf{OR})

3. a) Out of 800 families with 5 children each, how many would you expect to have i) 3 boys ii) atleast one boy iii) either 2 girls or 2 boys [5m]

b) A random variable x has the following probability function:

~)						• • • • • • • •	, O	p. 00.	•••••••••••••••••••••••••••••••••••••••			
	х	-3	-2	-1	0	1	2	3				
	P(x)	k	0.1	k	0.2	2k	0.4	2k				
Find i) k ii) mean iii) variance iv) $E(2x+3)$ v)V(3x+3)										[5m]		
						S	ECTI	ON –I	I			
4.The	The marks obtained by 10 students in two subjects are given below.											

Find the correlation coefficient

Subject 1	48	75	30	60	80	53	35	15	40	38
Subject 2	44	85	45	54	91	58	63	35	43	45

5. Calculate the coefficient of correlation and lines of Regression for the following data:[10m]

Х	9	8	7	6	5	4	3	2	1			
Y	15	16	14	13	11	12	10	8	9			

SECTION –III

6. a) The following are the average weekly losses of worker hours due to accidents in 10 industrial plant before and after a certain safety programme was put into operation:

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Test whether the safety programme is effective in reducing the number of accidents at 5%LOS [10m]

(**OR**)

- 7. a) A random sample of 500 apples was taken from a large consignment and 60 were found to be bad.Obtain 95% confidence interval for the percentage number of bad apples in the consignment. [8m]
 - **b**) Explain about i) point estimation ii) interval estimation

SECTION -IV

8. Ten specimens of copper wires drawn from a large lot have the following breaking strength(in kg) 518,572,570,568,572,578,572,569,548.Test whether the mean breaking strengths of the lot may be taken to be 518 kg weight [10m]

(**OR**)

9.The following is the distribution of the daily number power failures reported in a city. Test the goodness of fit of Poisson distribution at 5%LOS [10m]

No# of power failures	0	1	2	3	4	5	6	7	8	9
No# Of days	9	43	64	62	42	36	22	14	6	2



10.a) Patients arrive at a clinic according to a Poisson distribution at the rate of 30 patients per hour. The waiting room does not accommodate more than 13 patients not including the one i.e, examine. Examination time per patient is exponential with mean rate 20 per hour.

(i) Find the effective arrival rate at the clinic (ii) What is the probability that an arriving patient will not wait (iii)What is the expected waiting until the patient is discharged from the clinic. [5m]

b) State Kendal's notation.

(**OR**)

[5m]

[2m]

11.a)The transition probability matrix is given by $P = \begin{bmatrix} 0.1 & 0.4 & 0.5 \\ 0.2 & 0.2 & 0.6 \\ 0.7 & 0.2 & 0.1 \end{bmatrix}$ and $p_0 = \begin{bmatrix} 0.4 & 0.4 & 0.2 \end{bmatrix}$

Find the distribution after three transitions and Find the limiting probabilities [6m]

b) Find periodic and aperiodic states in each of the following transition probability matrices.

 $(a) \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} \qquad (b) \begin{bmatrix} \frac{1}{4} & \frac{3}{4} \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$ [4m]

Code No: R15A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, May 2017

Probability and Statistics



Time: 3 hours

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART - A

(25 Marks)

Max. Marks: 75

1. a Define classical definition of probability.

b. A box contains 6 red, 4 white and 5 black balls. A person draws 4 balls from the box at random. Find the probability that among the balls drawn there is at least one ball of each color.

- c. What is angle between two regressions lines ?
- d. Explain the term Regression.
- e. Define sampling distribution.
- f. Explain (1) Type-I-error (2) Type-II-error.
- g. Write a short note on Chi-square test.
- h. Obtain 95% confidence interval for mean with n = 16, 400, $\bar{x} = 3.42$, s = 0.68. (table value=2.947)
- i. What is a waiting line?
- j. Define Markov processes.

PART – B

(50 marks)

SECTION-I

a) Two persons A and B appeared for an interview for a job. The probability of selection of A is 1/3 and that of B is 1/2. Find the probability that (i) both of them will be selected (ii) only one of them will be selected (iii) none of them will be selected

b) State Baye's theorem.

OR

- 3. a) The diameter of an electric cable assumed to be a continuous r.v with the p.d.f f(x) = 6x(1 x), 0 ≤ x ≤ 1. Check that f(x) is p.d.f, and find b such that P(x < b) = P(x > b) .
 - b) Components are packed in boxes of 20. The probability of a component being defective is 0.1. What is the probability of a box containing 2 defective components?

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SECTION -II

- 4.a) Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y):
 - X:65 66 67 67 68 69 70 72 Y:67 68 65 68 72 72 69 71

 b) In a record of an analysis of correlation data, the following results are readable: variance of X = 9; Regression equations: 8X-10Y+66 = 0 and 40X-18Y = 214. Find (i) the mean values of X and Y

(ii) The correlation coefficient between X and Y and

(iii) The standard deviation of Y

OR

5. The following are midterm and final examination test scores for 10 students from a calculus class, where x denotes the midterm score and y denotes the final score for each student. X: 68 87 75 91 82 77 86 82 75 79

Y: 74 79 80 93 88 79 97 95 89 92

Calculate the least-squares regression lines for these data.

SECTION -III

6. a) Discuss the test procedure for testing single mean of the population when size of the sample is large.

b) The mean lifetime of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. If μ is the mean lifetime of all the bulbs produced by the company, test the hypothesis $\mu = 1600$ hours against the alternative hypothesis $\mu \neq 1600$ hours using a 5% level.(Table value=1.96)

OR

7. a) Test the significance of the difference between the means of the samples from the following data:

	Sample A	Sample B	
Size of sample	100	150	
Mean	50	51	
Standard deviatio	n 4	5 (Table value=	1.96)

b) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of theproposal are same at 5% level.

SECTION –IV

8. a) sample of 10 boys has the I.Q's 70, 120, 110,101, 88, 83, 95, 98, 107 and 100. Test . the mean I.Q of the students is 100 at 0.05level of significance.(Table value=2.262)

b) Explain the test procedure for t-test for difference of population means.

OR

9. Fit a Poisson distribution to the following data and test the goodness of fit at 0.05 levels:

No. of acciden	ts:	0	1	2	3	4	5	6
No. of days	:	150	65	45	34	10	6	2

SECTION -V

10 a) What are the characteristics of queuing model $M/M/1: \infty/FCFS$

b) A single server queuing system with Poisson input, exponential service times. Suppose the mean arrival rate is 3 calling units per hour, the expected service time is 0.25 hours and the maximum permissible number calling units in the system is two. Calculate the expected number in the system.

OR

* * * * * * * * * *

11. a) Define Markov chain. Give examples.

b) Explain about limiting distribution of a Markov chain.

Code No: R15A0024-161

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India) B.Tech. III Semester Regular Examinations, NOV 2016

PROBABILITY AND STATISTICS

Roll No	1	5	N	3				
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Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART - A

(25 Marks)

- a) What are the measures of central tendency?
- b) If A and B are both random events. $P(\overline{A})=2/3$, $P(A \cup B)=3/4$, $P(A \cap B)=1/4$. Find $P(A \cap \overline{B})$.
- c) A typist makes on average 2 mistakes per page. What is the probability of a particular page having no errors on it?
- d) State any two properties of two regression coefficients.
- e) What is a standard error of an estimate?
- f) Explain the terms: (i) Statistical Hypothesis (ii) Types of errors.
- g) What are the applications of student t- distribution?
- h) State the properties of Chi-square distribution.
- i) What are the characteristics of a Queue?
- i) Define Markov chain.

PART – B **SECTION-I**

2. a) State and Prove addition law of Probability for two events.

b) A factory production line is manufacturing bolts using three machines, A, B and C. Of the total output, machine A is responsible for 25%, machine B for 35% and machine C for the rest. It is known from previous experience with the machines that 5% of the output from machine A is defective, 4% from machine B and 2% from machine C. A bolt is chosen at random from the production line and found to be defective. What is the probability that it came from,(i).machine A (ii) machine B (iii) machine C?

OR

3. a) A random variable X has the following probability distribution

X: 0 1 2 3 4 5 7 6 P(x): 0 k 2k 2k 3k k2 2k2 7k2+k Find (i) constant k (ii) $P(X \le 6)$ (iii) $P(X \ge 6)$ (iv) find 'c' if $P(X \le c) > 1/2$. b) X is a normally distributed with mean $\mu = 30$ and SD $\sigma = 4$. Find (i) P(x < 40) (ii) P(30 < x < 35).

(50 marks)

R15

1.

SECTION -II

4.a) Obtain the correlation coefficient to the following data.

Х	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

b) Explain the concept of repeated ranks.

OR

- 5. a) Explain the fitting procedure of line of regression Y on X.
 - b) 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 known 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.

SECTION -III

- 6.a) Explain the procedure of a hypothesis testing problem.
 - b) The mean lifetime of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. If μ is the mean lifetime of all the bulbs produced by the company, test the hypothesis $\mu = 1600$ hours against the alternative hypothesis $\mu \neq 1600$ hours using a 5% level.(Table value=1.96)

OR

- 7. a)The means of two large samples of 1000 and 2000 items are 67.5 cms and 68.0cms respectively. Can the samples be regarded as drawn from the population with standard deviation 2.5 cms. Test at 5% level of significance.(Table value=1.96)
 - b) In a sample of 1000 people in a state, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat eaters are equally popular in this state at 1% level of significance? (Table value=2.58)

SECTION – IV

8. a) sample of 10 boys has the I.Q's 70, 120, 110,101, 88, 83, 95, 98, 107 and 100. Test the mean I.Q of the students is 100 at 0.05 level of significance. (Table value=2.262)
b) Explain the test procedure for paired t-test for means

OR

9. 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)

4.0					and the local division of the local division		
				SE	ECTI	ON-	V
No. of families:	14	56	110	88	40	12	
No. of Girls:	0	1	2	3	4	5	
No. of Boys:	5	4	3	2	1	0	

10 a) What are the measures of queuing model (M / M / 1): $(\infty / FCFS)$

b) In railway marshalling yard goods trains arrive at a rate of 30 trains per day. Assuming that the inter arrival time follows an exponential distribution and service time distribution is also exponential with an average 36 minutes. Calculate: (i) The mean queue size (ii) The probability that the queue length exceeds 10.

OR

11. A gambler has Rs.2. He bets Rs.1 at a time and wins Rs.1 with probability 0.5.

He stops playing if he loses Rs.2 or wins Rs.4.

i) What is the transition probability matrix of the related Markov chain?

ii) What is the probability that he has lost his money at the end of 5 plays?

* * * * * * * * * *

R15A0401

Electronic Devices and Circuits

R15

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

B.Tech II Year I Semester Examinations, Model Paper I -2017

Electronic Devices and Circuits

(Common to EEE, ECE, CSE, EIE, BME, IT, MCT, ETM, ECOMPE)

Time: 3 hours

Max. Marks: 75

10x5=50

PART-A

Answer all the following questions:

1. (a)	What is a pn junction? How is it formed?	(2M)
(b)	Sketch the energy-band Diagrams for intrinsic and extrinsic semiconductors	(3M)
(c)	What is meant by rectifier?	(2M)
(d)	Compare the performance measure of different filters.	(3M)
(e)	Why Transistor is called Current Controlled Device?	(2M)
(f)	What is early effect? How does it modify the V-I characteristics of a BJT?	(3M)
(g)	What is meant by operating point? Explain its significance	(2M)
(h)	What is the condition for thermal stability and thermal resistance?	(3M)
(i)	Explain when a FET acts as a voltage variable resistor.	(2M)
(j)	Explain the drain and transfer characteristics of a JFET in details	(3M)

PART-B

Answer all the following questions

- 2. (a) Draw the V-I characteristics of a diode with zero cut-in voltage and equivalent resistance of 100 Ω . Draw the load line if RL is also 100 Ω .
 - (b) Explain V-I characteristics of pn junction Diode.

- 3. (a) Explain the constructional and principal operations of SCR and PHOTO diode.
- 4. Draw and explain the circuit diagram of full-wave rectifier with inductor filter. Derive the Ripple factor equation.

- Derive expressions for ripple factor, regulation and rectification efficiency of a Center tapped Transformer Full wave rectifier.
- 6. (a) Explain different current components in a transistor.
 - (b) Explain how Transistor acts as an Amplifier

(OR)

- 7. Draw the circuit diagram of Common Emitter amplifier using accurate h-parameter model. Derive expressions for A_{V} , A_{I} , R_{I} & R_{O} .
- What are the compensation techniques used for V_{BE} and I_{CO}? Explain with the help of suitable circuits

(OR)

- 9. (a) Design a collector to base bias circuit using silicon transistor to achieve a stability factor of 20, with the following specifications: $V_{CC} = 16V, V_{BE} = 0.7V, V_{CEQ} = 8V, I_{CQ} = 4mA \& \beta = 50$
 - (b) Derive condition for thermal stability?
- 10. (a) With the help of neat sketches and characteristic curves explain the construction & operation of a JFET and mark the regions of operation on the characteristics.
 - (b) Derive expression for transconductance in a field effect transistor.

- 11. (a) Explain the construction and principle of operation of Depletion type N-channel MOSFET
 - (b) Compare BJT and FET

R15

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

B.Tech II Year I Semester Examinations, Model Paper II -2017

Electronic Devices and Circuits

(Common to EEE, ECE, CSE, EIE, BME, IT, MCT, ETM, ECOMPE)

Time: 3 hours

Max. Marks: 75

5x10= 50 marks

PART-A

Answer all the following questions:

1. (a)	What do you mean by potential barrier for a p-n junction?	(2M)
(b)	What is the significance of negative resistance of a tunnel diode	(3M)
(c)	Define peak inverse voltage (PIV).	(2M)
(d)	Explain FWR working principle with circuit and waveforms.	(3M)
(e)	What are the three regions of a Transistor?	(2M)
(f)	What is thermal runway? How can it avoid?	(3M)
(g)	What is faithful amplification?	(2M)
(h)	Derive relation between α , β and γ ?	(3M)
(i)	Define the pinch off voltage (V_p) sketch the depletion region before and after	
	Pinch-off?	(2M)
(j)	Derive Expression for saturation drain current	(3M)
	PART-B	

Answer all the following questions:

2. (a) Explain the effect of temperature on V-I characteristics of a diode.

(b) Distinguish between drift and diffusion current in a semiconductor.

OR

- Explain the working of Tunnel diode with help of energy band diagrams and Draw V-I Characteristics
- 4. (a) A Full wave single phase rectifier makes use of 2 diodes, the internal forward resistance of each is considered to be constant and equal to 30Ω . The load resistance is 1K Ω . The transformer secondary voltage is 200-0-200V (rms).Calculate V_{DC}, I_{DC}, and Ripple factor

(b) A Zener voltage regulator circuit is to maintain constant voltage at 60 V, over a current range from 5 to 50 mA. The input supply voltage is 200 V. Determine the value of resistance R to be connected in the circuit, for voltage regulation from load current $I_L = 0$ mA to I_L max, the maximum possible value of I_L . What is the value I_L max?

OR

- 5. (a) Derive expression for FWR Rectifier i) DC load current ii) DC output voltageiii) Peak Inverse Voltage of each diode IV) Efficiency v) Ripple factor
- 6. (a) Compare the three transistor amplifier configurations with related to A_{I}, A_{V}, R_{i} and R_{O} .
 - (b) For the emitter follower with $R_s = 0.5K$, $R_L = 50K$, $h_{fe} = -50$, $h_{re} = 1K$, $h_{oe} = 25\mu A/V$, $h_{re} = 1$. Calculate A_V , A_I , Z_i and Z_O

(OR)

- 7).(a) Draw the circuit diagram of a transistor in CB configuration and explain the output characteristics with the help of different regions.
 - (b) Calculate the collector current and emitter current for a transistor with $\alpha_{D.C.} = 0.99$ and $I_{CBO} = 50$ µA when the base current is 20µA..
- 8. Draw a Fixed bias circuit and explain its operation. Calculate the Stability factor S_1S^1 .

(OR)

- Define stability factors for a BJT with Self biasing method. Suggest how this method to effects on operating point of a BJT circuit
- 10. (a) Sketch the drain characteristics of MOSFET for different values of V_{GS} & mark different regions of operation.
- (b) Give the construction details of JFET and explain its operation.

- 11. (a) Write short notes on applications of FET as a voltage variable resistor.
- (b) Explain the principle of CS FET amplifier with the help of circuit diagram. Derive the expressions for A_v, input impedance and output impedance

R15

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

B.Tech II Year I Semester Examinations, Model Paper III -2017

Electronic Devices and Circuits

(Common to EEE, ECE, CSE, EIE, BME, IT, MCT, ETM, ECOMPE)

Time: 3 hours

Max. Marks: 75

PART-A

Answer all the following questions:

1.(a)	What is mean by zener breakdown	(2M)
(b)	Explain the effect of temperature on the V-I characteristics of pn junction diode	(3M)
(c) (d)	What is meant by filter in rectifier circuits Bridge rectifier is becoming more and more popular, why?	(2M) (3M)
(e)	Write B.J.T specifications and limitations	(2M)
(f)	Explain how transistor acts as an Amplifier?	(3M)
(g)	What is meant by stabilization	(2M)
(h)	What is thermal runway? How can it avoid?	(3M)
(i)	State the application of JFET and compare MOSFET	(2M)
(j)	When FET acts as a voltage variable resistor (V.V.R)?	(3M)

PART-B

Answer all the following questions:

5x10= 50 marks

2. Explain in detail, the reason for exponential rise in forward characteristic of a diode with suitable mathematical expression.

(OR)

- 3) a) Explain the construction and working principal of photo diode.
- b) Draw the equivalent circuits of diode
- 4. Draw the circuit diagram of a Full wave bridge rectifier. Explain the operation of circuit with relevant waveforms

- 5 a) Compare the performance of Inductor filter and capacitor filter.
- b) Explain Full wave rectifier with neat diagram?

- 6. Define the hybrid parameters for a basic transistor circuit and give CE hybrid model.
- (b) Explain input and output characteristics of C.E Configuration

(OR)

- 7. (a) Summarise the salient features of the characteristics of BJT operatives in CE, CB and CC configurations?
- (b) Calculate the collector current and emitter current for a transistor with $\alpha_{D.C.} = 0.99$ and $I_{CBO} = 20$ μ A when the base current is 50 μ A.
- Draw a Collector feedback bias circuit and explain its operation. Calculate the Stability factor S

(OR)

- 9. (a) What is a load line? Explain its significance.
- (b) Find the Q-point of self-bias transistor circuit with the following specifications: $V_{CC} = 22.5V$, $R_L = 5.6k\Omega$, $R_C = 1k\Omega$, $R_I = 90k\Omega$, $R_2 = 10k\Omega$, $V_{BE} = 0.7V$ and $\beta = 55$. Assume $I_B \gg I_{CO}$.
- 10(a) Bring out comparison between JFET and MOSFET.
- (b) Draw the circuit's diagram of common drain amplifier and derive expression for voltage gain

- 11. (a) Compare Depletion MOSFET and enhancement MOSFET
- (b) Explain in detail about generalized FET amplifier

R15

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

B.Tech II Year I Semester Examinations, Model Paper IV -2017

Electronic Devices and Circuits

(Common to EEE, ECE, CSE, EIE, BME, IT, MCT, ETM, ECOMPE)

Time: 3 hours

Max. Marks: 75

PART-A

Answer all the following questions:

a)	What is diode equation?	(2M)
b)	Draw the V-I characteristics of SCR & define all related terms.	(3M)
c)	What is the purpose of bleeder resistance in a rectifier circuit using LC filter?	(2M)
d)	Write short note on Full wave rectifier (FWR) along with input output waveform	ms.(3M)
e)	Why hybrid parameters are called so? Define those	(2M)
f)	What factors are to be considered for selecting the operating point Q for an	
	amplifier?	(3M)
g)	Why does potential divider method of biasing become universal?	(2M)
h)	Why FET is unipolar and BJT is Bipolar Device	(3M)
i)	Draw the symbols of JFET (N Channel/P channel) $MOSFET$ (Depletion MO	SFET
	(n-channel/p-channel) and Enhancement MOSFET (n-channel/p-channel)	(2M)
j)	Draw the low frequency hybrid equivalent circuit for CE,CB and CC	(3M)
	PART-B	

Answer all the following questions:

5x10= 50 marks

- (a) Explain the V-I characteristics of Zener diode and distinguish between Avalanche and Zener Break downs.
- (b) In a Zener diode regulator, the supply voltage = 300V, $V_z = 220V$, $I_z = 15$ mA and load current = 25mA. Calculate the value of resistor required to be connected in series with the Zener diode.

(OR)

 Draw the basic structure of Varactor diode and explain its operation and V-I Characteristics. 4. A 230 V, 60Hz voltage is applied to the primary of a 5:1 step down, center tapped transformer used in a full wave rectifier having a load of 900Ω. If the diode resistance and the secondary coil resistance together has a resistance of 100Ω, determine
i) Dc voltage across the load. ii) Dc current flowing through the load.
iii) Dc power delivered to the load. iv) PIV across each diode.

(OR)

- 5. (a) Design ripple factor of LC filter for a Full wave rectifier
- (b) In a full-wave rectifier using an LC filter L-10mH, C=100 μ F and R_L = 500 Ω . Calculate I_{DC}, V_{DC} for an input Vi=300sin (100 t)
- 6. (a) Draw the circuit diagram of a transistor in CB configuration and explain the output characteristics with the help of different regions.
- (b) In a germanium transistor collector current is 51mA, when base current is 0.4mA. If $h_{fe} =$

 $\beta_{dc} = 125$, Calculate cut off current, I_{CEO}.

(OR)

- 7. Explain the input and output characteristics of a transistor in CC configuration
- (b) Calculate the values of I_E , α_{dc} and β_{dc} for a transistor with $I_B=13\mu A$, $I_C=200\text{mA}, I_{CBO}=6\mu A$. Also determine the new level of I_C which will result from reducing I_B to 100mA
- 8. Draw a Self bias circuit and explain its operation. Calculate the Stability factor S,S',S''

(OR)

- 9 (a) what is a load line? Explain its significance.
- (b) Find the Q-point of self-bias transistor circuit with the following specifications: V_{CC} = 22.5V, R_L =5.6k Ω , R_C =1k Ω , R_L =90k Ω , R_2 =10k Ω , V_{BE} = 0.7V and β = 55. Assume I_B>>I_{CO}.
- 10) The field effect transistor is called a voltage-sensitive electronic control device. Explain why is the case?
- b) Name and define the circuit parameters of the JFET. How are they related to each other?

- 11.(a) Explain the construction and principle of operation of Enhancement mode N-channel MOSFET.
- b) Compare BJT & FET.

R15

ALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

B.Tech II Year I Semester Examinations, Model Paper V -2017

Electronic Devices and Circuits

(Common to EEE, ECE, CSE, EIE, BME, IT, MCT, ETM, ECOMPE)

PART-A

Time:	Time: 3 hours		
Answe	er all the following questions:	5x2= 10 marks	5
(a)	Sketch the V-I characteristics of p-n junction diode for forward bia	s?	(2M)
(b)	Explain zener diode as a voltage regulator.		(3M)
(c)	(c) Distinguish between the incremental resistance and the apparent resista		
	the diode		(2M)
(d) (e)	Derive efficiency of FWR. In a filter circuit, why capacitor is a parallel combination and series	combination	(3M)
	for inductor.		(2M)
(f)	Define Transformer Utilization Factor (TUF).		(2M)
(g)	What is transistor?		(3M)
(h)	Draw voltage divider bias circuit; derive an expression for its stabil	ity factor.	(2M)
(i)	Explain transfer characteristics of JFET with its non-linear relation	S	(3M)
(j)	Explain tunneling effect		(2M)

PART-B

5x10= 50 marks Answer all Answer all the following questions:

2. (a) Explain the concept of diode capacitance. Derive expression for transition capacitance?

Find the value of D.C. resistance and A.C resistance of a Germanium junction diode at (b) 25° C with reverse saturation current, $I_{o} = 25\mu$ A and at an applied voltage of 0.2V across the diode.

- With neat energy band diagrams, explain the V-I characteristics of Tunnel diode in detail. Also explain the negative-resistance region in the characteristics and applications of Tunnel diode.
- 4. Draw the circuit diagram of full-wave rectifier with inductor filter. Explain its operation with necessary equations.

(OR)

- 5. Derive the expression for the ripple factor of π -Section filter when used with a Fullwave-rectifier. Make necessary approximations.
- 6.(a) Based on the currents flowing through a BJT illustrate the amplification process.
- (b) Compare CB, CC, and CE configurations

(OR)

- 7. Draw the circuit diagram, AC equivalent & small signal equivalent of Common Emitter amplifier using accurate h-parameter model. Derive expressions for $A_V, A_I, R_I \& R_O$.
- 8. Explain the basic requirements of transistor biasing. Verify these requirements in collector to base bias circuit.

(OR)

- 9. Design a fixed bias circuit using silicon transistor, with the following specifications: $V_{CC} = 16V, V_{BE} = 0.7V, V_{CEO} = 8V, I_{CO} = 4 \text{ mA } \& \beta = 50.$
- 10. (a) A self biased P-channel JFET has a pinch-off voltage of $V_P=5V$ and $I_{DSS}=12mA$.the supply voltage is 12V .Determine the values of R_D and R_S so that $I_D=5ma$ and $V_{DS}=6V$
- (b) List the advantages and disadvantages of FET over MOSFET

- 11. (a) Explain self biasing of Common source JFET
- (b) Explain the significance of threshold voltage of an E-MOSFET.

Code No: R15A0401

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, May 2017

Electronic Devices and Circuits



Time: 3 hours

Max. Marks: 75

R15

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART - A (25	Marks)
a) Write the PN junction diode applications.	[2M]
b) Explain the temperature dependence of V-I characteristics of PN diode	[3M]
c) Define Transformer utilization factor (TUF) of a rectifier.	[2M]
d) What is a rectifier and how a PN junction diode used as a rectifier.	[3M]
e) Draw the hybrid parameter model for BJT.	[2M]
f) A transistor has I _B =100 μ A, I _{CO} =5 μ A, α =0.95, Calculate I _C .	[3M]
g) What is biasing.	[2M]
h) Explain early effect.	[3M]
i) Draw the symbols of Depletion MOSFET and Enhancement MOSFET	for both
n channel and p channel.	[2M]
i) Compare BJT and JFET.	[3M]

PART - B

(50 Marks)

SECTION - I

28	a) Write the volt-ampere equation for PN junction diode. Draw and explain the	the V-I
ch	aracteristics of PN junction diode under forward and reverse bias	.[5M]
1	b) Explain about breakdown mechanisms in semiconductor devices.	[5M]
	OR	
3.	a) Explain the principle and operation of Tunnel diode and draw its V-I chara	acteristics.
		[6M]
	b) Discuss about Zener Diode characteristics.	[4M]

SECTION - II

4. a) I	Draw a neat diagram	and explain working principle of full wave bridge r	ectifier.[5M]
b) I	Draw the circuit for	a half wave rectifier and derive the expression for	
	i) DC load voltage	ii) RMS current iii) Ripple factor	[5M]

OR

5. a) What are different types of filters? Compare them. [5M]

b) A HWR circuit supplies 100mA DC current to a 250ohms load. Find the DC output voltage, PIV rating of a diode and the RMS voltage for the transformer supplying the rectifier. [5M]

SECTION – III

6. a). Explain the operation of transistor with current components in detail.	[6M]
b) Explain the operating modes of BJT.	[4M]
OR	
7. a) Explain the input and output V-I characteristics of common base configu	ration of BJT
	[5M]
b) Explain how the BJT can be used as an amplifier	[5M]

SECTION – IV

8. a) Explain in detail about Thermal Runaway and how to avoid it. [5M] b) In a Self bias circuit containing $R_1=50K\Omega$, $R_2=25K\Omega$, $Re=1K\Omega$, $Rc=3K\Omega$, $\beta=90$, Vcc=12V, $V_{BE}=0.7V$. Find the operating point, Stability factor S [5M]

OR

9. a) Give the advantages of h-parameter analysis. [4M]
b) The h-parameters of a Transistor used in a CE circuit are hie=1KΩ, hre=2×10⁻⁴. hfe=50, hoe=25µA/V. The load resistance for the transistor is 1KΩ in the collector circuit. Determine Ri, Ro, Av, Ai in the amplifier stage (Assume Rs= 1KΩ). [6M]

SECTION – V

10.a) Explain in detail the working of JFET and draw its drain and transfer characteristics.[5M]b) Explain the construction and working of Enhancement MOSFET. [5M]

OR

11. a) Derive the expressions for Z i, Z₀ and A_v for common source J-FET amplifier [6M]
 b) Compare BJT and MOSFET [4M]

R15A0461

Digital Logic Design

MODEL PAPER-1 MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year – I Semester Examination DIGITAL LOGIC DESIGN (CSE)

Time: 3 hours

1

Note: This question paper contains two pars A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A

a)	Convert $(256.25)_{10}$ to () ₈ to () ₁₆	(2marks)
b)	State and Demorgan's theorem of Boolean algebra.	(3marks)
c)	Simplify the given Boolean function to minimal number of literals	
	F = X + Y[Z + (X + Z)']	(2marks)
d)	What is canonical form? Give an example.	(3marks)
e)	Implement AND gate and NOR gate using NAND	(2marks)
f)	What is Magnitude comparator?	(3marks)
g)	Write differences between combinational and sequential circuits.	(2marks)
h)	What are the applications of counters?	(3marks)
i)	Briefly explain about RAM.	(2marks)
j)	Compare PROM, PLA and PAL.	(3marks)

PART-B

SECTION-I

	0.75	
	2'scomplementrepresentation.	(4marks)
	c) Perform the binary arithmetic operations on (+12)-(4) using signed	
	b) Given that $(64)_{10} = (100)_b$, determine the value of b.	(2marks)
2.	a) Convert the number $(127.75)_8$ to base 10, base 3, base 16 and base 2.	(4marks)

OR

3. a) State and Prove the Huntington postulates of Boolean algebra. (5marks) b) Find the complement of the function and represent in sum of minterms F = xy + z' (5marks)

SECTION-II

R15

Max. Marks: 75

 4. Simplify the following Boolean function for minimal SOP form using K-map and implement using NAND gates. (10marks) F(W,X,Y,Z)=∑(1,3,7,11,15)+d(0,2,5)

OR

5. Using the Quine-McCluskey method, obtain the minimal expression for $F = \sum m (1, 2.3, 5, 6, 7, 8, 9, 12, 13, 15)$ (10marks)

SECTION-III

6.	a) What is combinational circuit? Explain design procedure.	(5marks)
	b) What is full adder? Design full adder using two half adders.	(5marks)

OR

7. a) Write short notes on multiplexer.(5marks)b) Design a 64 x 1 MUX using only 8:1 MUXs.(5marks)

SECTION-IV

8. a) What is race around condition? How it can be avoided? (5marks)
b) Draw schematic circuit of master-slave JK flip-flop and explain its operation with the help of truth table. (5marks)

OR

9. Design a synchronous counter to generate the sequence 0,1,2,3,5,8 and repeat the sequence using T flip-flops. (10marks)

SECTION-V

10. Explain the different types of memory. Explain error detection and correction read only memory. (10marks)

OR

11. Tabulate the truth table for an 8X4 ROM that implements the Boolean Function $A(x, y,z) = \sum(0, 3, 4, 6) \qquad (10 \text{marks})$ $B(x, y, z) = \sum(0, 1, 3, 7)$ $C(x, y, z) = \sum(1, 5)$ $D(x, y, z) = \sum(0, 1, 4, 5, 7)$

MODEL PAPER-2 MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year – I Semester Examination DIGITAL LOGIC DESIGN (CSE)

Time: 3 hours

1.

Note: This question paper contains two pars A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A

a)	Define unit distance code.	(2marks)
b)	What are the properties of EX-OR gate.	(3marks)
c)	Simplify the given Boolean function to minimal number of literals	
	F = A [B + C'(AB + AC')']	(2marks)
d)	Define prime and essential prime implicant.	(3marks)
e)	Design 1-bit comparator.	(2marks)
f)	Explain briefly about decoder.	(3marks)
g)	Write differences between latch and flip flop.	(2marks)
h)	Compare merits and demerits of ripple and synchronous counters.	(3marks)
i)	Explain about ROM Organization.	(2marks)
j)	Write differences PLA ,PAL (3marks)	

PART-B

SECTION-I

2. a) Convert the number (17.125)₁₆ to base 10, base 4, base 5 and base 2. (4marks)
b) Perform the binary arithmetic operations on (-14)-(-2) using signed 2's complement representation. (3marks)

c) Justify the statement that "Gray code is a class of reflected code". (3marks)

OR

3. a) What are Self complementing codes? Give examples. (5marks)
b) Write the procedure for constructing Hamming codes. Construct hammingcodes for the decimal numbers 1, 4, 8. (5marks)

R15

Max. Marks: 75

SECTION-II

4. a) Simplify the following function using K-map F=A'BC'D'+A'BC'D+AB'CD+AB'CD+AB'CD'+ABCD+A'B'C'D' (5marks) b) Determine the minimal sum of product form of $F(W,X,Y,Z)=\sum m(4,5,7,12,14,15)+d(2,8,10)$ (5marks)

OR

5. Determine the prime implicants of the function. $F(W,X,Y,Z) = \sum m (1, 4, 6, 7, 8, 9, 10, 11, 15)$. Also minimize the logic function using Tabulation method. (10marks)

SECTION-III

6.	a) Draw the logic diagram of a full adder using only 2- input NAND gate	s and give the
	expression for sum and carry outputs.	(5marks)
	b) Design a4-bit gray code to binary code converter.	(5marks)

OR

7. a) Draw the logic diagram of a 1-line to 4-line demultiplexer and explain its working. (5marks)

b) Design 4-parallel adder/subtractor circuit diagram and its working operation. (5marks)

SECTION-IV

- 8. Draw graphical symbols and write characteristic tables, characteristic equations and excitation tables for the following flip-flops.
 - a) SR flip-flop b) JK flip-flop c) T flip-flop (10marks)

OR

9. Design modulo 10 counter using JK flip-flops. (10marks)

SECTION-V

(10marks)

(10marks)

- 10. Explain about memory decoding?
 - OR

11. Write a short note on

- a) Address and data bus
- b) Sequential memory
- c) RAM
- d) Cache memory

MODEL PAPER-3 MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year – I Semester Examination DIGITAL LOGIC DESIGN (CSE)

Time: 3 hours

Note: This question paper contains two pars A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A

1.	a)	Explain sing magnitude representation with example.	(2marks)
	b)	What are the basic theorems in Boolean algebra?	(3marks)
	c)	Write about sum of products and products of sums of Boolean express	ion.
			(2marks)
	d)	Explain steps of simplification in Karnaugh maps with example.	(3marks)
	e)	Explain the working of full adder with help of diagram.	(2marks)
	f)	Design 2 by 2 multiplier.	(3marks)
	g)	Construct Master-Slave J-K flip flop.	(2marks)
	h)	Explain about Ripple counter.	(3marks)
	i)	Difference between SRAM and DRAMs.	(2marks)
	i)	What is the difference between PLA and PAL?	(3marks)

PART-B

SECTION-I

2. a) Explain various number systems and Binary codes used in digital logic design with examples. (5marks)

b) Draw logic diagram of the Boolean expression without simplifying (5marks) (A+B) (C+D) (A'+B+D)

OR

- 3. a) Obtain the duality and complement of the following Boolean expressions.(5marks)
 - i) A'B+A'BC'+A'BCD+A'BC'D'E
 - ii) A+B+A'B'C
 - b) Express the Boolean function F=A+B'C in a sum of minterms. (5marks)

R15

Max. Marks: 75

SECTION-II

a)Realize the following function using basic gates. (Two-level).F(x,y,z)=∑(3, 5, 6, 7)
b) Simplify the Boolean function F together with don't care condition d, and then express the simplified function in some of minterms: F(A,B,C,D)=∑(0,2,5,7,11,15),d=∑ (3,4,6,12,13) (5+5marks)

OR

5. a) Construct Karnaugh maps for three variable, four variable and five variable Boolean functions and discuss their simplification methods. (5marks)
b) Implement the following Boolean function using NAND and NOR gates after simplification using karnaugh map method F (A, B, C) = ∑m (0,1,2,3,6,7).(5marks)

SECTION-III

6. a) Discuss with example how higher Decoders are realized using low-order Decoders.
b) Draw the logic diagram of a 4 bit binary to gray and gray to binary code converter and verify its working with suitable examples. (5+5marks)

OR

7. a) Explain the functions of a Demultiplexer and encoder with necessary diagrams and discuss their applications. (5marks)
b) Construct logic diagram of a 4bit 2's complement adder for performing subtraction operation and verify it's working by taking suitable examples. (5marks)

SECTION-IV

8. a) Convert clocked SR flip flop to a T- flip flop. (5marks)
b) Explain techniques used to eliminate racing condition in JK flip flops. (5marks)

OR

9. Draw the circuit diagram of a 4 bit UP/DPWN binary counter and explain its working with the help of its state diagram and truth table. (10marks)

SECTION-V

10. a) Explain various types of memories and their construction and characteristics and discuss the hierarchy of memory organization. (5marks)
b) Implement the following two Boolean functions with a PLA (5marks)
F1(A, B, C)=∑(0,2,4,6),F2(A, B, C)=∑(0,1,6,7)

OR

11. What is meant by memory decoding? Discuss the structure of address bus and data bus with suitable diagram. (10marks)

MODEL PAPER-4 MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY B.Tech II Year – I Semester Examination DIGITAL LOGIC DESIGN (CSE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two pars A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A

1.	a)	Explain weighted codes with example.	(2marks)
	b)	State and prove consensus theorem.	(3marks)
	c)	Name different Minimization techniques.	(2marks)
	d)	What is race around condition? How is it avoided?	(3marks)
	e)	How does a ripple carry-adder function?	(2marks)
	f)	Draw logic diagram of a 3:8 decoder.	(3marks)
	g)	What is excitation table?	(2marks)
	h)	What is a twisted ringcounter?	(3marks)
	i)	Explain the functioning of Random Access memory.	(2marks)
	j)	Draw memory hierarchy to improve its capacity.	(3marks)

PART-B

SECTION-I

2. a) Convert the decimal number 35.45 into corresponding octal and binary number.
b) What is hamming code? How is the hamming code word tested and corrected. Explain with an example. (5+5marks)

OR

3. a) What are the universal gates? Realize AND, OR, NOT, XOR gates using Universal gates. (5marks)
b) Using 2's complement method perform (68.32)₁₀ (42.64)₁₀ (5marks)

R15
SECTION-II

a)Simplify Y=∑(3, 6, 7, 8, 10, 12, 14, 17, 19, 20, 21, 24, 25, 27, 28) using K-map method. (5marks)
b) Implement Ex-OR gate using 4×1 MUX. (5marks)

OR

5. Convert the following expressions to sum of product form. (10marks)
a) (A'+B+C) (A+B'+C') (ABC)

b) (A+B+C')(A'+B'+C')(A'+BC)

SECTION-III

6. a) Explain the working of 4-bit magnitude comparator. (5marks)
b) Draw the logic diagram of 4×1 multiplexer and explain its working. (5marks)

OR

7. a) Draw the schematic diagram and truth table of full adder. Design the full adder using universal gates. Draw the relevant logic diagrams with necessary expressions.(5marks)b) Name different code converters and design any one code converter. (5marks)

SECTION-IV

8. a) Explain the basic difference between combinational and sequential circuits.(4marks)
b) Explain the working of JK flip flop. How are the deficiencies of JK flip flop overcome with Master-Slave configuration? (6marks)

OR

- 9. a) Draw and explain the operation of 4 bit shift register with necessary diagrams.
 - b) Differentiate between Ripple counter and synchronous counter. Draw respective block diagrams for 3 bit counting.

SECTION-V

- 10. a) Using PLA, implement a BCD to excess-3 code converter. Draw and explain its operation through truth table and logic diagram.
 - b) Explain in brief, about logic construct of 32×4 ROM. (5+5 marks)

OR

- 11. a) List different types of memory. Explain how combinational functions can be realized using ROM with an example.
 - b) Write short note on Memory decoding. (5+5 marks)

Code No: R15A0461

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, May 2017

Digital Logic Design



Time: 3 hours

Max. Marks: 75

R15

Note: This question paper contains two parts A and B Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART - A	(25 Marks)
1. (a) Write the truth tables for OR, AND and NOT gates	[2M]
(b) State the basic properties of Boolean algebra?	[3M]
(c) What is incompletely specified functions/don"t care conditions?	[2M]
(d) What are the limitations of K-map?and write the advantages of	
Quine McCluskey method	[3M]
(e) Draw the logic circuit of a half adder and construct truth table	[3M]
(f) Define multiplexer and comparator	[2M]
(g) What is the operation of JK flip-flop?	[3M]
(h) What is a modulo counter, ring and Johnson counter?	[2M]
(i) What is Read and Write operation? and define Static RAM and dyn	amic RAM
	[3M]
(j) What is programmable logic array? How it differs from ROM?	[2M]

PART - B

(50 Marks)

[2M]

SECTION - I

2.a) Express the following in decimal: a) (10110.0101)₂, b) (16.5)₁₆, c) (26.24)₈, d) $(FAFA.B)_{16}$, e) $(1010.1010)_2$ (a) $(10110.0101)_2$

b) Obtain the complement of f = wx'y + xy' + wxz using De Morgan's theorem

OR

3. a)Explain the Ex-OR and Ex-NOR gates with truth tables. b) Discuss the canonical and standard form with examples.

SECTION – II

4. Reduce the Boolean function using k-map technique and implement using gates f (w, x, y, z)= Σm (0,1,4,8,9,10) which has the don't cares condition d (w, x, y, z)= Σm (2,11). OR

5. Discuss the multilevel NAND/NOR realizations with examples.

SECTION - III

- 6. Design a half adder using atmost three NOR gates and explain logic operation..
- 7. Design a 2 bit magnitude comparator and explain SECTION – IV
- 8. Describe the JK flip-flop and realize D and T flip flops using Jk flip-flops.
 - OR
- 9. Explain the working of BCD Ripple Counter with the help of state diagram and logic diagram.

SECTION - V

10. Explain a ROM architecture with neat diagrams

OR

* * * * * * * *

11. Explain in detail about PAL.

Code No: R15A0461-161

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

B.Tech. III Semester Regular Examinations, NOV 2016

DIGITAL LOGIC DESIGN

18/11/16

	(CSE)	
Roll No	N 3	

Time: 3 hours

Max. Marks: 75

R15

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries

10 marks.

PART - A	(25 Marks)
1. (a) What is the difference between binary code and BCD?	[2M]
(b) Reduce $AB + (AC)' + AB'C(AB + C)$	[3M]
(c) What is a K- map? and Give an example.	[3M]
(d) What is prime implicant and non-prime implicant?	[2M]
(e) Explain the design procedure for combinational circuits	[3M]
(f) Define encoder.	[2M]
(g) Write the difference between combinational and sequential circuts	[3M]
(h) What is a shift register? and mention the applications of shift registers.	[2M]
(i) What are the types of ROM?	[2M]
(j) Compare PROM, PLA and PAL.	[3M]

PART - B

(50 Marks)

SECTION - I

2.a) Convert the following binary numbers to hexadecimal: a) 1.11010, b) 1110.10b) Describe a Binary Coded Decimal Code.

OR

3. a)Describe the universal logic gates with truth tables.b) Convert the given expression in canonical SOP form Y = AC + AB + BC.

SECTION – II

4. Determine the prime implicants of the function F (W,X,Y,Z) = $\Sigma m (1,4,6,7,8,9,10,11,15)$

OR

5. Obtain the minimum SOP using tabular method and verify using K-map F=m₀+m₂+m₄+m₈+m₉+m₁₀+m₁₁+m₁₂+m₁₃

SECTION - III

6. Write the design procedure for half adder and explain how a full adder can be built using two half adders.

OR

7. Implement the following using a mux. F(a,b,c,d) = (0,1,3,4,8,9,15) and obtain the truth table.

SECTION – IV

8. Write the truth tables and excitation tables of SR, JK, D, and T Flip flops.

OR

9. Design a single mode Counter and explain Ring Counter Using Shift Register.

SECTION - V

10. Describe the ROM organization and explain PROM, EPROM, and EEPROM.

OR

11 Explain in detail about PLA with F1(A, B, C)= $\sum(0,2,4,6)$, F2(A, B, C)= $\sum(0,1,6,7)$.

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Code No: 113BS

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B.Tech II Year I Semester Examinations, February/March - 2016

DIGITAL LOGIC DESIGN

(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

R13

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b as sub questions.

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	PARI-A	(25 Marks)
1.a)	Write about the Floating point number representation	
b)	What are the basic theorems in Boolean algebra?	[2]
c)	Name different Minimization techniques	[3]
d)	What is race ground and the other is the second and the	[2]
(2)	How door of the local tion? How is it avoided?	[3]
C)	now does a ripple carry-adder function?	[2]
1)	Design the 2-bit Binary Adder using logic gates.	[3]
g)	Compare latch and flip flop.	[2]
h)	What are the various methods used for triggering flip-flops?	[2]
i)	Explain the functioning of Random Access memory	
j)	Draw memory hierarchy to improve its capacity.	[2]
	in moral only to improve its capacity.	[3]
	PAPT	
	TAKI-B	(50 Marks)
2.a)	Convert the Decimal Number 25 45 internet	
	Number.	Number and Binary

What is Hamming code? How is the Hamming code word tested and corrected. b)Explain with an example. [5+5]

OR

- What are universal gates? Realize AND, OR, NOT, XOR gates using Universal 3.a) gates. b)
 - Using 2's complement method perform. $(68.32)_{10} (42.64)_{10}$. [5+5]
- 4.a) Simplify $Y = \Sigma m(3, 6, 7, 8, 10, 12, 14, 17, 19, 20, 21, 24, 25, 27, 28)$ using K-map method.
- Implement Ex-OR gate using 4×1 MUX. b) [6+4] OR Convert the following expressions to Sum of Product form 5. a) (A'+B+C) (A+B'+C') (ABC)
 - b) (A+B+C') (A'+B'+C') (A'+BC) [5+5]
- 6.a) Explain the working of 4-bit magnitude comparator. Draw the logic diagram of 4×1 multiplexer and explain its working. b) [5+5] OR 7.a)
- Draw the schematic diagram and truth table of full adder. Design the full adder using universal gates. Draw the relevant logic diagrams with necessary expressions.

Name different code converters and design any one code converter. b) [5+5]

- 8.a) Explain the basic difference between Combinational and Sequential circuits.
 - b) Explain working of JK Master Slave flip flop. How are the deficiencies of JK Flip-Flop overcome with Master-Slave configuration? [5+5]

OR

- 9.a) Draw and explain the operation of 4 bit Shift Register with necessary diagrams.
 - b) Differentiate between Ripple counter and synchronous counter. Draw respective block diagrams for 3 bit counting. [5+5]
- 10.a) Using PLA, implement a BCD to excess-3 code converter. Draw and explain its operation through truth table and logic diagram.
 - b) Explain in brief, about logic construction of 32×4 ROM. [5+5]

OR

11.a) List different types of memory. Explain how combinational functions can be realized using ROM with an example.

inghe the lettered later diagram

b) Write a short note on Memory decoding.

[6+4]

R13

Code No: 113BS

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B.Tech II Year I Semester Examinations, November - 2015 DIGITAL LOGIC DESIGN

(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

(25 Marks)

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

	State and Prove De Morgan's Theorems.	[2M]
l.a)	State and Flove De Worgan's Theorem.	[3M]
b)	Realize an XOR gate using universal gates.	sions [2] M]
c)	Write about Sum of Products and Product of Sums of Boolean express	SIOIIS.[21VI]
4)	Evaluin Steps of Simplification in Karnaugh maps with example.	[3M]
a)	Explain Steps of Simplification with help of diagram	[2M]
e)	Explain the working of Full adder with help of diagram.	[2]/]
£	Draw the logic diagram of a 3/8 decoder.	[JIVI]
-)	Construct Master-Slave L-K Flip-Flop	[2M]
g)	Construct Master-blave 5 121 mp 1 sept	[3M]
h)	Explain about Ripple counter.	[] ACI
i)	Differentiate between SRAMs and DRAMs.	
-/	TTAL 1100 have been DI A and DAT 9	I3M

j) What is the difference between PLA and PAL

PART-B

(50 Marks)

- 2.a) Explain various number systems and Binary codes used in digital logic design with examples.
 - b) Draw the logic diagram of the Boolean expression without simplifying (A+B) (C+D) (Ā+B+D). [5+5]

OR

- 3.a) Explain the signed binary number representation and floating point number representation with typical examples and discuss about their advantages.
- b) Convert $(AB+C)(B+\overline{CD})$ expression into sum of products and product of sums form. [5+5]
- 4.a) Realiaze the following function using basic gates.(Two-level). $f(x, y, z) = \sum (3, 5, 6, 7)$
 - b) Simplify the Boolean function F together with don't care condition d, and then express the simplified function in some of minterms: $F(A,B,C,D) = \sum (0,2,5,7,11,15), d = \sum 3.4,6,12,13).$ OR
- 5.a) Construct Karnaugh maps for three variable, four variable and five variable Boolean functions and discuss their simplification methods.
 - b) Implement the following Boolean function using NAND gates and NOR gates after simplification using Karnaugh map method: F(A,B,C)=(0,1,2,3,6,7). [5+5]

- 6.a) Discuss with example how higher order Decoders are realized using low-order Decoders.
 - b) Draw the logic diagrams of a 4 bit binary to gray and gray to binary code converter and verify its working with suitable examples. [5+5]

OR

- 7.a) Explain the functions of a De multiplexer and Encoder with necessary diagrams and discuss their applications.
 - b) Construct logic diagram of a 4bit 2's complement adder for performing subtraction operation and verify its working by taking suitable examples. [5+5].
- 8.a) Draw the circuit diagram of a 4 bit UP/DOWN binary counter and explain its working with the help of its state diagram and truth table.
 - b) Design a 4 bit binary Ripple counter using T flip-flops and explain its working with help of state diagrams and truth table. [5+5]

OR

- 9.a) Design a 4 bit universal shift register and explain its working with the help of its state diagram and timing diagram.
 - b) Explain the working of synchronous sequential circuits and asynchronous sequential circuits with examples and mention their applications. [5+5]
- 10.a) Explain various types of memories and their construction and characteristics and discuss the hierarchy of memory organization.
 - b) Implement the following two Boolean functions with a PLA $F_1(A, B, C) = \sum (0, 2, 4, 6)$ $F_2(A, B, C) = \sum (0, 1, 6, 7).$
- [5+5]

OR

- 11.a) What is Cache memory? Explain the organization of cache memory with suitable diagrams.
 - b) What is meant by memory decoding? Discuss the structure of address bus and data bus with suitable diagrams. [5+5]

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after simplification using Kornauth may unched: