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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fourth Semester B.Sc Computer Science Degree Examination, April 2024

BMT4C04(CS) – Mathematics – 4

(2022 Admission onwards)

Time: 2 hours   Max. Marks : 60

Section A
All questions can be attended.
Each question carries 2 marks. Overall ceiling 20

1. Solve the initial value problem $\frac{dy}{dx} = 3y$, $y(0) = 5.7$.

2. Find a general solution of the ODE $y' + (x+2)y^2 = 0$

3. Test for exactness and solve the differential equation $x^3 dx + y^3 dy = 0$.

4. Solve the linear ODE $y' - y = e^{2x}$

5. What is a homogeneous linear ODE? Give example.

6. Let $f(t) = e^{at}$, where a is a constant and $t \geq 0$. Find $L(f(t))$.

7. Solve for $u = u(x,y)$, $u_{xx} = u$.

8. Write one dimensional heat equation.

9. State Fundamental Theorem 1 for second order PDEs in two and three independent variables.

10. Approximate $\int_0^{\frac{\pi}{2}} (x^2 + 1)dx$ with n = 10 using Trapezoidal Rule.

11. Classify the PDE $3\frac{\partial^2 u}{\partial x^2} + 5\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial^2 u}{\partial y^2} = 0$

12. Test whether the functions e^x and e^{-x} are linear dependent or independent.

Section B
All questions can be attended.
Each question carries 5 marks. Overall ceiling 30

13. Sketch the curve $y = 4x + c$. Find its orthogonal trajectory.

14. Verify by substitution that the functions $y = 1 + \cos x$ and $y = 1 + \sin x$ are solutions of the non-homogeneous linear ODE $y'' + y = 1$, but their sum is not a solution.

15. Find the laplace transforms of $\cosh at$ and $\sinh at$.

16. Find a general solution and a corresponding particular solution of the initial value problem $x^2 y' + 3xy = \frac{1}{x}, y(1) = -1$.

17. What is a Bernoulli Equation? Solve the Bernoulli equation $y' = Ay - By^2$.

18. Find a basis of solutions of the ODE $(x^2 - x) y'' - xy' + y = 0$.

19. Find the inverse of the transform $L(f) = \frac{18s-12}{9s^2-1}$.

PartC

Answer any one of the question.

The question carries 10 marks.

20. a) What are Euler – Cauchy Equations?

b) Solve the equation $x^2 y'' + 0.6 x y' + 16.04y = 0$.

21. a) Find $f(t)$ if $L(f) = \frac{2}{s^3+9s}$.

b) Solve the initial value problem $y'' + y' + 9y = 0$, $y(0) = 0.16$, $y'(0) = 0$ by Laplace transforms.

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fourth Semester B.Sc Computer Science Degree Examination, April 2024

BCS4A13 – Object Oriented Concepts through Python

(2022 Admission onwards)

Time: 2½ hours   Max. Marks : 80

Note: You can answer all the questions in Sections A&B. But there shall be Ceiling in these sections

PART-A
Answer all questions.
Each question carries Two mark.
Ceiling -25 Marks

1. Define the terms abstraction and polymorphism.

2. Mention any two advantages of object-oriented Programming languages.

3. What is the purpose of raw_input function in Python?

4. Explain about the use of comment statements in Python.

5. Write syntax of for statement in Python.

6. Write an example for compound Boolean expression in Python.

7. What do you mean by recursive function calls?

8. Explain any two functions in Python belonging to random?

9. Write syntax to define a user defined class in Python.

10. Write a python program to reverse a string without using any built-in functions.

11. What do you mean by object?

12. Write python statement to input a value from user.

13. Write a Python program to check a string is palindrome or not?

14. What do you mean bykeyword parameter?

15. Write python code to create a class and object.

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PART-B
Answer all questions.
Each question carries Five mark.
Ceiling -35 Marks

16. Write notes on any two OOP concepts.

17. Explain eval function in Python.

18. Write short note on features of Python programming language.

19. Compare for and while statement in Python.

20. Write python program to create a list and sort elements in it.

21. Write a python program to define a function that performs calculation of simple interest.

22. Compare set and tuple data containers in python.

23. Explain the term inheritance.

PART-C
Answer any two questions.
Each question carries 10marks.

24. Explain various branching statements in Python.

25. Explain dictionary and list data containers.

26. Write short note on user defined functions in Python with suitable examples.

27. Explain various operators in Python. Write short note on operator precedence and associativity.

$2 \times 10 = 20$ marks

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fourth Semester B.Sc Computer Science Degree Examination, April 2024

BCS4A14 – Principles of Software Engineering

(2022 Admission onwards)

Time: 2 ½ hours Max. Marks : 80

Note: You can answer all the questions in Section A&B. But there shall be a Ceiling in each section.

PART-A
Answer *all* questions.
Each question carries Two marks.
Ceiling -25 Marks

1. Define Product and Process.
2. "Software doesn't wear out". Justify the myth.
3. Defne embedded software.
4. Explain Functional Requirements.
5. Elaborate on the Feasibility study.
6. Discuss Requirement Specification.
7. Define the term Software Design.
8. Explain Abstraction.
9. Elaborate on modularity.
10. Describe software testing process with its uses.
11. Discuss the term Observability.
12. Explain the concept of Test Cases.
13. Define Software configuration management.
14. Explain Baseline in Configuration management.
15. Describe the term Change control.

PART -B
Answer *all* questions.
Each question carries Five marks.
Ceiling -35 Marks

16. Illustrate Linear Sequential model with an example.

17. Elucidate the steps specified in the guidelines for requirement elicitation.

18. With a neat diagram explain the translation of the analysis model to the software design.

19. Discuss Coupling with its various types.

20. Enumerate major testing principles.

21. Elaborate on black box and various methods for black box testing.

22. Explain the Software Reengineering Process.

23. Elaborate on the SCRUM framework with a neat diagram.

PART - C
Answer any *two* questions.
Each question carries Ten marks.

24. a) Explain Process, Methods and Tools. (3)

    b) Enumerate any four techniques for requirement validation. (4)

    c) Elaborate on Structural Portioning (3)

25. a) Explain Incremental Model of Development (3)

    b) Elaborate on Requirement Management. (4)

    c) Describe Condition Testing in white-box testing. (3)

26. a) Discuss the RAD Model of software development. (3)

    b) Describe the Requirement Engineering Process. (3)

    c) Elaborate on maintenance and its various types. (4)

27. a) Explain component level design. (3)

    b) Elaborate on various Coding Standards. (4)

    c) Differentiate Forward and Reverse Engineering. (3)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fourth Semester B.Sc Computer Science Degree Examination, April 2024

BCS4B06 – Fundamentals of Database Management Systems & RDBMS

(2022 Admission onwards)

Time: 2 hours

Max. Marks : 60

PART A
Answer all questions

1. Differentiate File Systems and Database Management Systems.

2. Discuss Data Models and their importance in Database Management Systems.

3. Elaborate on the concept of Entity Set.

4. Elaborate on the Relational Database Model.

5. Describe the concept of Relational Algebra.

6. Define Anomalies in databases.

7. Explain briefly Multivalued dependencies.

8. Explain the process of normalization.

9. Explain data definition language with example.

10. Elaborate on views with example.

11. Define ACID properties.

12. Explain briefly the concept of concurrency control.

(12 x 2 marks – 24 marks, Maximum ceiling 20 marks)

PART-B
Answer all questions

13. Explain the concept of Entity Relationship model and various types of constraints in DBMS.

14. Explain Relational calculus and Domain calculus.

15. Explain relational algebra's selection and projection operations with suitable examples.

16. Elucidate various normal forms that can applied in database design.

17. Illustrate various types of Join operations that can be performed with examples.

18. Elaborate with examples on the create, grant, revoke, alter, and drop commands with examples.

19. Illustrate the two-phase locking protocol.

(7x5 marks – 35 marks, Maximum ceiling 30 marks)

PART-C
Answer any one question

20. a) Recall the three-schema architecture of DBMS with the figure.   (4 marks)

    b)Explain the creation of views with example.   (2 marks)

    c)Explain the concept of serializability with a suitable example.   (4 marks)

21. a) Define Strong and weak entities in an entity set.   (2 marks)

    b) Briefly discuss Data Integrity.   (2 marks)

    c) Discuss briefly the handling of relations with more than one candidate key.   (4 marks)

    d) Explain pattern matching in SQL.   (2 marks)

(1 x10 marks – 10 marks)