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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
Fourth Semester B.Sc Degree Examination, March/April 2021
BCS4A13 – Object Oriented Concepts through Python
(2019 Admission onwards)

Time: 2 ½   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. Given the list fruits=('apple', 'orange', 'banana','grapes'), Write the output of fruits[-3:-1]

2. What is meant by bytecode?

3. What is Python IDLE?

4. Create a dictionary books with key 'title' as 'Python Programming' and the key 'author' as 'Balaguruswamy'?

5. Write the syntax of print statement.

6. How to give comments in Python?

7. What are the rules for naming identifiers?

8. Write a python script that returns a new set with all items from both sets by removing duplicates.

9. What is the purpose of using pass statement?

10. Write how to assign multiline string to a variable.

11. Write a Python program to swap two numbers using multiple return values in a single return statement.

12. Write the difference between 'in' and 'not in' operators.

13. What is the output of math.remainder(10,3) and math.remainder(8,3)?

14. What are the different constants used in Python Math module?

15. from date time import date

d=date.today()

Using the above code, write statements to print each component of date such as day month and year separately.

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

16. Explain the features of Python.

17. List the operators in Python, in the order of precedence.

18. Explain the significance of global keyword with example.

19. Write a note on nested dictionaries with examples.

20. Write a note on default arguments and positional arguments with examples.

21. Write a python program to find the sum of the digits and reverse of a number.

22. Define recursion. Write a program to find factorial of a given number using recursi

23. Explain how to create class and its instances using Python

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

24. Explain the characteristics of Object Oriented Programming.

25. Explain all forms of if statement with examples.

26. Explain passing of arguments with examples.

27. Illustrate how string slicing is done in Python with example. Write a python prog search a string in the given list.

2 x 10 =

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fourth Semester B.Sc Degree Examination, March/April 2021

BCS4A14 – Principles of Software Engineering

(2019 Admission onwards)

Time: 2 ½ hours

Max. Marks: 80

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

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

Define Software Engineering. What is its role in the Development Process?

Recall Software Process and Process Model.

Define RAD Model with its demerits.

What is Software Requirement Specification?

Define the concept of Projection in a System.

What are Functional Requirements?

What is Coupling?

What is function Oriented Design?

How Control Flow Graph help testing?

What is Black Box Testing?

What are Code Reviews?

What is the role of testing strategies?

What is Software Maintenance?

What is Reverse Engineering Process?

What is Change Control Process?

PART – B

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

16. Illustrate Component Based Development Model.

17. Recall the IEEE Structure of Software Requirement Specification.

18. Explain various Architectural Views.

19. Dissect the steps involved in Object Oriented Design.

20. What are the various standards to be followed in coding process?

21. Outline Test Driven Development Process.

22. Memorize various methods for selecting Test cases in Black box Testing.

23. How structural testing can be conducted during white box testing?

PART - C

Answer any *two* questions.
Each question carries Ten marks.

24. i) What Methods in Software Engineering and recall various method components? (6)

    ii) What are the attributes of good software? (4)

25. Explain Software Configuration Management with its major tasks.

26. Illustrate various levels of Cohesion.

27. Identify various scenarios which requires Refactoring.

(2 x 10 = 20 Marks)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
Fourth Semester B.Sc Degree Examination, March/April 2021
BCS4B06 - Fundamentals of Database Management System and RDBMS

(2019 Admission onwards)

Time: 2 hours

Max. Marks: 60

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

PART – A
Answer *all* questions.
Each question carries Two mark.
Ceiling -20 Marks

1. Define Database Management Systems? Give an example.

2. What are Schemas and Instances?

3. Recall ER Models? How ER model help the database design?

4. Define Relational Data Model? Give an example.

5. What are Constraints? Give an example.

6. Define Functional Dependencies.

7. What is Normalization? Why is it used in DBMS?

8. Explain the concept of Primary Key and Foreign Key with examples.

9. What are DDL and DML Statements? Give Examples.

10. What are views? Why is it used?

11. What are concurrent operations?

12. What is Rollback Process?

PART – B
Answer *all* questions.
Each question carries Five marks.
Ceiling -30 Marks

13. Explain ACID properties in DBMS.

14. What is a Join in SQL? What are the various types of Joins?

15. What is a Data Model? Elucidate various Data Models.

16. Elaborate different levels of abstraction with a neat diagram.

17. What are Anomalies in Databases? List and elaborate various Anomalies?

18. Recall different Normal forms that can be applied to data normalization.

19. Write notes on
    a) Multi-valued dependencies and Join Dependencies
    b) Integrity Rules

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

20. What is Concurrency Control in Transaction Management? Why is it required? Explain the two phase locking protocol of Concurrency Control.

21. Study the following table definitions
    STUDENT (<u>ROLLNO</u>, NAME, AGE, GENDER, ADDRESS, ADVISOR)
    COURSE (<u>COURSEID</u>, CNAME, TAUGHTBY, CREDITS)
    PROFESSOR(<u>PROFID</u>, PNAME, PPHONE)
    ENROLLMENT(<u>ROLLNO, COURSEID</u>, GRADE)
    The underlined are the Primary Keys. ADVISOR and TAUGHTBY are Foreign Keys referring to the tables PROFESSOR, (ROLLNO AND COURSEID) in ENROLLMENT

    Write SQL statements for the following.
    1. Create the respective tables with primary key and foreign key (4)
    2. Insert proper values into all the tables (2)
    3. Modify the STUDENT table by adding PARENTNAME (1)
    4. List the name of students who have not enrolled for any course. (2)
    5. List names of all female students with their advisor name (1)

(1 x 10 = 10 Marl

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
Fourth Semester B.Sc Degree Examination, March/April 2021
BMT4C04 – Mathematics – 4
(2019 Admission onwards)

Time: 2   hours   Max. Marks : 60

PART A
Answer all questions. Each question carries 2 marks.
Maximum mark from this section is 20.

1. Find the order and degree of the differential equation $\frac{d^3y}{dx^3} = \left((1 + (\frac{dy}{dx})^2)\right)^{3/2}$.

2. Give an example for a linear and a non-linear differential equation.

3. Define an autonomous differential equation and give an example.

4. Find a solution to the differential equation $x\frac{dy}{dx} = 4y$.

5. Find the integrating factor in simplified form for the differential equation

6. $\frac{dy}{dx} + y \tan x = \sin 2x$

7. Write the general form of Bernoulli's differential equation and explain how it can be solved

8. Define the Dirac Delta function and WRITE its Laplace transformation.

9. Find the inverse Laplace transformation of $F(s) = \frac{s+1}{s^2+1}$.

10. State the superposition principle for homogenous differential equations.

11. Verify whether the functions $f_1(x) = 5$, $f_2(x) = \cos^2 x$ and $f_3(x) = \sin^2 x$ are linearly dependent or independent in the interval $(-\infty, \infty)$

12. Find the wroskian of the two functions $f_1(x) = e^x$, $f_2(x) = e^{-x}$

PART B
Answer all questions. Each question carries 5 marks.
Maximum mark from this section is 30.

13. Derive the formula for the Laplace transformation of $f'''(t)$, where $L(f(t)) = F(s)$ is given.

14. Find the Fourier cosine series of the function $f(x) = x$.

15. Using the method of separation of variables, solve the partial differential equation
$\frac{\delta^2 z}{\vartheta x^2} - 2\frac{\vartheta z}{\partial x} + \frac{\partial z}{\partial y} = 0$

16. Solve the differential equation $x^2 y'' + xy' - y = 0$

17. Show that the differential equation $(e^{2y} - y\cos(xy))dx + (2xe^{2y} - x\cos(xy) + 2y)dy = 0$ is exact and hence solve the same.

18. Solve the initial value problem $\cos x \, (e^{2y} - y)\frac{dy}{dx} = e^y \sin(2x)$, $y(0) = 0$

19. Using the method of undetermined coefficients, solve $y'' + 4y = 8x^2$.

PART C
Answer any ONE question. One question carries 10 marks.

20. Using the Laplace transformation, solve the initial value problem
$y'' - y = t$, $y(0) = 1$, $y'(0) = -1$

21. Find the Fourier Series of the function $f(x) = x$, $-\pi < x < \pi$

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fourth Semester B.Sc Degree Examination, March/April 2021

BPH4C04 - Electricity, Magnetism and Nuclear Physics

(2019 Admission onwards)

Time: 2 hours   Max. Marks : 60

The symbols used in this question paper have their usual meanings

Section A – Short Answer type.

(Answer all questions in two or three sentences, each correct answer carries a maximum of 2 marks)

1. What is electrostatic shielding?

2. Distinguish between primary and secondary cosmic rays.

3. Define Nuclear Magnetic Resonance.

4. Derive the relation between permeability and susceptibility.

5. Define temperature coefficient of resistance.

6. Electron cannot be accelerated using cyclotron. Why?

7. Explain the terms retentivity and coercivity.

8. What is Meissener effect?

9. What is Higg's Boson?

10. Show that the introduction of a dielectric slab into the capacitor can increase the capacitance.

11. Define reduction factor of TG.

12. What is drift velocity? Write down its expression.   **(Ceiling – 20)**

Section B – Paragraph / Problem type.
(Answer all questions in a paragraph of about half a page to one page, each correct answer carries a maximum of 5 marks)

13. The binding energy of $_{12}^{24}$ Mg is 198.25 MeV. Find its atomic mass?

    (Mass of hydrogen atom = 1.00783u , mass of neutron = 1.0865u)

14. The activity of a radioactive sample is decreased to 75% of the initial value after 30 days. Calculate the half life of sample.

15. Describe the classification of elementary particle

16. With the help of neat diagram explain the working of linear accelerator

17. What capacitance is required to store an energy of 100 KWh at a potential difference of 10^4 V?

18. Explain cosmic ray shower

19. The force between two electrons when placed in air equal to 0.5 times weight of an electron. Find the distance between two electrons

    (Given mass of electron = 9.1 x 10^{-31} Kg).   **(Ceiling – 30)**

SECTION C – Essay type
(Essays - Answer in about two pages, any one question.
Answer carries 10 marks)

20. Explain the principle of potentiometer. How can we determine the resistance using potentiometer?

21. Explain the theory of vibration magnetometer. With the help of Searle's Vibration magnetometer how can we find the moment of magnet?

                                                                    (1 x 10 = 10 marks)