

15 MAR 2022

**SVKM'S**

**Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)**

**Academic Year (2021-22)**

**Class: SYBSC Semester: IV**

**Program: Bachelor of Science**

**Subject: Computer Science**

**Course Name: Advanced Java**

**Time: 7:30 am to 9:15 am**

**Course Code: USMACS402**

**Date:**

**Max. Marks: 50**

**Duration: 1 hr. 45 minutes**

**REGULAR EXAMINATION**

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**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) Answer to each new question to be started on a fresh page.
- 3) Figures in brackets on the right-hand side indicate full marks.
- 4) Assume Suitable data if necessary

**Q1.** **Answer any 2 of the following** [14]

A What are Panes in Swings? Why they are required? Explain any two types of Panes. 7

B What is a Driver? Explain any two types of drivers in JDBC. 7

C Write a JDBC program to search records from Employee table. 7

Employee (eid, ename,date\_of\_joining,salary)

**Q2.** **Answer any 2 of the following** [14]

A Write a servlet program to enter username and password and greet the user if username is equal to password and respond with an appropriate message if wrong. 7

B Define a servlet? Explain its life cycle methods. 7

C What are different levels of scope in JSP? Explain with an example. 7

**Q3.** **Answer any 2 of the following** [14]

A Differentiate between JSON and XML. 7

- |   |   |   |
|---|---|---|
| B | Write a code snippet to encode and decode JSON.   | 7 |
| C | What are interceptors in Struts2? What is the execution flow with respect to interceptor? | 7 |

**Q4.** **Answer any 4 of the following** [08]

- |   |   |   |
|---|---|---|
| A | What is an expression tag?  | 2 |
| B | Which statement in JDBC is used to operate on triggers and cursors? | 2 |
| C | What are the life cycle methods of JSP?                             | 2 |
| D | What are the transaction management methods in JDBC.                | 2 |
| E | List the features of struts2.                                       | 2 |
| F | Write the tags used in web.xml file of servlet.                     | 2 |

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- 7 JUL 2022

**SVKM'S**

**Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)**  
**Academic Year (2021-22)**

**Class: SYBSC      Semester: IV**

**Program: Bachelor of Science**

**Max. Marks: 50**

**Subject: Computer Science**

**Course Name: Advanced Java**

**Time:**

**Course Code: USMACS402**

**Date:** Duration: 1 hr. 45 minutes

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- 3) Figures in brackets on the right-hand side indicate full marks.
- 4) Assume Suitable data if necessary

**Q1.                          Answer any 2 of the following                          [14]**

- A Differentiate between AWT and Swing. 7
- B What is ResultSet? Explain any five methods in ResultSet with an example. 7
- C Write a JDBC program to insert records into Student table using prepared Statement. 7

Assume table as Student (id, name, class, etc)

Code should also print the number of rows inserted.

**Q2.                          Answer any 2 of the following                          [14]**

- A What is Deployment descriptor in servlet? Explain its structure. 7
- B Write a servlet program to manage a session. 7
- C Describe JSP Life cycle. 7

**Q3.** **Answer any 2 of the following** [14]

- A What is Struts? Differentiate between struts model 1 and model 2. 7
- B Explain different data types in JSON with an example. 7
- C Describe struts.xml. Configuration file with an example. 7

**Q4.** **Answer any 4 of the following** [08]

- A Define OGNL in struts2? 2
- B What is the CGI? 2
- C List any two implicit objects of JSP. 2
- D What is CLOB? 2
- E Write the features of JSON over XML. 2
- F What are the two ways of creating a frame in swing. 2

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04 MAR 2023

SVKM'S

Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)  
Academic Year (2022-23)

Class: SYBSC Semester: IV

Program: B.Sc Computer Science

Course Name: Advanced Java

Course Code: USMACS402

Date:

Max. Marks: 75

Time:

Duration: 2 hrs 30 minutes

### REGULAR EXAMINATION

**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) Answer to each new question to be started on a fresh page.
- 3) Figures in brackets on the right-hand side indicate full marks.
- 4) Assume Suitable data if necessary.

**Q1 ATTEMPT ANY 3 FROM THE FOLLOWING:**

[21]

A Write a swing snippet for generating the following.

7

Registration Form in Windows Form:

Name:	<input type="text"/>
Email-ID:	<input type="text"/>
Create Password:	<input type="text"/>
Confirm Password:	<input type="text"/>
Country:	<input type="text"/>
State:	<input type="text"/>
Phone No:	<input type="text"/>
<input type="button" value="Submit"/>	<input type="button" value="Clear"/>

B What is a Driver? Explain any two types of drivers in JDBC.

7

C Differentiate between AWT and Swing.

7

D Describe any 4 methods and any 3 fields used for navigation through database records using a resultset object.

7

<b>Q2 ATTEMPT ANY 3 FROM THE FOLLOWING:</b>	<b>[21]</b>
A Define a servlet? Explain its life cycle methods.	7
B Explain forward and include actions in JSP with an example.	7
C Describe servletconfig interface in detail.	7
D Write a servlet code to show the use of request dispatcher, also write its web.xml.	7
 <b>Q3 ATTEMPT ANY 3 FROM THE FOLLOWING:</b>	<b>[21]</b>
A What is JSON? Differentiate between JSON and XML.	7
B What are interceptors in Struts2? What is the execution flow with respect to interceptor?	7
C Explain the components of struts framework.	7
D Write a program to depict MVC using struts2.(Just print your name with a welcome message).	7
 <b>Q4 ATTEMPT ANY 3 FROM THE FOLLOWING:</b>	<b>[12]</b>
A What is the use of BLOB and CLOB?	4
B State the three directive elements available in JSP.	4
C What is action entity in Struts2 framework?	4
D Write a code snippet to encode JSON object.	4

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17 MAR 2022

**SVKM'S  
Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)  
Academic Year (2021-22)**

**Class:**S.Y.B.Sc  
**Program:** Bachelor of Science  
**Subject:**Computer Science  
**Course Code :** USMACS404  
**Date:**

**Semester:** IV  
**Max. Marks:** 50  
**Time:** 7:30 am to 9:15 am  
**Subject:** Android Developer Fundamentals  
**Duration:** 1 hr 45 minutes

**REGULAR EXAMINATION**

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**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) Answer to each new question to be started on a fresh page.
- 3) Assume Suitable data if necessary

- Q. 1 Attempt any TWO of the following.** 14
- a. Explain android platform architecture with diagram.
  - b. What is Intent? How to send and retrieve data using Intent? Explain with suitable example.
  - c. What are the different examples of Input Controls? What is EditText and write a code to retrieve text from it? List its common input types?
- Q. 2 Attempt any TWO of the following.** 14
- a. What is a popup menu? List and Explain Steps to implement popup menu.
  - b. List and explain steps to connect to the Internet with suitable example.
  - c. What is a notification? How are notifications used? Write a code to build and send a notification.
- Q. 3 Attempt any TWO of the following.** 14
- a. What are different data storage options? When to use internal/external storage? Write a code to create a file in external storage.
  - b. What is SQLite database? List and discuss the steps in implementing SQLite database in detail.
  - c. What is a Content Provider? List and explain steps to implement Content Provider.
- Q. 4 Attempt any FOUR of the following.** 08
- a. What is View? What are its properties? Give few examples.
  - b. What are different forms of navigation? Explain in brief.
  - c. Complete the below code, so that changes in the shared preferences are saved:  

```
SharedPreferences.Editor preferencesEditor =  
        mPreferences._____();
```

```
preferencesEditor.putInt("count", mCount);  
preferencesEditor.putInt("color", mCurrentColor);  
preferencesEditor._____();
```

- d. What are the benefits of using a SQLite database to store your data?
- e. What is custom broadcasts? How to send custom broadcasts?
- f. List the limitations of AsyncTask.

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**Academic Year (2021-22)**

**Class:**S.Y.B.Sc

**Semester:** IV

**Program:** Bachelor of Science

**Max. Marks:** 50

**Subject:**Computer Science

**Time:**

**Course Code :** USMACS404

**Subject:** Android Developer Fundamentals

**Date:**

**Duration:** 1 hr 45 minutes

**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) Answer to each new question to be started on a fresh page.
- 3) Assume Suitable data if necessary

**Q. 1 Attempt any TWO of the following.**

14

- a. What is Activity Lifecycle? Explain Activity states and callbacks graph.
- b. What is Intent? How to start an Activity with an explicit intent? Explain with suitable example.
- c. How user interacts with apps? What is Button? Explain how to respond to Button taps with example.

**Q. 2 Attempt any TWO of the following.**

14

- a. What are different types of menus? What is Option Menu? List and Explain Steps to implement options menu.
- b. What is a RecyclerView? Give overview of RecyclerView Components.
- c. What is AlarmManager? What you need to schedule an alarm?

**Q. 3 Attempt any TWO of the following.**

14

- a. What are different data storage options? When to use internal/external storage? Write a code to create a file in internal storage.
- b. What is SQLite database? Explain methods for creating, updating, deleting and querying database records by giving a suitable example.
- c. List and explain different components of a Content Provider App in detail.

**Q. 4 Attempt any FOUR of the following.**

- a. What changes are made when you add a second Activity to your app by choosing File > New > Activity and an Activity template?
- b. What is Notification priority? Which method is used to set priority level?
- c. To make your content provider visible and available to other apps, you need to declare in the AndroidManifest of the provider.

Complete the code below:

```
<_____
    android:name=".WordListContentProvider"
    android:authorities="com.android.example.wordlistsqllwithcontentprovider.provider"
    android:_____"true"/>
```

- d. Write code which sets the title, negative and positive buttons for an alert dialog.
- e. How to check if network connectivity is available for an app?
- f. List the steps to create Shared Preferences.

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**Amrutben Jivanlal College of Commerce and Economics (Autonomous)**  
**Academic Year (2022-23)**

10 MAR 2023

**Class: S. Y. B.Sc.(Computer Science)**

**Semester: IV**

**Program: Bachelor of Science**

**Max. Marks: 75**

**Course Name: Android Developer Fundamentals**

**Time: 10:30 am to 1:00 pm**

**Course Code: USMACS404**

**Duration: 2hrs 30 minutes**

**Date:**

**REGULAR EXAMINATION**

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**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) All questions carry equal marks.
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right hand side indicate full marks.

**Q.1. Attempt any Three** **(21)**

- a. With the example differentiate framework and library **(7)**
- b. Explain Scroll View and write a code snippet for the same **(7)**
- c. Differentiate List View and Recycle View **(7)**
- d. Develop code to add toggle button and display the toggle value **(7)**

**Q.2. Attempt any Three** **(21)**

- a. Develop code and process to add image in a page **(7)**
- b. Develop code to increase counter on tap of button **(7)**
- c. Develop UI code to add image in background and to add two text field and one toggle button and at the end one button **(7)**
- d. Elaborate the light mode and Dark mode with the example and write down the precaution's measures. **(7)**

**Q.3. Attempt any Three** **(21)**

- a. Develop code to accept Name age address from the user, store the details in one JSON structure and save the data in JSON. **(7)**
- b. Elaborate following firebaae authentication method **(7)**  
Mobile auth  
Email auth  
Custom auth
- c. Discuss loader write code for loader. **(7)**
- d. Elaborate how mobile and server can interact with each other and list the required permission. **(7)**

**Q.4. Attempt any Three** (12)

- Discuss pubspec.yaml file. (4)
- With the help of an example explain following (4)
  - Assest
  - Build.gradle
- Differentiate Firebase cloud firestore and Firebase RTDB (4)
- Differentiate Hybrid application development and native application development (4)

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For writing questions note an Interview question and also discuss how to implement a mobile application & communication between client and server. It is suggested to add more questions related to mobile application development.

It is suggested to add more questions related to mobile application development like how to implement a hybrid application using React Native, Java, C++, Swift etc. It is suggested to add more questions related to mobile application development like how to implement a hybrid application using React Native, Java, C++, Swift etc. It is suggested to add more questions related to mobile application development like how to implement a hybrid application using React Native, Java, C++, Swift etc. It is suggested to add more questions related to mobile application development like how to implement a hybrid application using React Native, Java, C++, Swift etc.

(12) **Q.5. Explain the following terms with examples. (10)**

(i) **Cloud Functions**: Cloud Functions are serverless functions which are triggered by events such as changes in real-time databases, Google Cloud Storage, or Google Sheets. These functions can be written in Node.js, Python, or Java and are triggered by specific events such as a file being uploaded to Google Cloud Storage or a new row being added to a Google Sheet.

(ii) **Cloud Functions for Firebase**: Cloud Functions for Firebase is a managed service that makes it easy to build backend logic, triggers and integrations for mobile, web and serverless apps using the same codebase.

(iii) **Cloud Functions for Firebase**: Cloud Functions for Firebase is a managed service that makes it easy to build backend logic, triggers and integrations for mobile, web and serverless apps using the same codebase.

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(ix) **Cloud Functions for Firebase**: Cloud Functions for Firebase is a managed service that makes it easy to build backend logic, triggers and integrations for mobile, web and serverless apps using the same codebase.

(x) **Cloud Functions for Firebase**: Cloud Functions for Firebase is a managed service that makes it easy to build backend logic, triggers and integrations for mobile, web and serverless apps using the same codebase.

SVKM'S  
Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)  
Academic Year (2021-22)  
Class: Second Year Semester: IV

Program: Bachelor of Science  
Subject: Computer Science/Fundamentals of Algorithms  
Date:  
Course Name: Fundamentals of Algorithms

Max. Marks: 50  
Time: 7:30 am to 9:15 am  
Duration: 1 hr 45 minutes  
Course code: USMACS401

REGULAR EXAMINATION

**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) Answer to each new question to be started on a fresh page.
- 3) Figures in brackets on the right hand side indicate full marks.
- 4) Assume Suitable data if necessary

Q-1 Answer Following (Any two):

[14]

1. Given following code explain master theorem used, find its recurrence relation and Complexity:

```
def func(n):
    cnt=0
    if n<=0:
        return
    for i in range(0,n) :
        for j in range(0,n):
            cnt=cnt+1
    func(n-3)
    print(cnt)
```

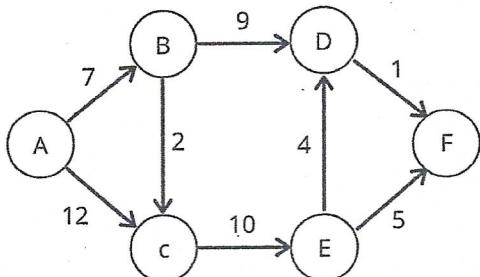
2. Discuss different types of algorithm analysis with its notations. Which is most commonly used analysis? Why?
3. Given following python program, discuss master theorem to find its complexity

```
def func(n):
    if (n<2):
        return
    else:
        cnt=0
    for i in range(0, 16):
        func(n//2)
    for i in range(0, n**4)
        cnt=cnt+1
```

Q-2 Answer Following (Any two):

[14]

- Given following graph:



Find shortest path using dijkstra's algorithm. Consider the source as A.

- Explain AVL tree with example.
- Describe tournament method to find 2<sup>nd</sup> smallest element using following values:  
20, 12, 30, 40, 5, 7, 10, 19, 25, 35, 45

Q-3 Answer Following (Any two):

[14]

- What is greedy algorithm? Explain properties of greedy algorithm. Give two applications of greedy algorithm.
- Find out longest common subsequence of "longest" and "stone".
- Given following characters and frequency, create Huffman code:

Character	Frequency
A	11
B	12
C	13
D	14
E	24
F	26

Q-4 Answer Following: (Any Four)

[08]

- Draw the node structure of threaded binary tree.
- Explain Recursion or Iteration as algorithm classification method.
- Discuss worst case complexity of linear search.
- Discuss in-degree and out-degree with example.
- Given recurrence relation  $T(n)=T(n-3)+n^2$  find its  $\Theta$ .
- Describe properties of dynamic programming.

SY B.Sc Comp Sci

22 JUN 2022

SVKM'S

Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)

Academic Year (2021-22)

Class: Second Year Semester: IV

Program: Bachelor of Science

Max. Marks: 50

Subject: Computer Science/Fundamentals of Algorithms

Time:

Date:

Duration: 1 hr 45 minutes

Course Name: Fundamentals of Algorithms

Course code: USMACS401

### REGULAR EXAMINATION

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- 3) Figures in brackets on the right hand side indicate full marks.
- 4) Assume Suitable data if necessary

Q-1 Answer Following (Any two):

[14]

1. Given following code explain master theorem used, find its recurrence relation and Complexity:

```
def func(n):
    cnt=0
    if n<=0:
        return
    for i in range(0,n) :
        cnt=cnt+1
    func(n-3)
    print(cnt)
```

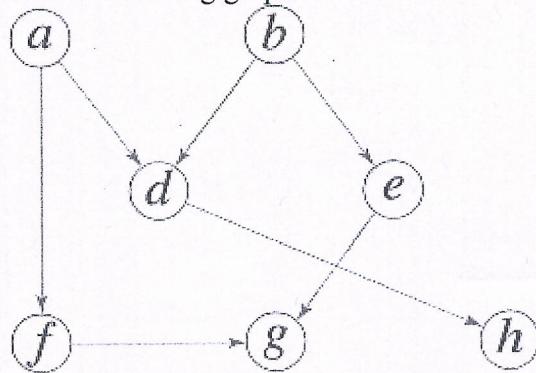
2. Explain different asymptotic notations.
3. Given following python program, discuss master theorem to find its complexity

```
def func(n):
    if (n<2):
        return
    else:
        cnt=0
    for i in range(0, 16):
        func(n//2)
    for i in range(0, n**4)
        cnt=cnt+1
```

[14]

Q-2 Answer Following (Any two):

- Given following graph:



Generate topological sorting.

- Explain N-ary tree with suitable example.
- Describe tournament method to find 2<sup>nd</sup> largest element using following values:  
12, 10, 8, 14, 16, 18, 22, 20, 5

Q-3 Answer Following (Any two):

[14]

- What is greedy algorithm? Explain properties of greedy algorithm. Give two applications of greedy algorithm.
- Find out longest common subsequence of "intention" and "execution".
- Given following characters and frequency, create Huffman code:

Character	Frequency
A	4
B	5
C	7
D	8
E	10
F	12
G	20

Q-4 Answer Following: (Any Four)

[08]

- Give properties of AVL tree.
- Explain procedural or declarative as algorithm classification method.
- Discuss best case complexity of linear search.
- Give applications of divide and conquer algorithm.
- For a recurrence relation  $T(n)=2T(n/4)+n^{0.51}$  apply suitable theorem to find it  $\Theta$ .
- Describe tabulation as approach of dynamic programming.

SVKM'S

Mithibai College of Arts, Chauhan Institute of Science &  
 Amrutben Jivanlal College of Commerce and Economics (Autonomous)  
 Academic Year (2022-23)  
 Year: 2 / Semester: IV

Program: B.Sc. Computer Science

Max. Marks: 75

Course: Fundamentals of Algorithms

Date:

Duration: 2 ½ hrs.

## REGULAR EXAMINATION

## Instructions:

- 1) This question paper contains 2 pages.
- 2) All questions are compulsory
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right hand side indicate full marks.
- 5) Assume Suitable data if necessary
- 6) Draw neat and well labelled diagrams wherever necessary.
- 7) Use of scientific calculator is permitted

**Q.1 Attempt any three.**

[21]

A What is Algorithm? Discuss different types of algorithm analysis.

Which is the most commonly used analysis? Why?

B What is the complexity of the following code? Detail each step.

def func1(n):

i=1

while i&lt;=n:

i=i\*2

print(i)

for j in range(0, n):

print(j)

C Given following python code find its complexity.

def func(n):

cnt=0

if n&lt;=0:

return

for i in range(0,n) :

for j in range(0,n):

cnt=cnt+1

func(n-3)

print(cnt)

D Develop recursive python program to find  $x^y$ . Find its complexity.**Q.2 Attempt any three:**

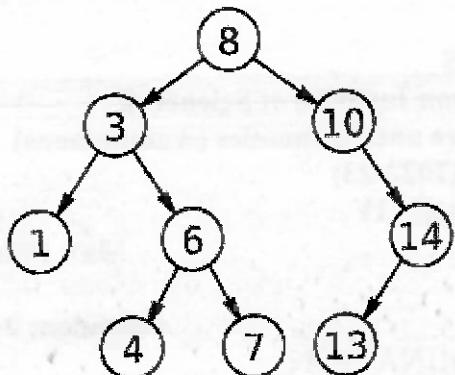
[21]

A What are heaps? Explain heapsort with following example:

8,3,7,1,2,5,6

B What is string matching? Describe naïve approach of the string matching with an example.

C Explain the concept of threaded binary tree with its node structure. Given following binary tree generate threaded binary tree.



- D Discuss median of median algorithm with suitable example.

**Q.3**

**Attempt any three.**

[21]

- A Explain following methods of algorithm classification:

- Linear Programming
- Reduction
- Deterministic or Non-Deterministic
- Exact or Approximate

- B Find out longest common subsequence of "longest" and "stone".

- C Write a program of quick sort as an application of divide and conquer strategy.

- D Given following character frequencies:

Character	a	e	i	o	u	s	t
Frequency	10	15	12	3	4	13	1

Find its Huffman code.

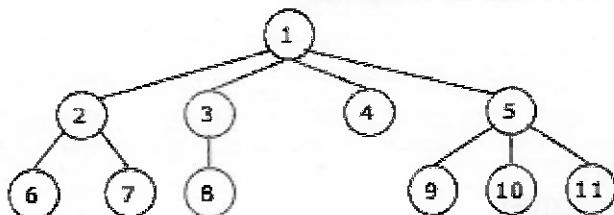
**Q.4**

**Attempt any three:**

[12]

- A Given recurrence relation  $T(n)=16T(n/4)+n$  find its  $\Theta$ .

- B What is Generic tree? Given the following generic tree convert it into the corresponding binary tree.



- C Explain the programming terminology by which D & C divides problems in sub-problems. Draw visualization of divide and conquer strategy.
- D Explain properties and approaches of dynamic programming

19 MAR 2022

SVKM'S

Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)  
Academic Year (2021-22)  
Class: SYBSc Semester: IV

Program: Bachelor of Science

Subject: Computer Science

Course Name: Linear Algebra with Python

Course Code: USMACS405

Date:

Max. Marks: 50

Time: 7:30 am to 9:15 am

Duration: 1 hr 45 minutes

**REGULAR EXAMINATION**

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**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 03 pages.
- 2) All questions are compulsory.
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right-hand side indicate full marks.
- 5) Assume Suitable data if necessary
- 6) Use of only non-scientific calculators is allowed

**Q 1. Attempt any two**

14

- A. Given  $u = (3, -2, -3, 1, -2)$ ,  $v = (2, -1, -2, 2, -1)$ , find 07
- i. distance between the vectors  $u$  and  $v$
  - ii. angle between the vectors  $u$  and  $v$
  - iii. projection between the vectors  $u$  and  $v$
  - iv. norm of the vector  $u$
- B. Given  $z$  and  $w$  are complex numbers where  $z = 2 - i$  and  $w = 3 + 2i$  then find 07
- i.  $z + w$
  - ii.  $zw$
  - iii. conjugate of  $z$
  - iv.  $w / z$
  - v.  $|z|$
- C. i. Solve the following triangular system of linear equations: 07
- $$\begin{aligned} 2p - 4q - 3r - 2s &= -9 \\ q + 4r - s &= 4 \\ 3r + s &= -6 \\ 2s &= -6 \end{aligned}$$

- ii. Determine whether the following homogeneous system of linear equations have non zero solution

$$\begin{aligned}x + y - z &= 0 \\2x + 4y - z &= 0 \\3x + 2y + 2z &= 0\end{aligned}$$

**Q 2.** Attempt any two

14

A. Given that

$$A = \begin{bmatrix} -7 & -12 & 1 \\ -4 & 3 & 4 \\ -2 & 5 & 2 \end{bmatrix} \quad B = \begin{bmatrix} 4 & 1 & -2 \\ 5 & 4 & 2 \\ -2 & -3 & -1 \end{bmatrix}$$

- i. Find the sum of the matrices
- ii. Find the transpose of matrix A
- iii. Find the inverse of matrix B from its adjugate matrix

B. Given that

$$A = \begin{bmatrix} 3 & -4 & 4 \\ 1 & 3 & -2 \\ 1 & 6 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 4 & -1 & 2 \\ 3 & 2 & 2 \\ -1 & -2 & 4 \end{bmatrix}$$

- i. Find the difference  $A - B$
- ii. Find the transpose of matrix A
- iii. Find the product of matrices

C. Find the basis and the rank of following matrix:

07

$$\begin{bmatrix} 1 & 2 & 0 & -1 \\ 2 & 6 & -3 & -3 \\ 3 & 5 & 4 & 0 \\ -2 & 2 & 1 & 2 \end{bmatrix}$$

**Q 3.** Attempt any two

14

A. Reduced the following matrix to it echelon form and then to its row-canonical form

07

$$\begin{bmatrix} 1 & 1 & 1 \\ 2 & 2 & -1 \\ 3 & 2 & 4 \end{bmatrix}$$

- B. Solve the following system of linear equations using Gaussian Elimination 07

$$\begin{aligned}3x + 5y + 2z &= -5 \\x + 3y + 2z &= -7 \\3x + y - 2z &= 11\end{aligned}$$

- C. For the following matrix A 07
- Find all eigenvalues and corresponding eigenvectors.
  - Find matrices P and D such that P is nonsingular and  $D = P^{-1}AP$  is diagonal.

$$A = \begin{bmatrix} 4 & 1 \\ 7 & -2 \end{bmatrix}$$

- Q 4. Attempt any four** 08

- A. Explain norm of a vector. 02  
B. Describe linearly dependent vectors. 02  
C. Explain degenerate linear equations and its solutions. 02  
D. What are the elementary row operations allowed on system of linear equations? 02  
E. Explain homogeneous system of linear equations 02  
F. Define eigenvalue and eigenvector. 02

- 2 JUL 2022

SVKM'S

Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)  
Academic Year (2021-22)

Class: SYBSc Semester: IV

Program: Bachelor of Science

Max. Marks: 50

Subject: Computer Science

Time:

Course Name: Linear Algebra with Python

Duration: 1 hr 45 minutes

Course Code: USMACS405

Date:

**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 03 pages.
- 2) All questions are compulsory.
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right-hand side indicate full marks.
- 5) Assume Suitable data if necessary
- 6) Use of only non-scientific calculators is allowed

**Q 1. Attempt any two** 14

- A. Given  $u = (2, -3, 2, 0, -4)$ ,  $v = (-1, -3, -3, -3, 2)$  find 07
- i. distance between the vectors  $u$  and  $v$
  - ii. angle between the vectors  $u$  and  $v$
  - iii. projection between the vectors  $u$  and  $v$
  - iv. norm of the vector  $u$
- B. Given  $z$  and  $w$  are complex numbers where  $z = 2 - 2i$  and  $w = -3 - 4i$  then find 07
- i.  $z + w$
  - ii.  $zw$
  - iii. conjugate of  $z$
  - iv.  $w / z$
  - v.  $|z|$
- C. i. Solve the following triangular system of linear equations: 07
- $$\begin{aligned} 2p - 3q + 5r - 2s &= 9 \\ 5q - r + 3s &= 1 \\ 7r - s &= 3 \\ 2s &= 8 \end{aligned}$$

- ii. Determine whether the following homogeneous system of linear equations have non zero solution

$$3x + 2y - 2z = 0$$

$$x - 2y + 2z = 0$$

$$x - 2y + 3z = 0$$

**Q 2.** Attempt any two

14

A. Given that

$$A = \begin{bmatrix} -2 & -3 & 1 \\ -14 & 2 & 4 \\ -2 & 3 & 2 \end{bmatrix} \quad B = \begin{bmatrix} -1 & -1 & -1 \\ -2 & 1 & -2 \\ 1 & 2 & 4 \end{bmatrix}$$

- i. Find the sum of the matrices
- ii. Find the transpose of matrix A
- iii. Find the inverse of matrix B from its adjugate matrix

B. Given that

07

$$A = \begin{bmatrix} -2 & -3 & 4 \\ 3 & 1 & -2 \\ 0 & 2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 4 & 1 & 1 \\ 2 & -2 & 3 \\ -1 & -3 & 2 \end{bmatrix}$$

- i. Find the difference  $A - B$
- ii. Find the transpose of matrix A
- iii. Find the product of matrices

C. Find the basis and the rank of following matrix:

07

$$\begin{bmatrix} 1 & 1 & 2 & 0 \\ 2 & 4 & 2 & 4 \\ 2 & 1 & 5 & -2 \\ -1 & 2 & 3 & -2 \end{bmatrix}$$

**Q 3.** Attempt any two

14

A. Reduced the following matrix to it echelon form and then to its row-canonical form

07

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & -1 \\ 3 & 2 & 2 \end{bmatrix}$$

B. Solve the following system of linear equations using Gaussian Elimination 07  
 $x + 2y - 3z = 1$   
 $2x + 5y - 8z = 4$   
 $3x + 8y - 13z = 7$

C. For the following matrix A 07  
i. Find all eigenvalues and corresponding eigenvectors.  
ii. Find matrices P and D such that P is nonsingular and  $D = P^{-1}AP$  is diagonal.

$$A = \begin{bmatrix} 3 & 2 \\ 3 & -2 \end{bmatrix}$$

Q 4. Attempt any four 08

- A. Explain linear combination of vectors. 02
- B. Explain spanning set and linear span of a vector space. 02
- C. What is a system of linear equations and its solutions? 02
- D. Describe the steps to convert a matrix into its row canonical form 02
- E. Describe diagonalization 02
- F. Define eigenvalue and eigenvector. 02

21 MAR 2022

SVKM'S  
Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)  
Academic Year (2021-22)  
Class:S.Y.B.Sc. Semester:IV

Program: Bachelor of Science  
Subject: Computer Science  
Course Code : USMACS406  
Course Name : .NET Technologies  
Date: \_\_\_\_\_

Max. Marks: 50  
Time: 7:30 am to 9:15 am  
Duration: 1 hr 45 minutes

**REGULAR EXAMINATION**

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**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) All Questions are compulsory.
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right hand side indicate full marks.

**Q.1 Attempt any TWO Questions (14)**

- A How does language compilation take place in .NET Framework ? (7)  
Explain it with a diagram
- B Write the list of datetime related functions available in C# along with (7)  
syntax and coding example
- C Discuss different class accessibility options available in C#. Create a (7)  
class and a constructor for the class. Create an object for the class.

**Q.2 Attempt any TWO Questions (14)**

- A Write a note on the following properties with possible values of Web (7)  
Controls.  
a. EnableViewState b. Page c. TabIndex d. AccessKey  
e. Parent f. BorderStyle (with possible values)
- B Write a note on the role of Cross-Page posting and Query String in (7)  
state management with appropriate coding examples

- C Create a Textbox which accepts an input from the user. Discuss all the possible validators that can be used with that textbox for various data types. Mention the properties of validation controls that should be changed for each validation. (7)

**Q.3 Attempt any TWO Questions (14)**

- A Write code snippets to create Connection object, DataReader object and insert a new record in a sample table. Assume the table details (7)

- B Write c# functions to create and retrieve an XML file given below using ASP.NET (7)

```
<clients>
<client location='CA'>
<supervisor> chromatic</supervisor>
<staffcount> 1 </staffcount>
</client>
</clients>
```

- C What is Simple Data Binding ? Write a code snippet to populate a CheckBoxList using class objects and array\_list (7)

**Q.4 Attempt any FOUR Questions (08)**

- A Write the syntax and example C# statements to declare 1D and 2D arrays (2) (Numeric and Strings)

- B What is Client-Side Validation and Server-Side Validation ? Give a (2) Scenario to explain these two concepts.

- C Give at least 4 rich data controls. (2)

- D Write about at least 4 wild card characters that can be used in validator (2) controls for regular expression

- E List the Properties of Connection String. (2)

- F Write a C# code for creating a base class and a derived class in C# (2)

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30 JUN 2022

**SVKM'S**

**Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)**  
**Academic Year (2021-22)**  
**Class:S.Y.B.Sc. Semester:IV**

**Program: Bachelor of Science**

**Max. Marks: 50**

**Subject: Computer Science**

**Time:**

**Course Code : USMACS406**

**Course Name : .NET Technologies**

**Date: \_\_\_\_\_**

**Duration: 1 hr 45 minutes**

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**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) All Questions are compulsory.
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right hand side indicate full marks.

**Q.1 Attempt any TWO Questions (14)**

- A What are the implications of Common Language Runtime in .NET Framework ?
- B Write the list of array related methods available in C# along with syntax and coding example (7)
- C Discuss different class accessibility options available in C#. Create a class and a constructor for the class. Create an object for the class. (7)

**Q.2 Attempt any TWO Questions (14)**

- A Draw the diagram to depict when a page is requested and rendered and explain the steps. Also write about Page directive code. (7)
- B Give at least 4 types of errors made by the user during data entry. Suggest ways to avoid them. (7)
- C What is AdRotator Control ? Write the XML file which is created for the AdRotator Control. (7)

**Q.3 Attempt any TWO Questions (14)**

- A Draw the ADO.NET architecture diagram and explain about the two ways of accessing the data from back end. (7)
- B Write functions to insert a record and retrieve the contents of a SQL table using disconnected architecture (7)
- C What is data binding and what are its types ? How do you populate a list box with SQL table contents using data binding ? (7)

**Q.4 Attempt any FOUR Questions (08)**

- A What are static members ? How is it different from other members ? (2)  
Give example
- B Write the properties that should be changed while adding (2) RangeValidator ?
- C What are cookies ? How do you create them in ASP.NET (2)
- D Write at least 4 generic properties of a web control (2)
- E Write a C# code for creating a base class and a derived class in C# (2)
- F List the Properties of Connection String. (2)

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15 MAR 2023

SVKM'S

Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)

Academic Year (2022-23)

Class:S.Y.B.Sc. Semester: IV

Program: B.Sc. Computer Science

Max. Marks: 75

Course Name: .NET Technologies

Time:

Course Code: USMACS406

Duration: 2 hrs 30 minutes

Date:

### REGULAR EXAMINATION

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**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) All Questions are compulsory.
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right hand side indicate full marks.
- 5) Assume Suitable data if necessary

**Q-1 Attempt any THREE Questions :** (21)

- a) How does Common Language Runtime impact .NET Framework ? (7)
- b) Draw the diagram to depict when a page is requested and rendered and explain the steps. (7)  
Also write about Page directive code.
- c) Discuss different class accessibility options available in C#. Create a class and a constructor (7) for the class. Create an object for the class.
- d) Explain passing parameter by value and by reference in functions with the help of a coding (7) example in C#.

**Q-2 Attempt any THREE Questions :** (21)

- a) How is information passed through query strings ? Explain with the help of a coding (7) example. Also write about URL encoding.
- b) Give at least 7 types of errors made by the user during data entry. Suggest ways to avoid (7) them.
- c) What is AdRotator Control ? Write the XML file which is created for the AdRotator (7) Control.
- d) List at least 7 web control classes with their equivalent HTML elements. Also write the (7) functionality of every control.

**Q-3 Attempt any THREE Questions :** (21)

- a) Draw the ADO.NET architecture diagram and explain about the two ways of accessing the data from back end. (7)
- b) Write functions to insert a record and retrieve the contents of a SQL table using disconnected architecture (7)
- c) What is Single-value Data binding ? Incorporate Single-value data binding and display different types of information on the web page. Also write the problems in single-value data binding (7)
- d) Assume an XML file which stores information about students. Create that file using XMLTextWriter and related classes. (XML Tree should have a depth of at least 4). (7)

**Q-4 Attempt any THREE Questions :** (12)

- a) Write a note on .NET languages and Intermediate Language (4)
- b) List any 4 derived classes of HtmlInputControl class. (4)
- c) Write down the steps to query information from a table with simple data access. (4)
- d) Write at least 4 generic properties of a web control (4)

24 JUN 2022

SVKM'S

Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)

Academic Year (2021-22)

Class:S.Y.B.Sc

Semester:IV

Program: Bachelor of Science

Max. Marks: 50

Subject: Computer Science

Time:

Course Code: USMACS403

Course Name : Physical Computing and IoT

Date:

Duration: 1 hr 45 minutes

**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) All Questions are compulsory.
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right hand side indicate full marks.
- 5) Assume Suitable data if necessary

<b>Q.1</b>		<b>Attempt any Two</b>	<b>14</b>
1		Elaborate the term Embedded systems with respect to following points:	7
		• Definition	
		• Components	
		• Diagram	
2		Draw and explain different features of Raspberry Pi.	7
3		Draw and explain structure of GPU.	7
<b>Q.2</b>		<b>Attempt any Two</b>	<b>14</b>
1		Currently world is moving towards M:M technology. Justify the impact of such technology in human life by providing at least three examples.	7
2		As a student of IoT what are the challenges for implementation of the same in current situation and in near future? Comment your views.	7
3		Explain Functional model and need for various functional groups with respect to IOT?	7
<b>Q.3</b>		<b>Attempt any Two</b>	<b>14</b>
1		Shreedevi is a fashion designer and very busy in her daily activities like meetings, new projects etc. She wants to implement smart office concept to simplify her daily activities. Help in identifying following:	7
		• What is a smart office?	
		• Tasks / activities managed by smart office.	

2	Darshil wants to know the security measures which can be used to keep IoT devices safe. Help her to identify those and explain them in brief.	7
3	Discuss various types of attacks in IoT	7
<b>Q.4</b>	<b>Answer any four questions.</b>	<b>8</b>
1	Why one need to use Linux as OS for raspberry pi. Provide any 2 justifications.	2
2	Explain following with respect to raspberry pi:	2
	• GPIO	
	• Ethernet	
3	Explain the purpose of following Linux commands with suitable example	2
	• mv	
	• cat	
	• grep	
	• ls	
4	Describe following :	2
	• Macro viruses	
	• File infectors	
5	Define URL and state its structure.	2
6	State the need of firewall.	2

08 MAR 2023

**SVKM'S**

**Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)**

**Academic Year (2022-23)**

**Class: S.Y.B.Sc Semester: IV**

**Program: Bachelor of Science**

**Max. Marks: 75**

**Subject: Computer Science**

**Time:**

**Course Code: USMACS403**

**Course Name : Physical Computing and IoT**

**Date:**

**Duration: 2 hr 30 min**

**REGULAR EXAMINATION**

**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) All Questions are compulsory.
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right hand side indicate full marks.
- 5) Assume Suitable data if necessary

**Q.1      Attempt any Three    21**

- 1 Define the term Embedded System. Draw and explain its various components.
- 2 Write a note on FPGA with respect to following :
  - Features
  - applications
- 3 State the need of following Linux commands in Raspberry PI.  
1)mv    2) cp    3) cat    4) ls    5) who am i    6) grep    7) touch
- 4 Analyze the comparison of CPU and GPU.

**Q.2      Attempt any Three    21**

- 1 In what way RFID plays a vital role in the field of IoT which helps in tracking inventory and improving customer satisfaction.
- 2 Compare M2M and IoT.
- 3 Discuss various inputs and outputs of an M2M Value Chain
- 4 What do you mean by IGVC? State the role of following with respect to IGVC :-
  - Data Factories
  - Service Provider/Data wholesalers
  - Intermediaries
  - Resellers

**21**

**Q.3      Attempt any Three**

- 1 Explain CoAP Protocol used in IOT
- 2 Pratham wants to purchase an IoT device to secure his office. Give him some tips to avoid IoT disasters.
- 3 Analyze the importance IoT in Education and Government sector
- 4 These days IoT has grabbed the popularity among other technologies. Discuss various characteristics/features which are responsible to make this popular.

**Q.4      Attempt any Three**

**12**

- 1 Draw pin diagram of Raspberry PI and list important pins.
- 2 Draw block diagram of 8051.
- 3 List and explain various features of Python.
- 4 State various features of carriots

- 5 JUL 2022

**SVKM'S**  
**Mithibai College of Arts, Chauhan Institute of Science &**  
**Amrutben Jivanlal College of Commerce and Economics (Autonomous)**  
**Academic Year (2021-22)**  
**Class: S. Y. B. Sc. Semester: IV**

**Program: Bachelor of Science** **Max. Marks: 50**  
**Subject: Computer Science**  
**Course Code / Name : USMACS407 Software Engineering** **Time:**  
**Date: \_\_\_\_\_** **Duration: 1 hr 45 minutes**

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**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) All Questions are Compulsory
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right hand side indicate full marks.
- 5) Assume Suitable data if necessary

**Q1. Answer the following (Any 2 out of 3)** 14

1. Explain Waterfall Model and CBSE.
2. Explain Extreme Programming and XP Process.
3. What is Feasibility Study and explain any 3 Feasibilities.

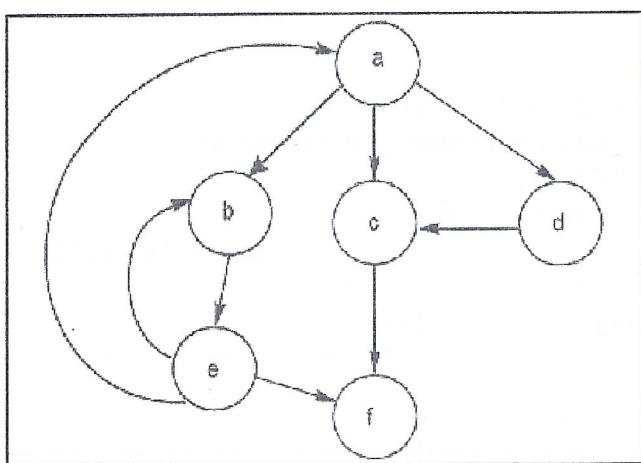
**Q2. Answer the following (Any 2 out of 3)** 14

1. Write a note on Functional and Non-functional requirements for a system.
2. Write a note on Design Specifications and attributes from IEEE Standard 1016.
3. Explain Activity Diagram. Draw an activity diagram for Online Shopping System for a Web Customer.

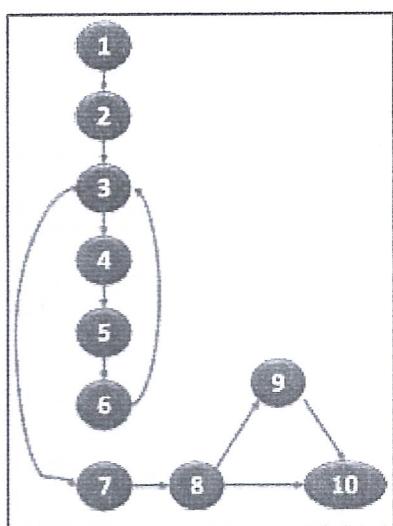
**Q3. Answer the following (Any 2 out of 3)** 14

1. Write a short note on Effort Distribution and Timeline charts.
2. Explain Function Based Metric and Object Oriented Design in details.
3. Explain: Cyclomatic complexity. Find the Cyclomatic Complexity of the following figures using atleast 2 ways.

a)



b)



Q4. Answer the following in two or few lines (Any 4 out of 6) 08

1. List broad categories of software application domain.
2. List the General principles of Software Engineering.
3. Who are the users of the SRS document?
4. Draw a Statechart Diagram for Traffic Signal.
5. What are the two fundamental testing activities?
6. List Project Scheduling Basic Principles.

SVKM'S

Mithibai College of Arts, Chauhan Institute of Science &  
Amrutben Jivanlal College of Commerce and Economics (Autonomous)  
Academic Year (2022-23)

Class: SYBSC Semester: IV

Program: B.Sc Computer Science

Max. Marks: 75

Course Name: Software Engineering

Time:

Course Code: USMACS407

Duration: 2 hrs 30 minutes

Date:

**REGULAR EXAMINATION**

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**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) Answer to each new question to be started on a fresh page.
- 3) Figures in brackets on the right-hand side indicate full marks.
- 4) Assume Suitable data if necessary.

**Q1 ATTEMPT ANY 3 FROM THE FOLLOWING: [21]**

- |   |   |
|---|---|
| A Define Software process. Explain software process framework with the help of a diagram. | 7 |
| B Explain Cultural, Economic and Organizational Feasibility in detail.                    | 7 |
| C What are the problems with waterfall model? Describe the concurrent model in detail.    | 7 |
| D What is Spiral model? How does the Spiral Model handle the need for risk management?    | 7 |

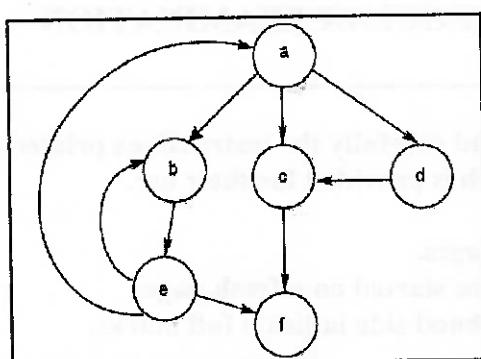
**Q2 ATTEMPT ANY 3 FROM THE FOLLOWING: [21]**

- |   |   |
|---|---|
| A What is Software Requirement Specification? State and explain the characteristics of SRS. | 7 |
| B Draw a State diagram for depicting a telephone call.                                      | 7 |
| C Explain usecase diagram with its components.  | 7 |
| D What is Cohesion? Explain any 3 types of cohesion.  | 7 |

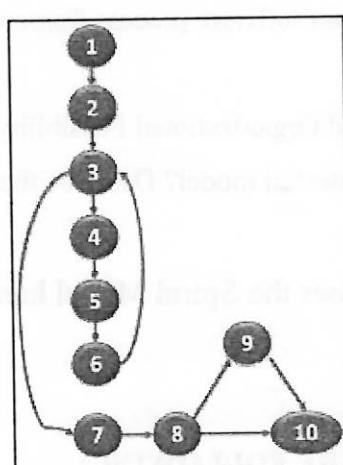
**Q3 ATTEMPT ANY 3 FROM THE FOLLOWING:** [21]

- A Write a short note on Effort Distribution and Timeline charts. 7
- B Explain Function point analysis in detail with an example. 7
- C What is testing? Discuss any 3 types of testing in detail. 7
- D Explain: Cyclomatic complexity. Find the Cyclomatic Complexity of the following figures using at least 2 ways. 7

a)



b)



**Q4 ATTEMPT ANY 3 FROM THE FOLLOWING:** [12]

- A State the reasons for failure of a software. 4
- B Who are the users of the SRS document? 4
- C Write a note on stakeholders in Software engineering. 4
- D What are the two fundamental testing activities? 4

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## SVKM'S

Mithibai College of Arts, Chauhan Institute of Science &  
 Amrutben Jivanlal College of Commerce and Economics (Autonomous)  
 Academic Year (2021-22)  
 Class: S. Y. B. Sc. Semester: IV

**Program: Bachelor of Science** **Max. Marks: 50**

**Subject: Computer Science**

**Course Code / Name : USMACS407 Software Engineering**

**Time: 7:30 am to 9:15 am**

**Date:** \_\_\_\_\_

**Duration: 1 hr 45 minutes**

**REGULAR EXAMINATION**

**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) This question paper contains 2 pages.
- 2) All Questions are Compulsory
- 3) Answer to each new question to be started on a fresh page.
- 4) Figures in brackets on the right hand side indicate full marks.
- 5) Assume Suitable data if necessary

**Q1. Answer the following (Any 2 out of 3)**

**14**

1. Explain Incremental Delivery and Spiral Development.
2. Explain: Software, Software Application Domains, Software Engineering
3. Explain Cultural, Economic and Organizational Feasibility in detail.

**Q2. Answer the following (Any 2 out of 3)**

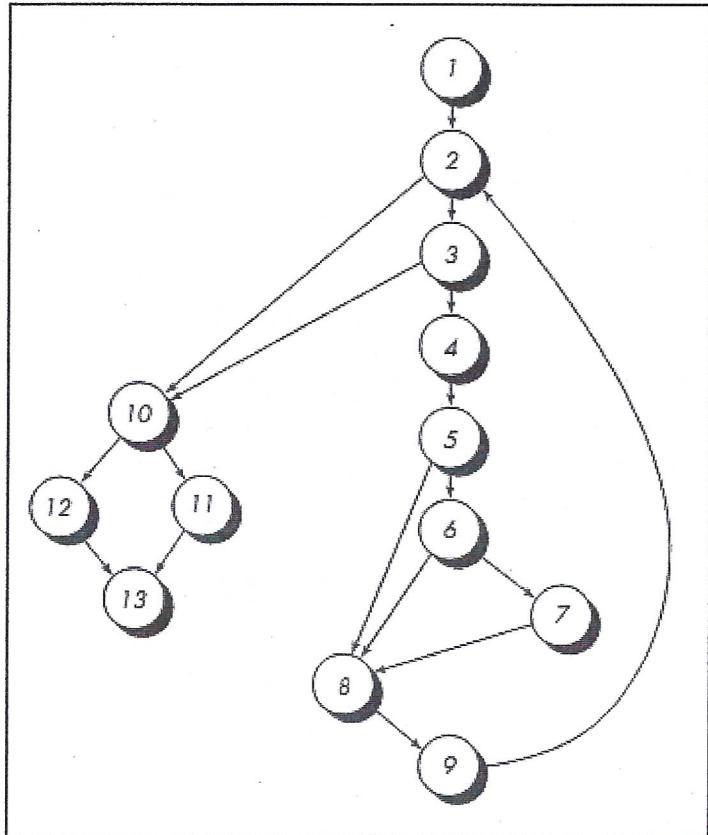
**14**

1. Explain SRS, its need and structure of SRS document.
2. Write a short note on Interaction Diagrams- Sequence and Collaboration with examples (diagrams).
3. Explain Use Case Diagram. Draw a Use Case Diagram for Student Management System.

**Q3. Answer the following (Any 2 out of 3)**

**14**

1. Describe COCOMO-II in brief.
2. Explain in short: Testing Principles, Levels of Testing, Test plan and Test oracles.
3. Explain: Cyclomatic complexity. Find the Cyclomatic Complexity of the following figure using all 3 ways.



Q4. Answer the following in two or few lines (Any 4 out of 6)

08

1. What are the attributes of Good Software?
2. Give the full form of:
  - a) CBSE
  - b) COTS
  - c) CASE
  - d) RUP
3. Define Coupling and Cohesion.
4. Draw the diagram of RE Process.
5. Which are the 3 major categories of Software Engineering Resources?
6. Define terms measurement, metrics, indicator.