ASSIGNMENT - 1
M.C.A. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester
M.C.A

PAPER – I - SOFTWARE ENGINEERING

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.

a) Define Software Engineering.

b) What is CMMI?

c) Define Business Process Engineering.

d) What is Data Flow Diagram (DFD)?

e) What is Validation Testing?

f) Define Software Quality.

g) What is Cleanroom Testing?

2.

a) Explain the evolving role of software in modern society and discuss the characteristics of good software.

b) Describe the Prescriptive Process Models and explain the Incremental and Spiral Models with neat diagrams

3.

a) Discuss the Capability Maturity Model Integration (CMMI) framework and explain its maturity levels.

b) Explain the Agile Process Models — Extreme Programming (XP) and Feature-Driven Development (FDD).

ASSIGNMENT - 2
M.C.A. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester
M.C.A

PAPER – I - SOFTWARE ENGINEERING

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.
a) Explain the System Engineering Hierarchy and describe the major components of a computer-based system.
b) Describe the steps involved in Requirement Engineering and the structure of a good SRS document.

2.
a) Discuss the importance of Design Concepts — abstraction, refinement, modularity, and hierarchy.
b) Explain Design Quality Guidelines and discuss how software design is validated for correctness.

3.
a) Explain the Strategic Approach to Software Testing and describe various levels of testing.
b) Discuss the W⁶HH Principle proposed by Barry Boehm for project management and control.

4.
a) Describe White-Box and Black-Box Testing Techniques with suitable examples. b) Explain Process and Project Metrics and their role in improving software quality.

5.
a) Discuss the Decomposition Techniques and provide an example of LOC-based estimation.
b) Explain Software Quality Assurance (SQA) Activities and the role of Formal Technical Reviews (FTRs).

6.
a) Explain Formal Methods and discuss the Object Constraint Language (OCL) with an example.
b) Describe the Cleanroom Software Engineering Process and explain the Box Structure Methodology.

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PAPER – II - COMPUTER NETWORKS

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. a) Use of Computer Networks

   b) Hardware networking

   c) IEEE 802.3.

   d) Wireless LAN

   e) User Datagram protocol

   f) Network layer

   g) Electronic mail

   h) Multi media

2. a) Explain framing methods with examples.

   b) Explain briefly about switching methods

3. a) Briefly 802.3 , 802.11 LANs and their services

   b) Write about design issues of a Data Link layer.

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PAPER – II - COMPUTER NETWORKS

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. a) Give description of network layer design issues.

   b) Give and explain 802.11 frame structure, services

2. a) Network layer in the internet. Explan

   b) Illustrate the subnet technology

3. a) Explain the role of bridges in internet

   b) Discuss about Tunneling and Fragmentation

4. a) Explain Distance Vector Routing Algorithm

   b) Give brief description about internet transport protocol with examples.

5. a) Explain about Domain Name System

   b) Give brief introduction about Electronic Mail.

6. a) Explain Simple network management protocol with examples

   b) Describe about multimedia audio and video with various applications.

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PAPER – III - WEB TECHNOLOGIES

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. a) List any four Java buzzwords.

b) Define dynamic binding.

c) What is the use of the <form> tag in HTML?

d) Define XML Schema.

e) What is a PreparedStatement in JDBC?

f) Define Cookie and mention its purpose.

g) List any two advantages of JSP over Servlets.

2. a) Explain the features of Java that make it platform independent.

   b) Differentiate between abstract class and interface with suitable examples.

3. a) What is event handling? Explain the event delegation model in Java.

   b) Write a Java program using Swing components to create a simple calculator GUI.

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PAPER – III - WEB TECHNOLOGIES

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. a) Explain the use of lists and tables in HTML with examples.

    b) What are frames? Write HTML code to divide a web page into two horizontal frames.

2. a) What is JavaScript? Explain its role in creating dynamic HTML pages.

    b) Write a JavaScript program to validate a user login form (username and password).

3. a) Explain the steps involved in establishing a JDBC connection with a database.

    b) Write a Java program using JDBC to retrieve employee details from a database table.

4. a) Explain the architecture and components of RMI in detail.

    b) What are UDP datagrams and sockets? Explain with example code for sending and receiving data.

5. a) Explain the life cycle of a Servlet with a neat diagram.

    b) Discuss session tracking techniques in Servlets.

6. a) What is JSP? Explain the anatomy of a JSP page and its processing stages.

    b) Describe the steps for setting up a JSP environment using JDK and Tomcat server.

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PAPER – IV - ARTIFICIAL INTELLIGENCE

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. Answer briefly
    a. What is Means–Ends Analysis?
    b. Define Production System (brief).
    c. State one limitation of Breadth-First Search.
    d. What is Resolution (one line)?
    e. Define Inheritance in Frames (brief).
    f. What is Reactive System (brief)?
    g. What is Pragmatic (Discourse) Analysis in NLP?

2. a. What is meant by "the underlying assumption" in AI? Explain its significance.
    b. Discuss Best-First Search — algorithm idea and admissibility considerations.

3. a. Explain Constraint Satisfaction Problems (CSP). Give an example and mention common
       CSP algorithms.
    b. Describe Means-Ends Analysis with a worked example.

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PAPER – IV - ARTIFICIAL INTELLIGENCE

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. a. Explain Computable Functions and Predicates in predicate logic with examples.
   b. Discuss Logic Programming as a paradigm — mention a typical use case.

2. a. Explain the Frame Problem and why it is challenging for knowledge representation.
   b. Compare Rule-based representation with Semantic Nets (short comparison + one pro each).

3. a. Introduce Nonlinear Planning using Constraint Posting and give an example constraint.
   b. Explain how problem solvers are augmented to handle uncertainty (conceptual answer).

4. a. Present the Unification algorithm stepwise and show unification for f(X, a) and f(b, Y).

   b. Explain the role of knowledge acquisition in building expert systems.

5. a. Define and distinguish the following briefly:
      Morphological Analysis, Semantic Analysis, Discourse Processing.
   b. Explain Qualitative Physics and one area where it supports commonsense reasoning.

6. a. Describe components of a Planning System using the Blocks World example.
   b. Outline an architecture for an Expert System (knowledge base, inference engine, user
      interface) and typical development steps.

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PAPER – V - PROGRAMMING AND PROBLEM-SOLVING USING PYTHON

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.
a) What is a Python variable?
b) Define tuple.
c) What is formatted output?
d) Define a set in Python.
e) What is inheritance?
f) What is a module in Python?
g) What is the purpose of the sqlite3 library?

2.
a) Describe the features and advantages of Python as a programming language.
b) Explain expressions, variables, and assignments in Python with suitable examples.

3.
a) Explain objects and classes in Python with examples.
b) What is the Python Standard Library? Discuss any four useful modules.

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PAPER – V - PROGRAMMING AND PROBLEM-SOLVING USING PYTHON

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.
a) Explain string manipulation and file operations in Python with examples.
b) Describe error handling and exceptions in Python with appropriate code examples.

2
a) Explain control structures in Python (if, for, while, break, continue, and pass).
b) Describe the set data type and module random in Python with examples.

3
a) Explain user-defined classes and method overriding with examples.
b) Discuss namespaces in Python — global, local, and built-in — with suitable examples.
7.
a) Explain recursion and write a Python function for binary search using recursion.
b) Describe modular programming and explain how modules improve software design.

4
a) Explain the design and development of GUIs using the tkinter library.
b) Describe event-driven programming using tkinter widgets with examples.

5
a) Explain the use of Python for Web programming and string pattern matching using regular expressions.
b) Write a short note on database programming in Python with an example of CRUD operations.