K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
IV SEMESTER (R15)
Branch: ECE
Model Paper
Subject: **PROBABILITY THEORY & STOCHASTIC PROCESSES**

Time: 3 Hours   Max.Marks:70

Answer any five questions, choosing one question from each unit.
All questions carry equal marks.

UNIT-1

1. (a) Explain the different methods to define the probability. Derive the Total
         probability expression and define Bayes theorem.
    (b) An elementary binary communication system consists of a transmitter and
        receiver. The channel occasionally causes errors to occur. The probabilities that
        the symbols 1 and 0 are selected are $P(B_1)$=0.6 and $P(B_2)$=0.4. The conditional
        probabilities are $P(A_1/B_1)$=0.9, $P(A_2/B_1)$=0.1, $P(A_1/B_2)$= 0.1 and $P(A_2/B_2)$= 0.9.
        Determine the total probabilities and Bayes theorem probabilities.

OR

2. (a) Define a random variable. Write conditions for a function to be a random
         variable.
    (b) Find a constant b>0 so that the function
$$f_X(x) = \begin{cases} e^{3x/4}, & 0 \le x \le b \\ 0, & elsewhere \end{cases}$$
        is a valid probability density.

UNIT-II

3. (a) Explain the moments about the origin and mean.
    (b) Find the variance of X, skew and coefficient of skewness for the exponential
         density function.

OR

4. (a) Explain the transformation of a discrete random variable.
    (b) A random variable X is uniformly distributed on the interval $(-\pi/2,\pi/2)$. X is
        transformed to the new random variable Y=T(X)= atan(X), where a>0, find the
        probability density function of Y.

UNIT-III

5. (a) Define the joint density function and list out its properties.

    (b) Find a constant b (in terms of a) so that the function

$$f_{X,Y}(x, y) = \begin{cases} be^{-(x+y)}, & 0 \le x \le a \text{ and } 0 < y < \infty \\ 0, & elsewhere \end{cases}$$ is a valid joint probability density.

OR

6. (a) Statistically independent random variables X and Y have respective densities

$f_X(x) = 5u(x)e^{-5x}$ *and* $f_Y(y) = 2u(y)e^{-2y}$. Find the density function of the sum W=X+Y.

(b) State and Prove the Central Limit Theorem.

UNIT-IV

7. (a) Explain Time Averages and Ergodocity.

(b) State and prove the properties of Auto correlation function.

OR

8. (a) Explain the relationship between the cross-correlation function and the cross power spectral density.

(b) Find the power spectrum and average power of the response of the LR network where X(t) is white noise for which $S_{XX}(\omega) = N_0/2$.

UNIT-V

9. (a) Derive an expression for power spectral density of LTI system response.

(b) Explain the relationship between the cross-correlation function and the cross power spectral density.

OR

10. (a) Write about band limited and narrow band processes.

(b) Explain the concept of band limited process and list out its properties.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B.Tech. IV Semester (CSE) (R15) Degree Examinations

(1505402) OPERATING SYSTEMS

Model Question Paper

Max. Time: 3 hrs   **Max. Marks: 70**

Note: Answer any **FIVE** questions choosing **ONE** question from each unit.
      All questions carry **Equal** marks.

UNIT-I

1.   a) What is operating system? What are the different operating system functions ? Explain.
                                    (7M)
     b) Write short notes on distributed systems.
     (7M)

(OR)

2.   a) Explain about Operating system services.
                                    (7M)
     b) Explain the different types of system calls.
        (7M)

UNIT-II

3.   a) What are different states a process can be in? Explain process state diagram in detail.
                                    (7M)
     b) Explain about Peterson's solution?
     (7M)

(OR)

4.   Consider 3 processes P1, P2 and P3, which require 5,7 and 4 time units and arrive   at time
                                0, 1 and 3.
     Draw the Gant chart, process completion sequence and calculate average waiting time for
     i) Round Robin scheduling with CPU time Quantum of 2 time units
     ii) FCFS
     iii) SJF
      (14M)

UNIT-III

5.   **a**) Explain about demand paging.
                                    (7M)
     b) Explain about internal and external fragmentation.
     (7M)

                                    (OR)

6.   Explain about different page replacement algorithms with an example.
                                    (14M)

UNIT-IV

7. a) Explain about deadlock characteristics.
                              (7M)
    b) Explain about Bankers Algorithm.
            (7M)

(OR)

8. a) Explain the different file access methods.
                              (7M)
    b) Write short notes on file sharing and protection.
(7M)

UNIT-V

9. How do we implement access matrix? Explain in detail.   (14M)

(OR)

10. Explain about user authentication.   (14M)

K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B.TECH IV SEM (CSE) (R15) DEGREE EXAMINATION

(1505403) DATABASE MANAGEMENT SYSTEMS
Model Question Paper

Time: 3 Hours   Max.Marks:70

Note: Answer any **FIVE** questions choosing **ONE** question from each unit.
All questions carry **Equal** marks.

UNIT- I

1. a) Explain about the Database System structure.   7M
   b) Write about Database users & administrators.   7M

(OR)

2. Briefly explain about the components in ER model.   14M

UNIT- II

3. a) Write about aggregate functions in SQL.   7M
   b) Write about SQL joins with an example.   7M

(OR)

4. a) What is a trigger?   7M
   b) Write about tuple relational calculus.   7M

UNIT- III

5. What is Normalization? Explain the Normal forms (1NF, 2NF, 3NF, BCNF)
   in detail.   14M

(OR)

6. a) Explain multi valued and join dependencies.   7M
   b) Write about fifth Normal form.   7M

UNIT-IV

7. a) Write about the measures of a query cost.   7M
   b) Explain about query processing steps.   7M

(OR)

8. a) What is transaction? Explain ACID properties of a transaction.   7M
   b) Write about the Serialization of a transaction.   7M

UNIT-V

9. What is a time-stamp? Write about time-stamp based protocol.   14M

(OR)

10. a) Write about failure classification.   7M
    b) What is a log-based recovery?   7M

K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.TECH IV SEM (CSE) (R15) DEGREE EXAMINATION
(1505404) FORMAL LANGUAGES & AUTOMATA THEORY Model Question Paper

Time: 3 Hrs.   Max. Marks: 70

Note: Answer any FIVE questions choosing one question from each unit   All questions carry Equal Marks

UNIT-I

1. a) Describe the following: 4x2=8M
    i) Alphabet, String, Language, Empty String. ii) NFA.
    iii) Transition Diagram.   iv) δ in NFA with ε (Epsilon) moves

  b) Minimize the following FA   6 M

δ	0	1
→ a0	a0	a3
a1	a2	a5
a2	a3	a4
a3	a0	a5
a4	a0	a6
a5	a1	a4
(a)	a1	a3

(OR)

2. a) Compare Moore and Mealy machines.   7 M

  b) Construct a Moore machine to determine residue mod 5 of input treated as a ternaray number?   7 M

UNIT-II

3. Construct a finite automata equivalent to the regular expression   14 M
        $(0+1)*(00+11)(0+1)*$

(OR)

4. a) Write closure properties of regular sets.   7 M

   b) Show that the set L={a^p/p is a prime} is not regular.   7 M

UNIT-III

5. a) Define Context Free Grammar? Give an example.   6 M

   b) Convert the following right linear grammar into equivalent left linear grammar   8 M
        S→bB, B→bC / aB / b, C→a.

(OR)

6. a) Discuss ambiguity in context free grammars   7 M

   b) Explain Chomsky normal form with example.   7 M

UNIT-IV

7. Define PDA? Construct PDA to accept the language   14 M
        L={ $n_a(w) = n_b(w)$ / w∈$(a,b)^*$ }

(OR)

8. Differentiate acceptance by final state and acceptance by empty stack in PDA.   14 M

UNIT-V

9. Define Turing Machine? Design a TM to accept the following language

L= $\{ 0^n1^n \ / \ n \geq 1 \}$ 14 M

(OR)

10. Write short note on:
   i) Post's Correspondence problem.   4 M
   ii) LR (0) Grammar.   4 M
   iii) NP complete and NP hard Problems   6 M

K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B.TECH IV SEM (CSE) (R15) DEGREE EXAMINATION

(1505405) JAVA PROGRAMMING

Model Question Paper

Time: 3 Hrs   Marks: 70

Note: Answer any FIVE questions choosing one question from each unit
        All questions carry Equal Marks

UNIT I

1. a) Write briefly about OOP concepts.   10 M
    b) Write about access control in java.   4 M

OR

2. a) Explain Overloading methods in Java with example program.   7 M
    b) Write briefly about Java buzzwords.   7 M

UNIT II

3. a) Explain Inheritance concept in java with syntax.   7 M
    b) Write a java program for multilevel inheritance.   7 M

OR

4. a) Explain the differences between classes and interfaces with examples.   7 M
    b) Explain about abstract method and abstract class with example.   7 M

UNIT III

5. a) Explain the process of Exception Handling in java.   7 M
    b) Explain user-defined exceptions with example program.   7 M

OR

6. a) Explain thread life cycle.   7 M
    b) Explain about multithreading concept in java with example program.   7 M

UNIT IV

7. a) Write about Mouse and Keyboard events in java.   7 M
    b) Explain button and text components in java.   7 M

OR

8.   Write about Layout manager types in java.   14 M

UNIT V

9. a) Explain differences between applets and applications.   4 M
    b) Explain about the lifecycle of applet.   10 M

OR

10. a) Write about JFrames and JComponents in swings.   7 M
    b) Explain Checkboxes and Radio button in swings with example program.   7 M

K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.TECH IV SEM (CSE) (R15) DEGREE EXAMINATION
(1505406) COMPUTER ORGANIZATION
Model Question Paper

Time: 3 Hours   Max. Marks: 70

Note: Answer any FIVE questions choosing one question from each unit
   All questions carry Equal Marks

UNIT-I

1. a) Explain about various functional units of a computer with its block diagram.   7M
    b) Write short notes on the following
            i) Basic performance equation   3M
            ii) Computer Types   4M

(OR)

2. a) Explain about Fixed point representation in detail.   7M
    b) Explain about Floating point addition and subtraction with suitable example.   7M

UNIT-II

3. Explain in detail about arithmetic logic shift unit with its neat diagram.   14M

(OR)

4. a) Design a 4-bit adder/subtractor using full adder and explain its function.   6M
    b) Briefly explain various addressing modes in detail.   8M

UNIT-III

5. a) Explain about Microprogram sequencer with its neat diagram.   7M
    b) Explain the design of Hardwired control unit.   7M

(OR)

6. Explain about Booth multiplication algorithm with suitable example.   14M

UNIT-IV

7. What is "Cache Memory"? Explain about various mapping procedures.   14M

(OR)

8. Explain the following.
            i)   Virtual Memory   6M
            ii)   DMA Transfer   8M

UNIT-V

9. Write short notes on the following.

    i)   Parallel Processing   7M
    ii)   Pipelining   7M

(OR)

10. Explain the following.
    I)   Arithmetic Pipeline   7M
    ii)   Instruction Pipeline   7M