



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

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DEPARTMENT OF INFORMATION TECHNOLOGY **II B.TECH IISEMESTER QUESTION BANK 2018-19**



LIST OF SUBJECTS

CODE	NAME OF THE SUBJECT
R18A0024	PROBABILITY AND STATISTICS
R18A0461	ANALOG & DIGITAL ELECTRONICS
R18A0503	DATA STRUCTURES
R18A0506	DISCRETE MATHEMATICS
R18A1201	COMPUTER ORGANIZATION AND ARCHITECTURE
R18A0504	OPERATING SYSTEMS

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
MODEL QUESTION PAPER-1
Probability and Statistics

Time: 3 hours

Max Marks: 70

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1a) A random variable has the following probability function

x	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K ²	2K ²	7K ² +K

Find i) k ii) $P(X \leq 6)$ iii) $P(X > 6)$ iv)) find 'c' if $P(X \leq c) > 1/2$ [7M]

b) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number E of defective items. [7M]

OR

2) For the following bivariate (two dimensional) probability distribution of X and Y find

i) $P(X \leq 2, Y = 2)$ ii) $F_X(2)$ iii) $P(Y = 3)$ iv) $P(X < 3, Y \leq 4)$ v) $F_Y(3)$

X/Y	1	2	3	4
1	0.1	0	0.2	0.1
2	0.05	0.12	0.08	0.01
3	0.1	0.05	0.1	0.09

[14M]

SECTION-II

3) 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 [14M]

OR

4) 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 30.4kg ii) more than 31.3 kg [14M]

SECTION-III

5a) Find the Karl-Pearson'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

[7M]

b) If θ is the angle between two regression lines and S.D of Y is twice the S.D of X and

$r = 1.25$, find $\tan \theta$. [7M]

OR

6) 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

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

[14M]

SECTION-IV

- 7a) A sample of size 64 and mean 70 were taken from a population whose standard deviation is 10. Construct 95% confidence interval for the mean. [7M]
- b) Write about (i) Null hypothesis (ii) Type I and Type II errors
- (iii) Alternative hypothesis. [7M]

OR

- 8a) In a study of automobile insurance a random sample of 80 body repair costs had a mean of Rs.472.36 and S.D of Rs.62.35. If \bar{x} is used as point estimate to the true average repair costs, with what confidence we can assert that the maximum error doesn't exceed Rs.10 [7M]
- b) Explain the procedure for Testing of Hypothesis. [7M]

SECTION-V

- 9) A survey of 320 families with 4 children each revealed the following distribution. [14M]

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

- 10) The following are the average weekly losses of worker hours due to accidents in 10 industrial plants 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. [14M]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous Institution - UGC, Govt. of India)
MODEL QUESTION PAPER-2

Probability and Statistics

TIME: 3hours

Max. Marks: 70

NOTE: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

- 1 a) If the p.d.f of a r.v x is given by $f(x) = \begin{cases} k(1 - x^2), & 0 < x < 1 \\ 0, & \text{otherwise} \end{cases}$
find i) k and ii) the cumulative distribution function of x . [7M]
b) Write the definitions of (i) Random variable (ii) Discrete random variable (iii) Continuous random variable and (iv) Probability Distribution function. [7M]

OR

- 2) A random sample with replacement of size 2 is taken from $S = \{1, 2, 3\}$. Let the random variable X denote the sum of the two numbers taken: (i) Write the probability distribution of X
(ii) Find the mean
(iii) Find the variance. [14M]

SECTION-II

3. A sales tax officer has reported that the average sales of the 500 businesses 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 businesses 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 sales of which are likely to range between Rs.30,000 and Rs.40,000 [14M]

OR

4. If 2% of light bulbs are defective, find
(i) atleast one is defective
(ii) exactly 7 are defective
(iii) $p(1 < x < 8)$ in a sample of 100
(iv) atleast one is defective [14M]

SECTION-III

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

X	0	5	10	15	20
Y	7	11	16	20	26

[7M]

- b) Show that the maximum value of rank correlation coefficient is 1 [7M]

OR

- 6a) The marks obtained by 10 students in mathematics and statistics are given below. Find the rank correlation coefficient between the two subjects

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

[7M]

- b) Find the Correlation coefficient if $b_{xy} = 0.85$, $b_{yx} = 0.89$. [7M]

SECTION-IV

7.a) Samples of size 2 are taken from the population 1,2,3,4,5,6 with replacement. Find

(i) The mean of the population

(ii) Standard deviation of population

(iii) The mean of the sampling distribution of means

(iv) The standard deviation of the sampling distribution of means

[12M]

b) What is a statistic? Give an example

[2M]

OR

8. a) Write about null hypothesis and testing of null hypothesis.

[4M]

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 favour of the hypothesis that is more at 5% level. [10M]

SECTION-V

9. 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

[14M]

OR

10. 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 days	9	43	64	62	42	36	22	14	6	2

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

[14M]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
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MODEL QUESTION PAPER-3
Probability and Statistics

Time: 3 hours

Max Marks: 70

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

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

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

[10M]

b) Define (i) Probability mass function (ii) Probability density function .

[4M]

OR

2 a) Two random variables x and y have the joint density function

$$f_{xy}(x, y) = \begin{cases} x^2 + \frac{xy}{3}, & 0 \leq x \leq 1, 0 \leq y \leq 2 \\ 0, & \text{otherwise} \end{cases}$$

Show that x and y are not independent . Find the conditional density function . check whether it is valid or not.

[7M]

b) The joint density function of w and z is given by

$$f_{wz}(wz) = \begin{cases} bwz & , 1 \leq w \leq 3 , 2 \leq z \leq 4 \\ 0 & , \text{otherwise} \end{cases}$$

Find b and marginal density function.

[7M]

SECTION-II

3a) 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) atleast one iii) exactly one.

[7M]

b) Fit a binomial distribution to the following data

[7M]

x	0	1	2	3	4	5
f	38	144	342	287	164	25

OR

4) In a normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution.

[14M]

SECTION-III

5) Obtain the rank correlation coefficient for the following data

[14M]

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	44	81	60	68	48	50	70

OR

6) 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. [14M]

SECTION-IV

7a) 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 [10M]

b) Write short notes on Type I and Type II error. [4M]

OR

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 . [10M]

b) Write step procedure for difference of means of two independent samples. [4M]

SECTION-V

9 a) Explain χ^2 test for independence of attributes. [4M]

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

[10M]

OR

10) The heights of 10 males of a given locality are found to be 70,67,62,68,61,68,70,64,64,66 inches .

Is it reasonable to believe that the average height is greater than 64 inches .Test at 5% LOS. [14M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester Regular Examinations, Nov 2019

ANALOG & DIGITAL ELECTRONICS

(Common to CSE & IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1a. Explain the effect of temperature on V-I characteristics of a diode. [7]
b. Distinguish between drift and diffusion current in a semiconductor. [7]

OR

- 2.a Draw the equivalent circuits of diode [7]
b) How a PN junction diode works? Draw and explain V-I characteristics of PN diode with neat diagram [7]

SECTION-II

- 3.(a) Explain different current components in a transistor. [7]
(b) Calculate the values of I_E , α and β for a transistor with $I_B=13\mu A$, $I_C=200mA$, $I_{CBO}=6\mu A$ [7]

OR

- 4.(a) Draw the circuit diagram of a transistor in CB configuration and explain the output Characteristics with the help of different regions. [14]

SECTION-III

5. (a) Convert the given expression in standard SOP form $f(A,B,C)=AC+BA+BC$ [7]
(b) Convert the given expression in standard POS form $Y=A.(A+B+C)$ [7]

OR

6. Find the complement of the following Boolean functions and reduce them to minimum number of literals.
a) $(b c' + a' d) (ab' + cd')$ [7]
b) $(b' d + a' b c' + a c d + a' b c)$ [7]

SECTION-IV

7. Simplify the following Boolean functions, using Karnaugh maps:
i. $F(w, x, y, z) = \sum m(11, 12, 13, 14, 15)$ [7]
ii. $F(A, B, C, D) = \sum m(0, 2, 4, 5, 6, 7, 8, 10, 13, 15)$ [7]

OR

8. (a) Draw the multiple-level NAND circuit for the following expression: $w(x + y + z) + xyz$

- (b) Draw a logic diagram using only two-input NOR gates to implement the following function: $F(A, B, C, D) = (A \oplus B)'(C \oplus D)$

SECTION-V

- 9.(a) Design full-adder using half adders.
(b) Realize full adder using two half adders and logic gates.

OR

10. (a) Draw the logic diagram of a JK flip-flop and using excitation table explain its operation
(b) Convert the JK flip into T flip-flop

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II B. Tech I Semester Regular Examinations, Nov 2019

ANALOG & DIGITAL ELECTRONICS

(Common to CSE & IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1(a). Find the value of D.C. resistance and A.C resistance of a Ge junction diode at 25°C with reverse saturation current, $I_o = 25\mu A$ and at an applied voltage of 0.2V across the diode. [7]

(b) Explain about Zener Diode characteristics [7]

OR

2. Explain the operation of PN Junction Diode with neat diagrams? [14]

SECTION-II

3.(a) Based on the currents flowing through a BJT illustrate the amplification process. [7]

(b) In a germanium transistor collector current is 51mA, when base current is 0.04mA. If $h_{fe} = \beta_{dc} = 51$, Calculate cut off current, I_{CEO} . [7]

OR

4. (a) Draw the circuit diagram of a transistor in CB configuration and explain the output characteristics with the help of different regions. [7]

(b) Compare CB, CC, and CE configurations. [7]

SECTION-III

5. Implement the following Boolean function using minimum number of basic gates. [14]

(a) $(AB + AB')(AB)'$

(b) $[(ABD(C + D + E)) + (A + DBC)'](ABC + (CAD)')$

OR

6. (a) Express the following numbers in decimal: [7]

(i) $(26.24)_8$

(ii) $(16.5)_{16}$

(b) Convert the following number to Hexadecimal: [7]

i) $(735.5)_8$

ii) $(1011011)_2$

SECTION-IV

7. Simplify the following Boolean functions, using Karnaugh maps:

i. $F(x, y, z) = \sum(2, 3, 6, 7)$

ii. $F(A, B, C, D) = \sum(2, 3, 6, 7, 12, 13, 14)$ [14]

OR

8.(a) Draw the multiple-level NOR circuit for the following expressions: [7]

$CD(B + C)A + (BC' + DE')$

(b) Simplify and implement the following function with two-level NAND gate circuit: [7]

$F(A, B, C, D) = A'B'C'D + CD + AC'D$

SECTION-V

9.(a) Define decoder. Construct 3x8 decoder using logic gates and truth table. [7]

(b) Define an encoder. Design octal to binary encoder. [7]

OR

10. (a) Convert JK flip-flop to T flip-flop b) Convert RS flip-flop to D flip-flop [7]

(b) What is the drawback of JK flip-flop? How is it eliminated in Master Slave flip-flop? Explain. [7]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester Regular Examinations, Nov 2019

ANALOG & DIGITAL ELECTRONICS

(Common to CSE & IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1. Draw the basic structure of PN Junction Diode and explain its operation and V-I Characteristics [14]

OR

2. (a) Explain the V-I characteristics of Zener diode ? [7]

(b) Distinguish between Avalanche and Zener Break downs. [7]

SECTION-II

3. (a) Explain the input and output characteristics of a transistor in CC configuration [7]

(b) Calculate the collector current and emitter current for a transistor with $\alpha_{D.C.} = 0.99$ and $I_{CBO} = 50 \mu A$ when the base current is $20 \mu A$ [7]

OR

4. (a) Summarize the salient features of the characteristics of BJT operatives in CE, CB and CC configurations. [7]

(b) Calculate the collector current and emitter current for a transistor with $\alpha_{D.C.} = 0.99$ and $I_{CBO} = 20 \mu A$ when the base current is $50 \mu A$. [7]

SECTION-III

5. (a) Find the complement and dual of the given function: $XY + X(WZ + WZ')$ [7]

(b) Convert the following numbers to Binary [7]

(i) $(27.315)_{10}$

(ii) $(68BE)_{16}$

OR

6. (a) Reduce the following Boolean function to four literals and draw the logic diagram:

$(A' + C)(A' + C')(A + B + C'D)$ [7]

(b) Convert the following numbers to Octal:

(i) $(1010.1010)_2$

(ii) $(FAFA)_{16}$ [7]

SECTION-IV

7. (a) Reduce the following function using k-map technique $F(A, B, C, D) = \pi(0, 2, 3, 8, 9, 12, 13, 15)$ [7+7]

(b) Minimize the expression using k-map $y = (A + B + C') (A + B + C) (A' + B' + C') (A' + B + C) (A + B + C)$

OR

8. Simplify the following Boolean expressions using K-map and implement it by using NOR gates. [14]

a) $F(A, B, C, D) = AB'C' + AC + A'CD'$

b) $F(W, X, Y, Z) = w'x'y'z' + wxy'z' + w'x'yz + wxyz$

SECTION-V

9. (a) Convert D flip-flop into T and JK flip-flops. [7]

(b) Implement a full adder using 8X1 multiplexer. [7]

OR

10. (a) Design a 1:8 demultiplexer using two 1:4 demultiplexer. [3]

(b) Convert JK flip-flop into D flip-flop [4]

(c) Construct a 5-to-32-line decoder with four 3-to-8-line decoders with enable and a 2-to-4 line decoder. Use block diagrams for the components. [7]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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II B. Tech I Semester Regular Examinations, Nov 2019

ANALOG & DIGITAL ELECTRONICS

(Common to CSE & IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1(a) Explain semi-conductors, insulators and metals classification using energy band diagrams. [7]
(b) Explain in detail the break down mechanisms in a diode. [7]

OR

- 2 (a) Explain the working of pn diode in forward and reverse bias conditions [7]
(b) Draw and explain VI characteristics of Si & Ge diode. [7]

SECTION-II

3. (a) Draw the circuit diagram of a transistor in CB configuration and explain the output characteristics with the help of different regions. [7]
(b) Explain the working of a PNP transistor with a neat diagram [7]

OR

- 4 (a) Explain the working of a NPN transistor. [7]
(b) Derive an expression between transistor parameters (α , β , γ)? [7]

SECTION-III

- 5.(a) Implement all logic gates using NAND gates. [4]
(b) Write the following Boolean expression in product of sums form: $a'b + a'c' + abc$ [4]
(c) Find the dual and complement of the following function: $A'BD' + B'(C'+D') + A'C$ [6]

OR

- 6.(a) Obtain the 1's and 2's complements of the following binary numbers: [7]
(i) 00010000 (ii) 00000000 (iii) 11011010 (iv) 10101010
(v) 10000101 (vi) 11111111
(b) Write the following Boolean expressions in sum of products form: $(b + d)(a' + b' + c)$ [7]

SECTION-IV

- 7.(a) Simplify the following using K- map and implement the same using NAND gates. [7+7]
 $Y(A, B, C) = \sum(0, 2, 4, 5, 6, 7)$
(b) Implement the following Boolean function with only two input NAND gates: $F = (AB' + D')E + C(A' + B')$

OR

- 8.(a) Simplify the following Boolean function with the don't conditions d using Kmap method: [7+7]
 $F(A, B, C, D) = \sum(1, 3, 8, 10, 15)$; $d(A, B, C, D) = \sum(0, 2, 9)$
(b) Implement the following Boolean function with only two input NOR gates: $F = (AB' + CD')E + BC(A + B)$

SECTION-V

- 9.(a) Define decoder. Construct 3x8 decoder using logic gates and truth table. [7]
(b) Define an encoder. Design octal to binary encoder. [7]

OR

10. (a) Convert JK flip-flop to T flip-flop b) Convert RS flip-flop to D flip-flop [7]
(b) What is the drawback of JK flip-flop? How is it eliminated in Master Slave flip-flop? Explain. [7]

Code No: R18A0503**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****Model papers for II B.Tech I Semester****Data structures****(IT)**

Roll No									
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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1(a) What is a Data structures? Explain various types with example. [7M]
 (b) Explain various operations on single linked list. Explain each with a neat sketch [7M]

OR

2. Write a C++ program to implement Circular linked list ADT. [14M]

SECTION-II

- 3(a) Explain Queue data structure with neat diagrams? [7M]
 (b) Write a C++ program for Static implementation of Queue ADT [7M]

OR

- 4(a) Explain Stack data structure with neat diagrams [7M]
 (b) Write a C++ program for Static implementation of Stack ADT [7M]

SECTION-III

- 5 Explain the technique of bubble sort. Sort the following elements using bubble sort. 98, 56, 12, 23, 86, 29, 42, 34, 67. and write a C++ program to implement bubble sort [14M]

OR

- 6 Explain selection sort ? Sort the following elements using selection sort. 98, 56, 12, 23, 86, 29, 42, 34, 67 and Write a C++ program to implement selection sort. [14M]

SECTION-IV

- 7 Explain the ways of implementing dictionaries and give applications of dictionaries [14M]

OR

- 8 What is a collision? What are various collision resolution techniques and Give the characteristics of Good hashing function [14M]

SECTION-V

- 9(a) What is a B-Tree? Construct a B-tree of order 3 for the following elements: 25, 10, 20, 30, 35, 80, 40, 50, 60, 82, 70, 90, 85, 93.. [7M]
 (b) Explain insertion, deletion in Binary search trees. [7M]

OR

- 10(a) Explain threaded binary trees [7M]
 (b) Prove that height of AVL tree with n elements is $O(\log(n))$. [7M]

Code No: R18A0503**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****Model papers for II B.Tech I Semester****Data structures****(CSE & IT)**

Roll No									
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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1(a) Write a C++ program to implement Doubly linked list ADT **[7M]**

OR

2(a) What is a linked list? what are various types of linked lists **[7M]**

(b) Write the ADT of linear list **[7M]**

SECTION-II

3(a) What are priority Queues? What are the applications of priority Queue **[7M]**

(b) What is a heap? Explain various types of heaps? **[7M]**

OR

4(a) Implement priority Queue using heap **[7M]**

(b) Explain heap sort with an example **[7M]**

SECTION-III

5(a) What is an external sort? Explain external sorting model **[7M]**

(b) Construct Max heap and Min heap for the following instance:
12,5,65,2,33,24,89,23,25,15,17,38,48,23 **[7M]**

OR

6(a) Explain different types of graph representation? **[7M]**

(b) Explain BFS and DFS with examples **[7M]**

SECTION-IV

7(a) What is double hashing? Compare: Quadratic probing and double hashing **[7M]**

(b) What is rehashing? Explain in detail **[7M]**

OR

8(a) Explain Quick sort ? Sort the following elements using Quick sort. 98 ,56 ,12 ,23, 86, 29,42, 34, 67 **[7M]**

(b) Write a C++ program to implement Quick sort **[7M]**

SECTION-V

9 What is a balanced tree? Give various types of balance trees. Discuss in detail **[14M]**

OR

10 What is an AVL Tree? Construct an AVL tree for the following elements: 2,10,12,3,35,8,40,5,60,18,7,90,28,93 and then delete 5,18 **[14M]**

Code No: R18A0503**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****Model papers for II B.Tech I Semester****Data structures****(CSE & IT)**

Roll No									
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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1(a) What is ADT? Write an ADT for linear list [7M]
(b) Explain various operations on doubly linked list. Explain each with a neat sketch [7M]

OR

- 2 Write a C++ Program to implement singly Linked list [14M]

SECTION-II

- 3 Write C++ program to implement stacks using Linked list [14M]

OR

- 4 Write C++ program to implement Queues using Linked list [14M]

SECTION-III

- 5(a) Write a C++ program to implement Linear Search [7M]
(b) Write a C++ program to implement Binary search [7M]

OR

- 6 Explain the following traversal methods in detail [14M]
a)DFS b)BFS

SECTION-IV

- 7 What is Dictionary? Write C++ code for implementation of Dictionary with Single linked list. [14M]

OR

- 8 Explain the ways of implementing dictionaries and give applications of dictionaries [14M]

SECTION-V

- 9(a) Explain insertion, deletion and searching in AVL tree [14M]

OR

- 10 What is a B-Tree? Construct a B-tree of order 3 for the following elements: 25,10,20,30,35,80,40,50,60,82,70,90,85,93 [14M]

Code No: R18A0503**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****Model papers for II B.Tech I Semester****Data structures****(CSE & IT)**

Roll No									
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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1 Write a C++ Program to implement Doubly Linked list [14M]

OR

2 Write a C++ Program to implement Singly Linked list [14M]

SECTION-II

3(a) What is a heap? Explain various types of heaps?. [7M]

(b) Write a C++ program to evaluate postfix expression [7M]

OR

4(a) Write C++ program to implement Stack using Linked list [7M]

(b) What are priority Queues? What are the applications of priority Queue [7M]

SECTION-III

5 Compare and Contrast all external sorting techniques and give applications of each of them. [14M]

OR

6 Explain the technique of bubble sort. Sort the following elements using bubble sort. 98, 56, 12, 23, 86, 29, 42, 34, 67 and Write a c++ program to implement bubble sort. [14M]

SECTION-IV

7(a) What is a skip list? Give its representation and write various operations that can be performed [7M]

on skip list in detail

(b) Differentiate between skip list and linked list [7M]

OR

8(a) Explain the problem associated with linear probing [7M]

(b) Explain Quadratic Probing in detail. [7M]

SECTION-V

9 Explain insertion, deletion and searching in BST tree [14M]

OR

10 What is a balanced tree? Give various types of balance trees. Discuss in detail [14M]

Code No: R18A506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Model Question Paper

Discrete Mathematics

(IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1(a) Obtain POS of the following formulas [7M]

$$(i) (P \wedge Q \wedge R) \vee (\sim P \wedge R \wedge Q) \vee (\sim P \wedge \sim Q \wedge \sim R)$$

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

(b) Show that $\sim p$ follows from the set of premises $(r \rightarrow \sim q), r \vee s, s \rightarrow \sim q, p \rightarrow q$ using indirect method of proof [7M]

OR

2(a) Explain different logical connectives in mathematical logic [4M]

(b) Show that the following implication without constructing truth table [10M]

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

$$(ii) p \rightarrow q \Rightarrow p \rightarrow p \wedge q$$

SECTION-II

3(a) 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 [7M]

(b) Let $X = \{1, 2, 3, 4\}$. Define a function $f: X \rightarrow X$ such that $f \neq I_X$ and is One – On. Find $f^2, f^3, f^1, f \circ f^1$ [7M]

OR

4(a) Explain Multinomial Theorem? Find the coefficient of $X^2 Y^2 Z^2$ in $(2X - 3Y + 5Z)^{10}$ [7M]

(b) What is the coefficient of $x^3 y^7$ in (a) $(x+10)^{10}$ (b) $(2x-9y)^{10}$ [7M]

SECTION-III

5(a) Find all the properties that satisfies for the following algebraic systems under the binary operations 'X' and '+'. [7M]

(a) Odd integer (b) All positive integers

(b) Find the generating functions for $a_r =$ the number of non negative integral solutions of $e_1 + e_2 + e_3 = r$ where $0 \leq e_1 \leq 3, 2 \leq e_2 \leq 6, e_3$ is odd and $1 \leq e_3 \leq 9$ [7M]

OR

6(a) Illustrate pigeon hole principle and its applications [7M]

(b) How many different arrangements of the word MISSISSIPPI, MATHEMATICS [7M]

SECTION-IV

7 Solve the recurrence relation using generating function $a_n - 6a_{n-1} = 0$ for $n \geq 1$ where $a_0 = 1$ [14M]

OR

8 Solve the recurrence relation of Fibonacci series [14M]

SECTION-V

9(a) Define Cycle? [7M]

(b) Apply DFS algorithm to form the spanning tree by taking own graph. [7M]

OR

- 10** Explain the following **[14M]**
- (a) Isomorphism and sub graphs
 - (b) Hamilton Paths
 - (c) Planar Graph
 - (d) Dual of a planar graph

Code No: R18A506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Model Question Paper

Discrete Mathematics

(IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 Using automatic theorem $(PVQ) \wedge (Q \rightarrow R) \wedge (P \rightarrow M) \Rightarrow (R \vee M)$ [14M]

OR

- 2(a) Define bound and free variable with one example [7M]
 (b) Define predicate with one example [7M]

SECTION-II

- 3(a) Verify and Explain the following relation R on $X = \{1, 2, 3, 4\}$ is equivalence relation or not $R = \{(1, 1), (1, 4), (4, 1), (2, 2), (3, 4), (3, 3), (3, 2), (4, 3), (4, 4)\}$ [7M]
 (b) Define Lattices and sub lattices. Give an example for each. [7M]

OR

- 4(a) Discuss about types of functions with an example for each. [7M]
 (b) For $f(x) = 2x + 3$ and $g(x) = -x^2 + 1$, find the composite function defined by $(f \circ g)(x)$, $f \circ g(3)$, $g \circ f(x)$, $g \circ f(3)$. [7M]

SECTION-III

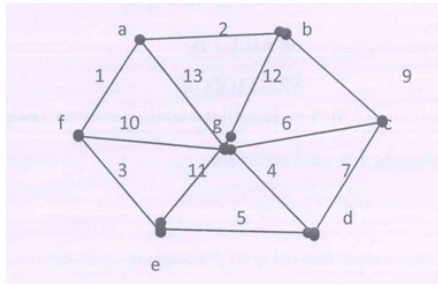
- 5(a) In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and other 3 will have 5 books each. [7M]
 (b) Using multinomial theorem, expand $(2X - 3Y + 4Z)^3$ [7M]
 OR
 6(a) Define the following terms (i) Group (ii) Abelian Group (iii) Semi Group (iv) Sub Group [7M]
 (b) Determine the number of integer between 1 and 10,000,000 have the sum of digits equal to 18 [7M]

SECTION-IV

- 7 Solve the recurrence relation $a_n - 7a_{n-1} + 12a_{n-2} = 0$ for $n \geq 2$ where $a_0 = 1$, $a_1 = 2$ [14M]
 OR
 8 find the generating function of $n^2 + n$ [14M]

SECTION-V

- 9(a) State and prove Eulers formula [7M]
 (b) Prove K_4 is planar. [7M]
 OR
 10 Find the minimum spanning tree of the following graph. [14M]



Code No: R18A506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Model Question Paper

Discrete Mathematics

(IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1(a) Show that 't' is a valid conclusion from the following premises $p \rightarrow q$, $q \rightarrow r$, $r \rightarrow s$, $\sim s$ and $p \wedge t$ [10M]
- (b) Prove that $(\Box x)(P(x) \wedge Q(x)) \Rightarrow (\Box x)(P(x) \wedge (\Box x)(Q(x)))$ [4M]

OR

- 2(a) Define Quantifiers and types of Quantifiers with examples. [7M]
- (b) Define Maxterms & Minterms of P & Q & give their truth tables [7M]

SECTION-II

- 3(a) Let A be a given finite set and P(A) its power set. let \subseteq be the inclusion relation on the elements of P(A). Draw the Hass diagram of (P(A), \subseteq) for i) $A = \{a\}$ ii) $A = \{a, b\}$ [7M]
- (b) Define an equivalence relation? If R be a relation in the set of integers Z defined by $R = \{(x, y) : x \in Z, y \in Z, (x - y) \text{ is divisible by } 6\}$. then prove that R is an equivalence relation? [7M]

OR

- 4(a) Let $A = \{1, 2, 3, 4, 5, 6, 7\}$. determine a relation R on A by $aRb \Leftrightarrow 3 \text{ divides } (a - b)$. show that R is an equivalence relation? [7M]
- (b) Define Bijective function with an 2 examples [7M]

SECTION-III

- 5(a) Show that every homomorphic image of an abelian group is abelian. [7M]
- (b) Prove that the set Z of all integers with the binary operation *, defined as $a * b = a + \Box b + \Box 1$, $\Box a, b \in Z$ is an abelian group. [7M]

OR

- 6(a) Define product rule? State Binomial theorem? Define permutation? Find the coefficient of (i) $x^3 y^2 z^2$ in $(2x - y + z)^9$. (ii) $x^6 y^3$ in $(x - 3y)^9$. [7M]
- (b) Out of 80 students in a class, 60 play foot ball, 53 play hockey, and 35 both the games. How many students (i) do not play of these games. (ii) play only hockey but not foot ball [7M]

SECTION-IV

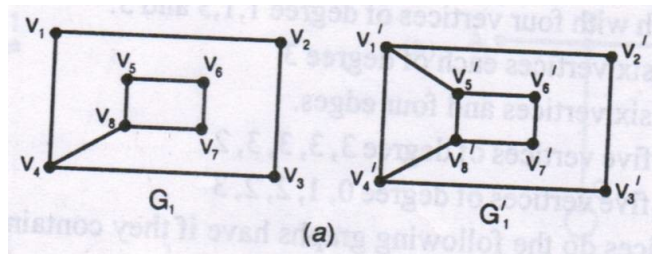
- 7(a) Solve $a_n - 4a_{n-1} + 4a_{n-2} = (n+1)^2$ given $a_0 = 0$, $a_1 = 1$. [7M]
- (b) Solve $a_n - 5a_{n-1} + 6a_{n-2} = 2n$, $n > 2$ with condition the initial $a_0 = 1$, $a_1 = 1$. Using generating function. [7M]

OR

- 8(a) Solve the recurrence relations [7M]
- a) $d_n = 2d_{n-1} - d_{n-2}$ with initial conditions $d_1 = 1.5$ and $d_2 = 3$. [5M]
- b) $b_n = 3b_{n-1} - b_{n-2}$ with initial conditions $b_1 = -2$ and $b_2 = 4$.

SECTION-V

- 9(a) Is the following pairs of graphs are isomorphic or not? [7M]



- (b) Define Spanning tree and explain the algorithm for Breadth First Search (BFS) traversal of a graph with suitable example [7M]

OR

- 10(a) Suppose a graph has vertices of degree 0, 2, 2, 3 and 9 . How many edges does the graph have? [7M]

- (b) Explain In degree and out degree of graph. Also explain about the adjacency matrix representation of graphs. Illustrate with an example? [7M]

Code No: R18A506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Model Question Paper

Discrete Mathematics

(IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1(a) Show that S is a valid conclusion from the premises $p \rightarrow q$, $p \rightarrow r$, $\neg(q \wedge r)$ and $(S \vee p)$ [7M]
- (b) Show that $(\exists x) M(x)$ follows logically from the premises $(\forall x)(H(x) \rightarrow M(x))$ and $(\exists x) H(x)$ [7M]

OR

- 2(a) Use indirect method of proof to prove that $(\forall x)(P(x) \vee Q(x)) \Rightarrow (\forall x)P(x) \vee (\exists x)Q(x)$ [7M]
- (b) Show that $R \wedge (P \vee Q)$ is a valid conclusion from the premises $P \vee Q$, $Q \rightarrow R$, $P \rightarrow M$ and $\sim M$ [7M]

SECTION-II

- 3(a) Define an equivalence relation? If R be a relation in the set of integers Z defined by $R = \{(x, y) : x \in Z, y \in Z, (x - y) \text{ is divisible by } 6\}$. then prove that R is an equivalence relation? [7M]
- (b) Let $f: A \rightarrow B$, $g: B \rightarrow C$, $h: C \rightarrow D$ then prove that $h \circ (g \circ f) = (h \circ g) \circ f$ [7M]
- OR
- 4(a) Define Bijective function, inverse function with an 2 examples [7M]
- (b) Let $A = \{1, 2, 3, 4, 5, 6, 7\}$. determine a relation R on A by $aRb \Leftrightarrow 3 \text{ divides } (a - b)$, show that R is an equivalence relation? [7M]

SECTION-III

- 5(a) A survey among 100 students shows that of the three ice cream flavors Vanilla, chocolate, straw berry . 50 students like vanilla, 43 like chocolate, 28 like straw berry, 13 like vanilla and chocolate, 11 like chocolate and straw berry, 12 like Straw berry and vanilla and 5 like all of them. Find the following. [7M]
- Chocolate but not straw berry
 - Chocolate and straw berry but not vanilla
 - Vanilla or Chocolate but not strawberry
- (b) Show that the set $\{1, 2, 3, 4, 5\}$ is not a group under addition & multiplication modulo 6 [7M]

OR

- 6(a) Show that if 8 people are in a room, at least two of them have birthdays that occur on the same day of the week. [7M]
- (b) Applying pigeon hole principle show that of any 14 integers are selected from the set $S = \{1, 2, 3, \dots, 25\}$ there are at least two whose sum is 26. Also write a statement that generalizes this result. [7M]

SECTION-IV

- 7(a) Solve the following $y_{n+2} - y_{n+1} - 2y_n = n^2$. [7M]

(b) Solve $a_n - 4a_{n-1} + 4a_{n-2} = (n+1)^2$ given $a_0 = 0$, $a_1 = 1$. [7M]

OR

8(a) Find the sequence generated by the following generating functions [7M]
(i) $(2x - 3)^3$ (ii) $x^4/(1-x)$

(b) Using generating function solve $a_n = 3a_{n-1} + 2$, $a_0 = 1$. [7M]

SECTION-V

9(a) Define the following graph with one suitable examples for each graphs [7M]
(i) complement graph (ii) sub graph (iii) induced sub graph (iv) spanning sub graph

(b) Explain about complete graph and planar graph with an example [7M]

OR

10(a) Show that in any graph the number of odd degree vertices is even. [7M]

(b) Define Euler circuit, Hamilton cycle, Wheel graph, Chromatic number. Find the chromatic number for $K_{3,3}$ [7M]

Code No: R18A1201

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester, Nov 2019****COMPUTER ORGANIZATION AND ARCHITECTURE****Department of Information Technology**

Roll No									
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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1(a) Explain Von Neumann architecture with suitable diagrams. [6M]
(b) What is a digital computer? Explain various types of computers? What are various components and it's functioning [9M]

OR

- 2(a) Show the step-by-step multiplication process using Booth algorithm when (-9) and (-13) are multiplied. Assume 5 bit registers to hold signed numbers and (-9) to be the multiplicand. [14M]

SECTION-II

- 3(a) Define register transfer language. Explain the instructions with suitable examples. [14M]
OR
4(a) Differentiate between Hard-wired controlled and Microprogrammed controlled microinstructions. [14M]

SECTION-III

- 5(a) Explain briefly about the direct mapping cache organization [14M]
OR
6(a) Comprehend the cache replacement algorithms. [14M]

SECTION-IV

- 7(a) Differentiate between interrupts and exceptions. Explain how processor responds to an interrupt [14M]
OR
8(a) Discuss USB device and electrical characteristics. [14M]

SECTION-V

- 9(a) What is pipelining? Name the two pipeline organizations. Explain about the arithmetic pipeline with the help of an example. [14M]
OR
10(a) Discuss about Flynn classification of parallel process systems. [14M]

Code No: R18A1201

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester, Nov 2019****COMPUTER ORGANIZATION AND ARCHITECTURE****Department of Information Technology**

Roll No									
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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1(a) Explain Von Neumann architecture with suitable diagrams. [4M]
 (b) Explain the circuit arrangement that implements for restoring binary division. [10M]

OR

- 2(a) Draw the flowchart for Booth's algorithm for multiplication of signed 2's complement numbers and explain with an example. [14M]

SECTION-II

- 3(a) Explain interrupt driven I/O method of data transfer technique for I/O module [14M]

OR

- 4(a) Explain in detail about the organization of microprogram sequencer and how it is used for address sequencing in a microprogrammed control unit. [14M]

SECTION-III

- 5(a) Explain briefly about memory hierarchy. [14M]

OR

- 6(a) Illustrate the implementation of static memories. [14M]

SECTION-IV

- 7(a) What is DMA? Explain the DMA transfer using neat diagram. [14M]

OR

- 8(a) Explain parallel interface circuit for connecting simple input device. [14M]

SECTION-V

- 9(a) What is instruction pipelining ? Explain six stage instruction pipelining with timing diagram [14M]

OR

- 10(a) Explain different types of hazards in instruction pipelining. Explain cache coherency [14M]

Code No: **R18A1201****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester, Nov 2019****COMPUTER ORGANIZATION AND ARCHITECTURE****Department of Information Technology**

Roll No									
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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1(a) Explain fixed point representation (Integer). [6M]
 (b) What is a digital computer? Explain various types of computers? What are various components and it's functioning [9M]
 OR
 2(a) Explain ripple carry adder circuit. [14M]

SECTION-II

- 3(a) Explain Instruction set architecture of a CPU [14M]
 OR
 4(a) Differentiate between Hard-wired controlled and Microprogrammed controlled microinstructions. [7M]
 (b) Explain different addressing modes [7M]

SECTION-III

- 5(a) Explain briefly about the memory organization & Memory interleaving [14M]
 OR
 6(a) Comprehend the cache replacement algorithms. [14M]

SECTION-IV

- 7(a) What is DMA? Explain the DMA transfer using neat diagram. [14M]
 OR
 8(a) Explain I/O Transfers program controlled and interrupt driven. [14M]

SECTION-V

- 9(a) What is pipelining? Name the two pipeline organizations. Explain about the arithmetic pipeline with the help of an example. [14M]
 OR
 10(a) Discuss about concurrent access to memory and coherency. [14M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**(Autonomous Institution – UGC, Govt. of India)****MODEL QUESTION PAPER****OPERATING SYSTEMS****(CSE& IT)**

Roll No									
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Time: 3 hours**Max. Marks: 70****Note:** Question paper Consists of 5 SECTIONS (One SECTION for each UNIT).Answer **FIVE** Questions, Choosing **ONE** Question from each SECTION and each Question carries 14 marks.**SECTION – I****1)** What is a system call? Explain different types of system calls. **(14M)****OR****2)** What is operating system? Give the view of OS as a resource manager **(14M)****SECTION – II****3)** Explain about various multithreading models and Thread libraries. **(14M)****OR****4)** What is FCS Scheduling algorithm? Explain SJF Algorithm with a neat gantt chart. **(14M)****SECTION – III****5)** What is Semaphore? Discuss in detail about the classical problems of synchronization. **(14M)****OR****6)** Describe in detail about the deadlock prevention methods. **(14M)****SECTION – IV****7)** Explain in detail about the structure of the page table. **(14M)****OR****8)** What is Copy on Write? Describe in detail about memory mapped Files. **(14M)****SECTION – V****9)** Explain the concept of FCFS, SSTF disk scheduling algorithms in detail. **(14M)****OR****10)** Describe in detail about the file system implementation. **(14M)**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**(Autonomous Institution – UGC, Govt. of India)****MODEL QUESTION PAPER****OPERATING SYSTEMS****(CSE & IT)**

Roll No									
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Time: 3 hours**Max. Marks: 70****Note:** Question paper Consists of 5 SECTIONS (One SECTION for each UNIT).Answer **FIVE** Questions, Choosing **ONE** Question from each SECTION and each Question carries 14 marks.**SECTION – I****d**1) Describe in detail about the OS Services. **(14M)****OR**2) What is the concept of virtual machine and illustrate it with UNIX as case study. **(14M)****SECTION – II**3) Define Process. Discuss in detail about PCB and context switching in the states of process. **(14M)****OR**4) What is Scheduling? Explain in detail about the Real Time Scheduling. **(14M)****SECTION – III**5) What is Critical section Problem and list the requirements to solve it. Write Peterson's Solution for the same. **(14M)****OR**6) What is deadlock? List the conditions that lead to deadlock. Enumerate and explain in detail about the methods for handling deadlock. **(14M)****SECTION – IV**7) Write Short notes on: 1. Address Binding 2. Logical versus Physical Address Space 3. Swapping 4. Dynamic linking and Shared Libraries **(14M)****OR**8) Define demand paging? Explain in detail about the concept and performance of demand paging. **(14M)****SECTION – V**9) Describe in detail about the polling, interrupts and DMA with respect to I/O hardware. **(14M)****OR**10) Explain various methods of allocating disk space to the files **(14M)**

Code No: R18A0504

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**(Autonomous Institution – UGC, Govt. of India)****MODEL QUESTION PAPER****OPERATING SYSTEMS****(CSE & IT)**

Roll No									
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Time: 3 hours**Max. Marks: 70****Note:** Question paper Consists of 5 SECTIONS (One SECTION for each UNIT).Answer **FIVE** Questions, Choosing **ONE** Question from each SECTION and each Question carries 14 marks.**SECTION – I****1) Discuss about the various generation and types of Operating systems (14M)****OR****2) How is layered operating system structured? Compare and contrast on Monolithic and microkernel operating systems (14M)****SECTION – II****3) Describe the various states of Threads in detail. (14M)****OR****4) What is a scheduling objective? Describe the pre-emptive and non-preemptive scheduling algorithms with an illustrative example. (14M)****SECTION – III****5) Define Racing Condition. Describe a hardware solution to avoid racing condition. (14M)****OR****6) Enumerate the necessary and sufficient conditions for the deadlock and describe the Banking Algorithm. (14M)****SECTION – IV****7) Define Paging. Describe the principle of operation of paging in detail. (14M)****OR****8) Consider the page reference string 1,3,4,0,5,3,2,1,0,4,5,2. How many page faults occur for the LRU and Optimal replacement algorithms with 4 frames each? (14M)****SECTION – V****9) Explain the different file access methods. (14M)****OR****10) Describe the scheduling methods a. FCFS b. C-SCAN (14M)**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**(Autonomous Institution – UGC, Govt. of India)****MODEL QUESTION PAPERS PAPERS****OPERATING SYSTEM****(CSE & IT)**

Roll No									
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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1.(a) Define an operating system? State and explain the basic functions or services of an operating system?

(b) Explain briefly system calls with examples [7M]

OR

2.(a) Explain the process state transition diagram with examples. [7M]

(b) Discuss the following process, program, process state, process control block, and process scheduling?

SECTION-II

3.(a) Describe process scheduling? **Explain** the various levels of scheduling. [7M]

(b) Distinguish pre-emptive and non-pre-emptive scheduling algorithms? [7M]

OR

SECTION-III

5.(a) Explain in detail the requirements that memory management technique needs to satisfy? [7M]

(b) Explain [7M]

- (i) Paging
- (ii) Page table structure
- (iii) Translation look-aside buffer
- (iv) Segmentation

OR

6. (a) Describe contiguous memory allocation concept with advantages and disadvantages? [7M]
(b) Describe the following? [7M]
(i) Virtual Memory
(ii) Cache Memory
(iii) Auxiliary Memory

SECTION-IV

7. (a) Consider the following reference string [7M]
7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1. Assume there are three frames. Apply LRU replacement algorithm to the reference string above and find out how many page faults are produced. Illustrate the LRU page replacement algorithm in detail and also two feasible implementations of the LRU algorithm.
b) Explain about Swapping. [7M]

OR

8. Explain in detail about file system structure and implementation [14M]

SECTION-V

- 9.(a) How deadlock detected and recovered? explain in detail with relevant example [7M]
(b) Discuss in detail the technique of deadlock avoidance? [7M]

OR

- 10.(a) Describe the terms. [7M]
a. Race condition
b. Atomic transaction
c. Critical section
d. Mutual exclusion
(b) Explain about the bankers algorithm for deadlock avoidance. [7M]