MASTER OF COMPUTER APPLICATIONS (MCA-NEW)

Term-End Examination

June, 2022

MCS-213 : SOFTWARE ENGINEERING

Time : 3 hours *Maximum Marks : 100*

(Weightage : 70%)

Note : *Question no.* ***1*** *is* ***compulsory****. Attempt any* ***three*** *questions from the rest.*

1. (a) Define Cleanroom Software Engineering. What is its significance ? Discuss the underlying principles of Cleanroom-based Software Development. *10*

(b) List and explain various phases of Spiral Model. *10*

(c) Write a short note on Cyclomatic Complexity. *10*

(d) Explain various levels of SEI-CMM. *10*

2. (a) What is Unit Testing ? How does it differ from Integration Testing ? *10*

(b) Develop SRS for a "Railway Reservation System". Make necessary assumptions. *10*

3. (a) What is meant by "Change Management" ? Explain the process of Change Management. *10*

(b) What is Cohesion ? Explain various types of Cohesion. *10*

4. (a) Draw the first 3-levels of DFD's for a "Railway Reservation System". Make necessary assumptions. *10*

(b) What is meant by "Verification" ? How does it differ from "Validation" ? Give an example for each. *10*

5. (a) What is meant by "Version Control" ? Explain with an example. *10*

(b) Write a short note on "Baselines". *10*

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Note : *Question no.* ***1*** *is* ***compulsory****. Attempt any* ***three*** *questions from the rest.*

1. (a) What are the different methods used for estimating cost and efforts required for completing a project successfully ? Explain any one of the methods. *10*

(b) Explain McCall's Quality factors. *10*

(c) Explain various steps involved in Debugging. *10*

(d) Briefly explain the process of Software Configuration Management. *10*

2. (a) Write a short note on "Human Computer Interface (HCI)". *10*

(b) Develop SRS for a "Hospital Management System." Make necessary assumptions. *10*

3. (a) What is Alpha Testing ? How does it differ from Beta Testing ? *10*

(b) Define the term "Risk". Explain different phases of Risk Management. *10*

4. (a) Explain any two methods for scheduling of Software Projects. *10*

(b) What is meant by "Boundary Value Analysis" ? Explain with the help of an example. *10*

5. (a) Draw the first 3 levels of DFDs for a "Student Information System". Make necessary assumptions. *10*

(b) Write a short note on Software Re-engineering. *10*

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1. (a) Explain the following approaches for the development of mobile applications : 10

(i) Native Application Development

(ii) Rapid Mobile Application Development (RMAD)

(iii) Progressive Web Applications (PWAs)

Also, mention any *two* advantages for each.

(b) Discuss the (i) requirements related optimization and (ii) architecture and design related optimizations in context of First Time Right (FTR) framework. 10

(c) In context to software project estimation, explain the following (highlighting their main tasks) : 10

(i) Estimating the project-size

(ii) Estimating efforts

(iii) Estimating the schedule

(iv) Estimating the total cost

(d) Discuss the following software engineering models : 10

(i) Waterfall model

(ii) Spiral model

2. (a) Discuss the Human Computer Interface (HCI) and User Experience (UX) and designing for mobility aspects of software design phase. 10

(b) Explain defect metrics and maintainability metrics for measurement of software quality. 10

3. (a) Define cleanroom software engineering. List and explain the principles for the cleanroom based software development. 10

(b) Explain the following emerging trends in software engineering highlighting their salient features, tools, technologies, purpose of usage and advantages : 10

(i) Low Code and No Code platforms

(ii) Containerization

4. (a) List and discuss the issues and challenges in management of web-based projects. 10

(b) Define CASE tools. What are the various categories of CASE tools available ? Also mention the factors that affect their deployment in an organisation. 10

5. Write short notes on the following : 4×5=20

   (a) Cloud platforms

   (b) Continuous Delivery Model

   (c) COCOMO Model

   (d) Control Flow Graph (CFG) along with an example graph for any programming construct.

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1. (a) Describe the architectural design and modular design aspects of software design along with suitable diagrams. 10

(b) With the help of an example for each, explain the following Behavioral UML diagrams : 10

(i) Activity diagram

(ii) Use-case diagram

(c) Describe all the phases involved in data science life cycle. 10

(d) Define the re-engineering process. Narrate the process of re-engineering along with a block diagram and an example of use-case diagram. 10

2. (a) Define requirements engineering. What are the various tasks and processes involved in it ? Discuss functional and non-functional requirements in context to requirements engineering. 10

(b) Define software quality. List and elucidate some of the attributes of software quality. 10

3. (a) With reference to change control, briefly discuss the following : 10

(i) Change Management Process

(ii) Change Request

(iii) Change Control Report

(iv) Change Control Authority

(v) Engineering Change Order

(b) Define risk management. With reference to risk management, discuss risk manager tool, risk avoidance, risk detection and risk control. 10

4. (a) Discuss the project management related optimizations and development related optimization of First Time Right (FTR) framework. 10

(b) What are the basic drivers for innovations in software engineering ? Also list and discuss any *two* emerging trends in software engineering. 10

5. Write short notes on the following : 4×5=20

(a) Conversational Interfaces

(b) Rapid Mobile Application Development

(c) Prototype Model

(d) Putnam's model for estimation

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1. (a) What are the different levels of capability maturity model ? Explain each of the levels. 10

(b) What is waterfall model ? Explain different phases of it. 10

(c) What is SRS ? In which phase of SDLC is it prepared ? Give SRS outline. 10

(d) What is COCOMO model ? Explain different levels of it. What are the three classes of Software projects for whom COCOMO model can be applied ? 10

2. (a) Define 'Software Quality'. Explain any *nine* attributes of Software Quality. 10

(b) What is White Box testing ? How does it differ from Black Box testing ? 10

3. (a) Explain the organisation of a Web Application Team. 10

(b) Explain any *two* approaches to the development of a mobile application. 10

4. (a) Explain any *two* methods of Data Analysis as part of Data Science. 10

   (b) What is UML ? Explain the classification of UML diagrams. 10

5. (a) Explain the process of Software design. 10

   (b) What is Re-engineering ? How does it differ from Reverse Engineering ? 10