

# New Horizon College of Engineering, Bangalore

Autonomous College affiliated to VTU, Accredited by NAAC with 'A' Grade & NBA

**ODD Semester End Examinations A.Y: 2022-23**

## Web Technologies

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

### Module 1

- 1a) Define a Web server. Write the types of Web Servers with its detail characteristics 10 L1 CO1 present in each category.
- b) Explain HTTP request and response methods with its status codes and suitable diagram. 10 L2 CO1

### OR

- 2a) Define MIME extension. Write a short note on MIME with a suitable example. 10 L1 CO1
- b) Explain web programmers tool box with its detail contents. State its importance. 10 L2 CO1

### Module 2

- 3a) Explain the different levels of style sheet with help of suitable code for each. 10 L2 CO2
- b) Develop a suitable HTML program with CSS code displaying Class Time table. 10 L3 CO2

### OR

- 4a) Explain different types of lists present in HTML with its proper syntax and usage citing an example under each category. 10 L2 CO2
- b) Develop a suitable HTML program with CSS to control background repetitions of an image along all axes. 10 L3 CO2

### Module 3

- 5a) Develop and demonstrate a XHTML file that includes JavaScript script for the following problems: a) Input: A number n obtained using prompt  
Output: The first n Fibonacci numbers

b) Input: A number n obtained using prompt  
Output: A table of numbers from 1 to n and their squares using alert box.

- b) Analyze the Document object model with the help of a suitable tree structure. 10 L4 CO3

### OR

- 6a) Develop and demonstrate, using JavaScript script, a XHTML document that collects the USN (the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper-case characters followed by three digits; no embedded spaces allowed) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected. 10 L3 CO3

- b) Analyze with a suitable example Events and Event handling methods in java script. 10 L4 CO3

**Module 4**

- 7a) Define Element Visibility in java script with a suitable java script code. 10 L1 CO4  
b) Analyze with a suitable program positioning of elements in Java script with 10 L4 CO4  
suitable example.

**OR**

- 8a) Define Dragging and Dropping of elements. Write a suitable program for 10 L1 CO4  
dragging and dropping of elements in Java script.  
b) Analyze and write, using JavaScript script, a XHTML document that contains 10 L4 CO4  
three short paragraphs of text, stacked on top of each other, with only enough of  
each showing so that the mouse cursor can be placed over some part of them.  
When the cursor is placed over the exposed part of any paragraph, it should rise  
to the top to become completely visible.

**Module 5**

- 9a) Justify the importance of PHP array methods. Write all array methods with its 10 L5 CO5  
proper syntax.  
b) Characterize the importance of form handling in PHP with a suitable code and 10 L5 CO6  
an example

**OR**

- 10a) Justify the importance of cookies and Sessions in PHP depending on their usage 10 L5 CO5  
and applicability.  
b) Justify the importance of PHP-Database connectivity. Create a XHTML form 10 L5 CO6  
with Name, Address Line 1, Address Line 2, and E-mail text fields. On  
submitting, store the values in MySQL table. Retrieve and display the data  
based on Name.

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**ODD Semester End Examinations A.Y: 2022-23**

## SOFTWARE TESTING

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

### Module 1

- |      |   |    |    |     |
|------|---|----|----|-----|
| 1 a) | Draw a neat diagram and describe the software testing life cycle                    | 10 | L1 | CO1 |
| b)   | Explain the steps involved in framing the software test cases                       | 5  | L2 | CO1 |
| c)   | Discuss the program behavior, its observation and analysis in software application. | 5  | L2 | CO1 |

### OR

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 2a) | Describe the test process models and sources of test generations in the types of testing. | 10 | L1 | CO1 |
| b)  | Discuss software quality and reliability with an example.                                 | 5  | L2 | CO1 |
| c)  | Compare verification and validation in the software projects.                             | 5  | L2 | CO1 |

### Module 2

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 3a) | Classify the boundary value analysis for the function of two variable.               | 10 | L3 | CO2 |
| b)  | Analyze the du-paths for Sales and Commission in the commission problem pseudo code. | 10 | L4 | CO2 |

```

27     sales = lockSales + stockSales + barrelSales
28     Output("Total sales: ", sales)

29     If (sales > 1800.0)
30         Then
31             commission = 0.10 * 1000.0
32             commission = commission + 0.15 * 800.0
33             commission = commission + 0.20*(sales-1800.0)
34     Else If (sales > 1000.0)
35         Then
36             commission = 0.10 * 1000.0
37             commission = commission + 0.15*(sales-1000.0)
38         Else commission = 0.10 * sales
39     EndIf
40 EndIf

41     Output("Commission is $", commission)
42 End Commission

```

**OR**

- 4a) Illustrate the model based testing by considering the ATM scenario test cases      10 L3 CO2
- i) Unsuccessful operation due to enter wrong PIN number 3 times.
  - ii) Unsuccessful operation due to invalid account type.
  - iii) Successful selection of amount to be withdrawn.
  - iv) Expected message due to amount to withdraw is greater than possible balance

- b) Examine the Program based Millers test coverage metrics with an example.      10 L4 CO2

**Module 3**

- 5a) Explain the stages of deployment testing in detail.      10 L2 CO3
- b) Classify the steps involved in defect bash with an example.      10 L3 CO4

**OR**

- 6a) Explain stress testing and state the reasons for stress testing.      10 L2 CO3
- b) Illustrate with an example acceptance testing and identify the criteria for acceptance testing.      10 L3 CO4

**Module 4**

- 7a) Compute a DDG graph for dynamic slicing with a suitable example.      10 L3 CO5
- b) Characterize the defect seeding also write the issues while using defect seeding technique.      10 L4 CO5

**OR**

- 8a) Illustrate the procedure used for selecting the test cases using regression testing.      10 L3 CO5
- b) Examine dynamic slicing and static slicing techniques adopted in regression testing.      10 L4 CO5

**Module 5**

- 9a) Illustrate the steps involved in installing selenium web driver.      10 L3 CO6
- b) Identify the various selenium commands and explain any 5 with suitable syntax and example.      5 L4 CO6
- c) Identify the steps to record and run test cases using selenium IDE.      5 L4 CO6

**OR**

- 10a) Classify the challenges in automation testing explain in brief.      10 L3 CO6
- b) Examine how does selenium web-driver work.      5 L4 CO6
- c) Examine the architecture of selenium web driver.      5 L4 CO6

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**ODD Semester End Examinations A.Y: 2022-23**

## MOBILE APPLICATION DEVELOPMENT

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

### Module 1

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 1a) | Describe in detail the various types of Android applications | 10 | L1 | CO1 |
| b)  | Explain the features of Dalvik virtual machine with diagram  | 10 | L2 | CO1 |

**OR**

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 2a) | Write note on the various components of Android architecture with neat diagram | 10 | L1 | CO1 |
| b)  | Explain about Android manifest file with an example.                           | 10 | L2 | CO1 |

### Module 2

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 3a) | Illustrate the use of activity stack with neat diagram                          | 10 | L3 | CO2 |
| b)  | Examine the various user interface components to create an Android application. | 10 | L4 | CO2 |

**OR**

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 4a) | Illustrate any Android application using spinners.               | 10 | L3 | CO2 |
| b)  | Examine the various steps involved in creating dynamic fragments | 10 | L4 | CO2 |

### Module 3

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 5a) | Illustrate the necessary methods on notification messages in Android application.                         | 10 | L3 | CO3 |
| b)  | Evaluate the various methods in broadcast receiver implementation for receiving messages by Android apps. | 10 | L5 | CO3 |

**OR**

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 6a) | Illustrate the background task execution using Asynchronous task.            | 10 | L3 | CO3 |
| b)  | Evaluate the services provided by intent filters to service implicit intents | 10 | L5 | CO3 |

### Module 4

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 7a) | Characterize the importance of SQLite in android. | 10 | L4 | CO4 |
| b)  | Interpret the importance of shared preferences.   | 10 | L5 | CO5 |

**OR**

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 8a) | Identify the steps involved in creating preference activity. | 10 | L4 | CO4 |
| b)  | Interpret the importance of file storage in android.         | 10 | L5 | CO5 |

### Module 5

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 9a) | Explain signing and versioning of apps.                                       | 10 | L2 | CO6 |
| b)  | Identify the various steps to distribute and monetize the mobile application. | 10 | L4 | CO6 |

**OR**

- |      |   |    |    |     |
|------|---|----|----|-----|
| 10a) | Explain building apps with Location – based services. | 10 | L2 | CO6 |
| b)   | Identify best practices for security and privacy.     | 10 | L4 | CO6 |

# New Horizon College of Engineering, Bangalore

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**ODD Semester End Examinations A.Y: 2022-23**

## FUNDAMENTALS OF DATA SCIENCE

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

### Module 1

- 1a) Describe how Drew Conway's Venn diagram tells us about what skills are required for being a Data Scientist. 10 L1 CO1
- b) Explain the importance of Data Science in Business Intelligence. 5 L2 CO1
- c) Explain applications of Machine Learning algorithms in Data Science. 5 L2 CO1

**OR**

- 2a) List and describe all necessary steps to be followed in development of a data science project. 10 L1 CO1
- b) Compare qualitative and quantitative data. 5 L2 CO1
- c) Discuss 4 levels of data with suitable examples. 5 L2 CO1

### Module 2

- 3a) Compute eigenvalues and corresponding eigenvectors of the following matrix. 10 L3 CO2  

$$\begin{pmatrix} 2 & -3 & 0 \\ 2 & -5 & 0 \\ 0 & 0 & 3 \end{pmatrix}$$
- b) Consider 4 data points A, B, C, D as below. Draw clusters of points using any 2 distance measures. Analyze new clusters. 10 L4 CO2

Data Point	X	Y
A	2	3
B	1	2
C	5	6
D	2	2

**OR**

- 4a) Draw the graph of the line  $x-3y=1$ , and find out the inequations corresponding to the upper and lower half-planes 10 L3 CO2

- 
- b) Examine the given matrix A and identify whether A is positive definite matrix or not. 10 L4 CO2

$$A = \begin{bmatrix} 10 & 5 & 2 \\ 5 & 3 & 2 \\ 2 & 2 & 3 \end{bmatrix}$$

**Module 3**

- 5a) Illustrate the laws of conditional probability with an example. 10 L3 CO3  
b) Prioritize the types of random variables used in data science contexts. 10 L5 CO4

**OR**

- 6a) Compute the differences between inferential statistics or descriptive statistics with an example. 10 L3 CO3  
b) Evaluate the sampling techniques with an example. 10 L5 CO4

**Module 4**

- 7a) Examine the use of Principal Component Analysis in the Dimensionality. 10 L4 CO5  
b) Evaluate the procedure for the Naïve Bayes algorithm with example. 10 L5 CO5

**OR**

- 8a) Examine the need of K means clustering and KNN algorithm in a real time by taking an example for each. Illustrate the mathematical intuition behind these 2 algorithms. 10 L4 CO5  
b) Evaluate and Explain the Need of Logistic Regression Algorithm with the help of Sigmoid Function. 10 L5 CO5

**Module 5**

- 9a) Illustrate the order of operations in which the filters are executed to perform the actions on view in Tableau. 10 L3 CO6  
b) Identify different filters to analyze data using Tableau. 4 L4 CO6  
c) Derive steps to connect data source with Tableau. 6 L4 CO6

**OR**

- 10a) Illustrate the differences between Bar graph and Histogram. Decide the purpose and use of the same in data science. 10 L3 CO6  
b) Examine the strategy of presenting the data in effective method of visualization. 4 L4 CO6  
c) Identify the different types of joins used in Tableau and explain each of them by drawing small sample amount of data 6 L4 CO6

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## SOFTWARE TESTING

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

### Module 1

- |      |   |    |    |     |
|------|---|----|----|-----|
| 1 a) | Draw a neat diagram and describe the software testing life cycle                    | 10 | L1 | CO1 |
| b)   | Explain the steps involved in framing the software test cases                       | 5  | L2 | CO1 |
| c)   | Discuss the program behavior, its observation and analysis in software application. | 5  | L2 | CO1 |

### OR

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 2a) | Describe the test process models and sources of test generations in the types of testing. | 10 | L1 | CO1 |
| b)  | Discuss software quality and reliability with an example.                                 | 5  | L2 | CO1 |
| c)  | Compare verification and validation in the software projects.                             | 5  | L2 | CO1 |

### Module 2

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 3a) | Classify the boundary value analysis for the function of two variable.               | 10 | L3 | CO2 |
| b)  | Analyze the du-paths for Sales and Commission in the commission problem pseudo code. | 10 | L4 | CO2 |

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27     sales = lockSales + stockSales + barrelSales
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- b) Examine the Program based Millers test coverage metrics with an example.      10 L4 CO2

**Module 3**

- 5a) Explain the stages of deployment testing in detail.      10 L2 CO3
- b) Classify the steps involved in defect bash with an example.      10 L3 CO4

**OR**

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**Module 4**

- 7a) Compute a DDG graph for dynamic slicing with a suitable example.      10 L3 CO5
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**OR**

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**Module 5**

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- b) Identify the various selenium commands and explain any 5 with suitable syntax and example.      5 L4 CO6
- c) Identify the steps to record and run test cases using selenium IDE.      5 L4 CO6

**OR**

- 10a) Classify the challenges in automation testing explain in brief.      10 L3 CO6
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## ODD Semester End Examinations A.Y: 2022-23

### MOBILE APPLICATION DEVELOPMENT

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

#### Module 1

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 1a) | Describe in detail the various types of Android applications | 10 | L1 | CO1 |
| b)  | Explain the features of Dalvik virtual machine with diagram  | 10 | L2 | CO1 |

**OR**

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 2a) | Write note on the various components of Android architecture with neat diagram | 10 | L1 | CO1 |
| b)  | Explain about Android manifest file with an example.                           | 10 | L2 | CO1 |

#### Module 2

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 3a) | Illustrate the use of activity stack with neat diagram                          | 10 | L3 | CO2 |
| b)  | Examine the various user interface components to create an Android application. | 10 | L4 | CO2 |

**OR**

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 4a) | Illustrate any Android application using spinners.               | 10 | L3 | CO2 |
| b)  | Examine the various steps involved in creating dynamic fragments | 10 | L4 | CO2 |

#### Module 3

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 5a) | Illustrate the necessary methods on notification messages in Android application.                         | 10 | L3 | CO3 |
| b)  | Evaluate the various methods in broadcast receiver implementation for receiving messages by Android apps. | 10 | L5 | CO3 |

**OR**

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 6a) | Illustrate the background task execution using Asynchronous task.            | 10 | L3 | CO3 |
| b)  | Evaluate the services provided by intent filters to service implicit intents | 10 | L5 | CO3 |

#### Module 4

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 7a) | Characterize the importance of SQLite in android. | 10 | L4 | CO4 |
| b)  | Interpret the importance of shared preferences.   | 10 | L5 | CO5 |

**OR**

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 8a) | Identify the steps involved in creating preference activity. | 10 | L4 | CO4 |
| b)  | Interpret the importance of file storage in android.         | 10 | L5 | CO5 |

#### Module 5

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 9a) | Explain signing and versioning of apps.                                       | 10 | L2 | CO6 |
| b)  | Identify the various steps to distribute and monetize the mobile application. | 10 | L4 | CO6 |

**OR**

- |      |   |    |    |     |
|------|---|----|----|-----|
| 10a) | Explain building apps with Location – based services. | 10 | L2 | CO6 |
| b)   | Identify best practices for security and privacy.     | 10 | L4 | CO6 |

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**ODD Semester End Examinations A.Y: 2022-23**

## FUNDAMENTALS OF DATA SCIENCE

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

### Module 1

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 1a) | Describe how Drew Conway's Venn diagram tells us about what skills are required for being a Data Scientist. | 10 | L1 | CO1 |
| b)  | Explain the importance of Data Science in Business Intelligence.  | 5  | L2 | CO1 |
| c)  | Explain applications of Machine Learning algorithms in Data Science.  | 5  | L2 | CO1 |

### OR

- |     |  |    |    |     |
|-----|--|----|----|-----|
| 2a) | List and describe all necessary steps to be followed in development of a data science project. | 10 | L1 | CO1 |
| b)  | Compare qualitative and quantitative data.   | 5  | L2 | CO1 |
| c)  | Discuss 4 levels of data with suitable examples.   | 5  | L2 | CO1 |

### Module 2

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 3a) | Compute eigenvalues and corresponding eigenvectors of the following matrix. | 10 | L3 | CO2 |
|-----|---|----|----|-----|

$$\begin{pmatrix} 2 & -3 & 0 \\ 2 & -5 & 0 \\ 0 & 0 & 3 \end{pmatrix}$$

- |    |  |    |    |     |
|----|--|----|----|-----|
| b) | Consider 4 data points A, B, C, D as below. Draw clusters of points using any 2 distance measures. Analyze new clusters. | 10 | L4 | CO2 |
|----|--|----|----|-----|

Data Point	X	Y
A	2	3
B	1	2
C	5	6
D	2	2

### OR

- |     |   |    |    |     |
|-----|---|----|----|-----|
| 4a) | Draw the graph of the line $x-3y=1$ , and find out the inequations corresponding to the upper and lower half-planes | 10 | L3 | CO2 |
|-----|---|----|----|-----|

- 
- b) Examine the given matrix A and identify whether A is positive definite matrix or not. 10 L4 CO2

$$A = \begin{bmatrix} 10 & 5 & 2 \\ 5 & 3 & 2 \\ 2 & 2 & 3 \end{bmatrix}$$

**Module 3**

- 5a) Illustrate the laws of conditional probability with an example. 10 L3 CO3  
b) Prioritize the types of random variables used in data science contexts. 10 L5 CO4

**OR**

- 6a) Compute the differences between inferential statistics or descriptive statistics with an example. 10 L3 CO3  
b) Evaluate the sampling techniques with an example. 10 L5 CO4

**Module 4**

- 7a) Examine the use of Principal Component Analysis in the Dimensionality. 10 L4 CO5  
b) Evaluate the procedure for the Naïve Bayes algorithm with example. 10 L5 CO5

**OR**

- 8a) Examine the need of K means clustering and KNN algorithm in a real time by taking an example for each. Illustrate the mathematical intuition behind these 2 algorithms. 10 L4 CO5  
b) Evaluate and Explain the Need of Logistic Regression Algorithm with the help of Sigmoid Function. 10 L5 CO5

**Module 5**

- 9a) Illustrate the order of operations in which the filters are executed to perform the actions on view in Tableau. 10 L3 CO6  
b) Identify different filters to analyze data using Tableau. 4 L4 CO6  
c) Derive steps to connect data source with Tableau. 6 L4 CO6

**OR**

- 10a) Illustrate the differences between Bar graph and Histogram. Decide the purpose and use of the same in data science. 10 L3 CO6  
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# New Horizon College of Engineering, Bangalore

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**ODD Semester End Examinations A.Y: 2022-23**

## Cyber Security, Forensics and Law

Duration: **3 hrs**

Max. Marks: **100**

**Answer five full questions choosing one complete question from each module.**

### Module 1

- |            |  |    |    |     |
|------------|--|----|----|-----|
| <b>1a)</b> | Describe Cybercrime. Identify the different types of Cyber Criminals.                                      | 6  | L1 | CO1 |
| <b>b)</b>  | Identify any four cybercrimes against an organization with suitable example for each.                      | 4  | L1 | CO1 |
| <b>c)</b>  | Classify the following scenarios according to the type of cybercrime giving suitable explanation for each. | 10 | L3 | CO1 |
1. Sagar sets up a fake chat service which mimics a bank help service. He chats with the customer and collects all his bank information to gain access to the customer's bank account.  
 2. Pratik designs a program which tries all the different combinations of alphabets, numbers and special characters to unlock someone else's account.  
 3. For the users of *DemoKart.com*'s website, it shows that there are no stocks of *iPhone 14 Pro* mobiles available but there were enough stocks available in their database when checked by their software engineer/tester.  
 4. Alice uses the public Wi-Fi network to track Bob's Facebook login credentials and uses his account to send fraud messages to his followers.

### OR

- |            |  |    |    |     |
|------------|--|----|----|-----|
| <b>2a)</b> | Describe pedophiles. Write the steps on how pedophiles operate.  | 6  | L1 | CO1 |
| <b>b)</b>  | Identify the most widely form of Spam being used by the attackers. List the web publishing techniques that should be avoided in order to avoid search engine spamming.                 | 4  | L1 | CO1 |
| <b>c)</b>  | Illustrate how cybercriminals may plan to attack cyber cafes. Apply the concept of cybersecurity to identify the tips for safety and security while using the computer in a cybercafe. | 10 | L3 | CO1 |

### Module 2

- |            |  |    |    |     |
|------------|--|----|----|-----|
| <b>3a)</b> | Illustrate the various differences between computer Virus and a computer worm with examples. | 10 | L3 | CO2 |
| <b>b)</b>  | Analyze how SQL Injection takes place with examples.   | 10 | L4 | CO2 |

### OR

- |            |   |    |    |     |
|------------|---|----|----|-----|
| <b>4a)</b> | Illustrate any five types of Phishing Scams used by the Phishers using suitable examples. | 10 | L3 | CO2 |
|------------|---|----|----|-----|

- 
- b)** Analyze any five countermeasures explaining how they can be used to avoid being a victim of Phishing Attack. 10 L4 CO2

**Module 3**

- 5a)** Illustrate Digital Signatures and the Indian IT Act 10 L3 CO3  
**b)** Identify Cybercrimes and other related Crimes punishable under Indian Laws. 10 L4 CO3

**OR**

- 6a)** Illustrate technology and students with respect to Indian Scenario 10 L3 CO3  
**b)** Investigate the Amendments to the Indian IT Act 10 L4 CO3

**Module 4**

- 7a)** Illustrate Forensics Analysis of E-mail 10 L3 CO4  
**b)** Examine the path of Digital Evidence. 10 L4 CO5

**OR**

- 8a)** Illustrate Challenges in computer forensics 10 L3 CO5  
**b)** Investigate Forensics and social networking sites 10 L4 CO4

**Module 5**

- 9a)** Explain the Toolkits for Hand-Held Device Forensics. 10 L2 CO6  
**b)** Explain Cell phone working characteristics 5 L2 CO6  
**c)** Explain the forensics of iPods 5 L2 CO6

**OR**

- 10a)** Explain Organizational Guidelines on Cell phone forensics 10 L2 CO6  
**b)** Discuss iPhone Forensics. 5 L2 CO6  
**c)** Discuss real life use of forensics 5 L2 CO6

# New Horizon College of Engineering, Bangalore

Autonomous College affiliated to VTU, Accredited by NAAC with 'A' Grade & NBA

## ODD Semester End Examinations A.Y: 2022-23

### DEEP LEARNING

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

#### Module 1

- |     |  |           |
|-----|--|-----------|
| 1a) | Discuss the perceptron learning algorithm and state the Limitations of the early perceptron? | 10 L2 CO1 |
| b)  | Examine hyperparameters used in Deep Learning.   | 10 L4 CO1 |

**OR**

- |     |   |           |
|-----|---|-----------|
| 2a) | Summarize the single layer perceptron neural network for implementing AND Logic Gate. Assume the suitable values for W1, W2 and b | 10 L2 CO1 |
| b)  | Examine the Backpropagation algorithm for updating weights pseudocode   | 10 L4 CO1 |

#### Module 2

- |     |   |           |
|-----|---|-----------|
| 3a) | Illustrate GAN with example.                                    | 10 L3 CO2 |
| b)  | Examine the applications of Restricted Boltzmann Machines(RBM). | 10 L4 CO2 |

**OR**

- |     |   |           |
|-----|---|-----------|
| 4a) | Illustrate any five optimizers used in Deep Learning Models | 10 L3 CO2 |
| b)  | Analyze the architecture of Autoencoder in details          | 10 L4 CO2 |

#### Module 3

- |     |   |           |
|-----|---|-----------|
| 5a) | Discuss in brief Recursive Neural Networks.                                 | 10 L2 CO3 |
| b)  | Estimate the feature map using convolution filter with padding=1, stride=1. | 10 L5 CO4 |

2	4	9	1	4
2	1	4	4	6
1	1	2	9	2
7	3	5	1	3
2	3	4	8	5

1	2	3
-4	7	4
2	-5	1

Image

Filter/Kernel

**OR**

- 6a) Explain LSTM unit in detail with a neat diagram and its gates. 10 L2 CO3  
b) Estimate the feature map using filter  $2 \times 2$  and stride  $2 \times 2$  for:  
a) MAX pooling  
b) AVG pooling

2	2	7	3
9	4	6	1
8	5	2	4
3	1	2	6

**Module 4**

- 7a) Compare multi class and multi label classification models with suitable examples. 10 L2 CO5  
b) Estimate the network memory requirements for training and testing the data. 10 L5 CO5

**OR**

- 8a) Summarize the step-by-step process to build the architecture of deep neural networks. 10 L2 CO5  
b) Estimate the weight initialization strategies used in deep learning. 10 L5 CO5

**Module 5**

- 9a) Explain the concept of speech recognition in detail. 10 L2 CO6  
b) Illustrate the concept of recommender system with any case study 10 L3 CO6

**OR**

- 10a) Explain the attention- based system architecture with three components for aligning pieces of the data. 10 L2 CO6  
b) Categorize the techniques used in Natural Processing model to deal with high dimensional outputs. 10 L3 CO6

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**ODD Semester End Examinations AY: 2022-23**

## ROBOTICS

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

### Module 1

- 1a) List three laws of Robotics and draw the Robot Anatomy, describe its parts. 7 L1 CO1
- b) Explain the wrist assembly of Robot with a neat sketch. 7 L2 CO1
- c) Classify the Robots based on physical configuration and illustrate cylindrical coordinate system. 6 L3 CO1

### OR

- 2a) Draw and describe three rotational joints of a manipulator. 7 L1 CO1
- b) Explain the terms spatial resolution, accuracy and repeatability. 7 L2 CO1
- c) Classify the Robots based on Control and illustrate Intelligent Robot. 6 L3 CO1

### Module 2

- 3a) Illustrate how the commutator rings helps the DC motor keeps continuous rotation. 7 L3 CO2
- b) Compute step angle and number of steps per revolution for a 2-phase stepper motor typically having four poles (two pole pairs) per phase. When the stator phases are energized, the rotor moves one-quarter of a tooth pitch to align with the energized stator poles. The rotor has 50 teeth and moves  $\frac{1}{4}$  tooth pitch at a time. 7 L3 CO2
- c) List and describe the different types of Grippers. 6 L1 CO2

### OR

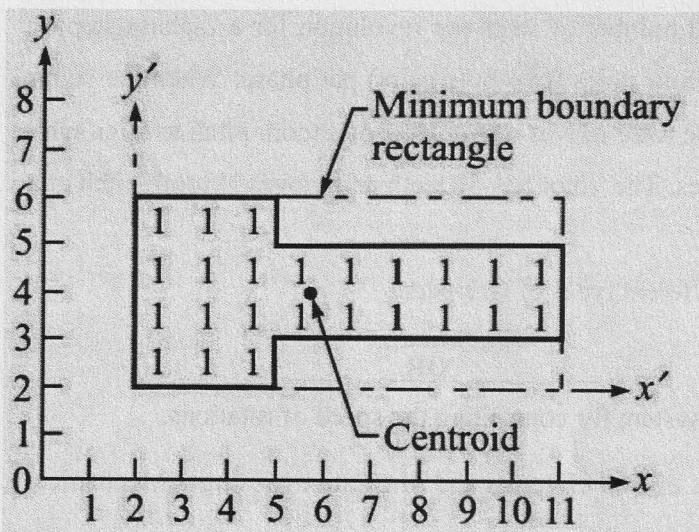
- 4a) Illustrate a closed loop system for controlling the speed of rotations. 7 L3 CO2
- b) Classify two main types of End effectors and illustrate two-finger Mechanical Gripper. 7 L3 CO2
- c) Draw an internal structure of a variable reluctance stepper motor and describe its working. 6 L1 CO2

**Module 3**

- 5a) Identify a position sensor where the output varies linearly with the difference between the winding voltages. Describe the working in detail and draw the ac output characteristics of the identified sensor. 7 L1 CO3
- b) Illustrate different techniques of data reduction in image processing. For an image digitized at 128 points per line and 128 lines, Solve the following: 7 L3 CO3
- (a) Total number of bits to represent the gray level values required if an 8 bit A/D converter is used to indicate various shades of gray
  - (b) Reduction in data volume if only black and white values are digitized.
- c) Identify the principles based on which range sensor works. Examine the working of time of flight range finders with respect to both ultra sonic and laser range sensors 6 L4 CO3

**OR**

- 6a) Identify a proximity sensor in which the sensor output is proportional to the back pressure effect of the air. Describe the working of the identified sensor in detail with a neat sketch 7 L1 CO3
- b) Illustrate the feature extraction technique in image processing. 7 L3 CO3



Refer the above binary image and Solve the following:

- (i) Thinness
- (ii) Compactness

- 
- c) Organize the building blocks of a robotic vision system and Investigate the steps involved in image processing and analysis in detail 6 L4 CO3

**Module 4**

- 7a) With relevant equations and geometric approach explain forward transformation for a robotic arm end with two degrees of freedom. Extend the obtained equations for three degrees of freedom. 6 L2 CO4
- b) A vector  $v=2i+5j+3k$  is rotated by 60 degree about the z-axis and translated by 3,4 and 5 units in the x, y, and z directions respectively. Compute the transformed vector with respect to the reference frame. 6 L3 CO4
- c) Examine the following Motion Commands in VAL programming: 8 L4 CO6
- (i) MOVE
  - (ii) MOVES
  - (iii) APPRO
  - (iv) DEPART
  - (v) DMOVE
  - (vi) HERE
  - (vii) OPEN
  - (viii) SPEED

**OR**

- 8a) Mathematically, explain the composite matrix obtained after accomplishing rolling, pitching and yawing by an angle  $\alpha$ ,  $\beta$  and  $\gamma$  with X, Y and Z axis respectively. Use the obtained composite matrix to predict the values of  $\alpha$ ,  $\beta$  and  $\gamma$ . 6 L2 CO4
- b) A vector  $v=3i+2j+7k$  is rotated by 60 degree about the Z –axis of the reference frame. It is again then rotated by 30 degree about x axis of the rotated frame. Computed the rotated vector. 6 L3 CO4
- c) Organize a VAL program for the palletizing operation of a robot. Assume the required variables, constants and other scenarios. 8 L4 CO6

**Module 5**

- 9a) Explain the three levels of safety sensor systems. 7 L2 CO5

- 
- b) Illustrate the three methods of economic analysis in detail 7 L3 CO5
- c) Suppose that the total investment cost is estimated to be \$ 3,00,000 for a particular robot project. The total operating costs (labor, maintenance and other annual expenses) are expected to be \$ 60,000 per year. Anticipated revenue from the robot installation is \$ 1,95,000 annually. It is expected that the robot project will have the service life of five years. The company uses 25% MARR as criterion for selecting its investment projects. Examine the equivalent Uniform Annual Cost.

**OR**

- 10a) Explain work place design considerations for safety. 7 L2 CO5
- b) Illustrate the sequence of steps that a company would follow in order to implement a robotic program in its operation 7 L3 CO5
- c) Organize the economic analysis using Equivalent Uniform Annual Cost Method with an example. Examine the cases- (i) EUAC >0 (ii) EUAC<0 6 L4 CO5

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## ODD Semester End Examinations A.Y: 2022-23

### DATA ANALYTICS

Duration: 3 hrs

Max. Marks: 100

**Answer five full questions choosing one complete question from each module.**

#### Module 1

- 1a) Describe about snowflakes and star schema with an example  
b) Explain types of data analytics

**OR**

- 2a) Describe fact constellation schema with an example  
b) Explain challenges in data analytics

#### Module 2

- 3a) Illustrate high availability feature of Vertica with an example  
b) By applying SQL concepts solve the following :  
a) Create Doctor table with column names DID, DocName, Designation, HospNo, Salary, Experience, Specialization  
b) Insert 5 values to the Doctor table  
c) Increase salary of Doctors by 30% whose experience is above 20 years  
d) List the Doctor details whose salary is in range of 50000 to 70000

**OR**

- 4a) Illustrate the uses of column storage with an example  
b) By applying SQL concepts solve the following :  
a) Create Student table with column names SID, SName, Place, Sem, Section, Age, Address  
b) Insert 5 values to the Student table  
c) Display SID and SName of students studying in 7 A  
d) Display details of all students who are from Bangalore

#### Module 3

- 5a) Describe projection types  
b) Explain steps to create projections

**OR**

- 6a) Describe projection properties  
b) Explain hybrid data store WOS and ROS

#### Module 4

- 7a) Compare acquisition analysis and conversion analysis  
b) Evaluate the dashboard types based on its metrics

**OR**

- 8a) Compare audience analysis and behavior analysis  
b) Justify whether kissmetrics can be used as a web analytical tool

#### Module 5

- 9a) Identify how data analytics is used by Kroger Company  
b) Examine the stages in target marketing strategy development

**OR**

- 10a) Identify how data analytics is used by Xerox Corp  
b) Examine the types of segmentation in Marketing analytics