



Co-funded by the European Union



Norwegian Embassy
Islamabad



ARTIFICIAL INTELLIGENCE DATA TECHNICIAN



© TVET SSP

ASSESSMENT PACKAGE
National Vocational Certificate Level 3

Version 1 - November, 2019



Implemented by

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Published by

National Vocational and Technical Training Commission
Government of Pakistan

Headquarter

Plot 38, Kirthar Road, Sector H-9/4, Islamabad, Pakistan
www.navttc.org

Responsible

Director General Skills Standard and Curricula, National Vocational and Technical Training Commission
National Deputy Head, TVET Sector Support Programme, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Layout & design

SAP Communications

Photo Credits

TVET Sector Support Programme

URL links

Responsibility for the content of external websites linked in this publication always lies with their respective publishers. TVET Sector Support Programme expressly dissociates itself from such content.

This document has been produced with the technical assistance of the TVET Sector Support Programme, which is funded by the European Union, the Federal Republic of Germany and the Royal Norwegian Embassy and has been commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in close collaboration with the National Vocational and Technical Training Commission (NAVTTTC) as well as provincial Technical Education and Vocational Training Authorities (TEVTAs), Punjab Vocational Training Council (PVTC), Qualification Awarding Bodies (QABs)s and private sector organizations.

Document Version

November, 2019
Islamabad, Pakistan

ARTIFICIAL INTELLIGENCE DATA TECHNICIAN



© TVET SSP

ASSESSMENT PACKAGE
National Vocational Certificate Level 3

Version 1 - November, 2019

Self-Assessment Checklist

Candidate Name	
Registration No.	
Qualification	National Vocational Certificate Level 3 - Artificial Intelligence Data Technician
Competency Standards	061900928 Code in Programming Language suitable for AI
Assessment Task	<p>Assessment Task 1:</p> <p>Install Python on provided workstation.</p> <p>Assessment Task 2:</p> <p>Create a class named “MathFunctions” and implement the functions provided in Annex-A. When done, validate the working of your class by executing instructions found in Annex-B.</p>

I can.....

Performance Criteria	Yes	No
1. Navigate to python website to Downloads	<input type="checkbox"/>	<input type="checkbox"/>
2. Choose an appropriate Python version	<input type="checkbox"/>	<input type="checkbox"/>
3. Check system requirements	<input type="checkbox"/>	<input type="checkbox"/>
4. Download the chosen Python setup files	<input type="checkbox"/>	<input type="checkbox"/>
5. Double click on the downloaded setup files	<input type="checkbox"/>	<input type="checkbox"/>
6. Enter admin username-password to authorize installation	<input type="checkbox"/>	<input type="checkbox"/>
7. Choose appropriate install options	<input type="checkbox"/>	<input type="checkbox"/>
8. Click install	<input type="checkbox"/>	<input type="checkbox"/>
9. Click add python to PATH environment variable	<input type="checkbox"/>	<input type="checkbox"/>
10. Code a python program	<input type="checkbox"/>	<input type="checkbox"/>
11. Save the text file as .py file	<input type="checkbox"/>	<input type="checkbox"/>
12. Open terminal/cmd application	<input type="checkbox"/>	<input type="checkbox"/>
13. Navigate to directory containing python program	<input type="checkbox"/>	<input type="checkbox"/>

14. Run the program with python	<input type="checkbox"/>	<input type="checkbox"/>
15. Code an "if" statement	<input type="checkbox"/>	<input type="checkbox"/>
16. Code an "elif" statement	<input type="checkbox"/>	<input type="checkbox"/>
17. Code an "else" statement	<input type="checkbox"/>	<input type="checkbox"/>
18. Code a "while" loop	<input type="checkbox"/>	<input type="checkbox"/>
19. Code a "for" loop	<input type="checkbox"/>	<input type="checkbox"/>
20. Write a "switch" statement	<input type="checkbox"/>	<input type="checkbox"/>
21. Use "continue" & "break" statements in loops	<input type="checkbox"/>	<input type="checkbox"/>
22. Write a "def" statement to define a function	<input type="checkbox"/>	<input type="checkbox"/>
23. Write a "class" statement to create a class with multiple functions and data elements	<input type="checkbox"/>	<input type="checkbox"/>
24. Define a "try" block	<input type="checkbox"/>	<input type="checkbox"/>
25. Apply some error prone code in try block	<input type="checkbox"/>	<input type="checkbox"/>
26. Handle the possible exceptions using "except" block	<input type="checkbox"/>	<input type="checkbox"/>
27. Apply "finally" block to statements that will always run	<input type="checkbox"/>	<input type="checkbox"/>
28. Open a python script file	<input type="checkbox"/>	<input type="checkbox"/>
29. Open a file with "r" flag in read mode using "open" statement	<input type="checkbox"/>	<input type="checkbox"/>
30. Read the file line by line or all at once into a python variable	<input type="checkbox"/>	<input type="checkbox"/>
31. Open a file with "w" flag in write mode	<input type="checkbox"/>	<input type="checkbox"/>
32. Write a python variable into the opened file	<input type="checkbox"/>	<input type="checkbox"/>
33. Select an appropriate package to install	<input type="checkbox"/>	<input type="checkbox"/>
34. Open terminal/cmd application	<input type="checkbox"/>	<input type="checkbox"/>
35. Use "pip install <package name>" command to install the package	<input type="checkbox"/>	<input type="checkbox"/>
36. Uninstall a package with "pip uninstall <package name>" command	<input type="checkbox"/>	<input type="checkbox"/>

Candidate's Signature: Assessor's Signature:
.....

Date:

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 – Artificial Intelligence Data Technician	CS Code:	Level:	Version: 02
Competency Standard Title: <ul style="list-style-type: none"> • Code in Programming Language suitable for AI 	Assessment Date (DD/MM/YY):		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Install Python on provided workstation</p> <p>Assessment Task 2: Create a class named “MathFunctions” and implement the functions provided in Annex-A. When done, validate the working of your class by executing instructions found in Annex-B.</p> <p>Assessment Task 3: Knowledge assessment (Oral)</p>
Time: 120 min	
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you are required to <u>Install Python on provided workstation. Also create a class named “MathFunctions” and implement the functions provided in Annex-A. When done, validate the working of your class by executing instructions found in Annex-B</u> demonstrating the following criteria:</p> <ol style="list-style-type: none"> 1. Navigate to python website to Downloads 2. Choose an appropriate Python version 3. Check system requirements 4. Download the chosen Python setup files 5. Double click on the downloaded setup files 6. Enter admin username-password to authorize installation 7. Choose appropriate install options 8. Click install 9. Click add python to PATH environment variable 10. Code a python program 11. Save the text file as .py file 12. Open terminal/cmd application 13. Navigate to directory containing python program 14. Run the program with python 15. Code an “if” statement 16. Code an “elif” statement 17. Code an “else” statement 18. Code a “while” loop

- | | |
|--|--|
| | <ol style="list-style-type: none">19. Code a “for” loop20. Write a “switch” statement21. Use “continue” & “break” statements in loops22. Write a “def” statement to define a function23. Write a “class” statement to create a class with multiple functions and data elements24. Define a “try” block25. Apply some error prone code in try block26. Handle the possible exceptions using “except” block27. Apply “finally” block to statements that will always run28. Open a python script file29. Open a file with “r” flag in read mode using “open” statement30. Read the file line by line or all at once into a python variable31. Open a file with “w” flag in write mode32. Write a python variable into the opened file33. Select an appropriate package to install34. Open terminal/cmd application35. Use “pip install <package name>” command to install the package36. Uninstall a package with “pip uninstall <package name>” command |
|--|--|

Assessors Judgment Guide (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Qualification	National Vocational Certificate Level 03 - Artificial Intelligence Data Technician
Competency Standard(s)	Code in programming language suitable for AI
Candidate Details	Name: Registration/Roll Number: Candidate Signature:
Assessment Outcome	<p>COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/></p> <p>Name of the Assessor:..... Assessor's code:</p> <p>Signature of the Assessor:</p>

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Nature of Activity							
Practical Skill Demonstration			✓				
Knowledge Assessment		✓					
Other Requirement							

Observation Checklist

Assessment Task	Description of assessment			
Assessment Task 1	Install Python on provided workstation			
Assessment Task 2	Create a class named "MathFunctions" and implement the functions provided in Annex-A. When done, validate the working of your class by executing instructions found in Annex-B			
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Navigate to python website to Downloads			
2.	Choose an appropriate Python version			
3.	Check system requirements			
4.	Download the chosen Python setup files			
5.	Double click on the downloaded setup files			
6.	Enter admin username-password to authorize installation			
7.	Choose appropriate install options			
8.	Click install			
9.	Click add python to PATH environment variable			
10.	Code a python program			
11.	Save the text file as .py file			
12.	Open terminal/cmd application			
13.	Navigate to directory containing python program			
14.	Run the program with python			
15.	Code an "if" statement			
16.	Code an "elif" statement			
17.	Code an "else" statement			
18.	Code a "while" loop			
19.	Code a "for" loop			

20.	Write a “switch” statement			
21.	Use “continue” & “break” statements in loops			
22.	Write a “def” statement to define a function			
23.	Write a “class” statement to create a class with multiple functions and data elements			
24.	Define a “try” block			
25.	Apply some error prone code in try block			
26.	Handle the possible exceptions using “except” block			
27.	Apply “finally” block to statements that will always run			
28.	Open a python script file			
29.	Open a file with “r” flag in read mode using “open” statement			
30.	Read the file line by line or all at once into a python variable			
31.	Open a file with “w” flag in write mode			
32.	Write a python variable into the opened file			
33.	Select an appropriate package to install			
34.	Open terminal/cmd application			
35.	Use “pip install <package name>” command to install the package			
36.	Uninstall a package with “pip uninstall <package name>” command			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Test Yourself (Multiple Choice Questions)

MODULE 1

Question 1

If Ali has to write a function to choose from a given set of options. Which of the following statements should he use?

- A "If" statement
- B "Switch" statement
- C "While" statement
- D "For" statement

Question 2

You have to display a sequence of numbers. Which statement should you use?

- A "If" statement
- B "Switch" statement
- C "While" statement
- D "For" statement

Question 3

Which of the following is a conditional loop statement?

- A "If" statement
- B "Switch" statement
- C "While" statement
- D "For" statement

Question 4

You are tasked with creating a function which keeps on printing a given integer until one of two conditions are met. Which comparative statement should be used?

- A and
- B or
- C not
- D >=

Question 5 A number 5.6 is changed into an integer with a command `toint()`. What value would you get?

- A 6
- B 5
- C 4
- D 3

MODULE 2

Question 6

Which of the following is the symbol for not equal to?

- A <=
- B >=
- C !=
- D ==

Question 7

What statement/ combination of statements would be suited to take factorial of a number:
Factorial of 5 = $5*4*3*2*1$

- A "For" statement with range()
- B "While" statement with range()
- C "If" statement with range()
- D "Switch" statement with range()

Question 8

How would you check if one of 3 integers is the largest?

- A Use "for" within a "for" statement
- B Use "while" within a "while" statement
- C Use "switch" within a "switch" statement
- D Use "if" within an "if" statement

Question 9

Ali has to compare two items in terms of it's price, color, shape and size. How many if statements should he use.

- A 2
- B 3
- C 4
- D 5

Question 10

Consider a function, which is extracting text from a file, editing it and printing its contents a specified number of times. Which of the following would this function definitely use.

- A “If” statement
- B “For” statement
- C “While” statement
- D “Switch” statement

Answers

Question 1	B
Question 2	D
Question 3	C
Question 4	B
Question 5	B
Question 6	C
Question 7	A
Question 8	D
Question 9	C
Question 10	B

ANNEXURE-A

Instructions:

1. Create a function named “comparison” to compare any two given integers and print the greater integer.
2. Create a function named “print_loop” to print any given string any given number of times.
3. Create a function named “print_descend” which takes in a positive integer, decrements it by one iteratively and print its value until it becomes less than zero.
4. Create a function named “switch_fn” using switch statement which either prints area or parameter of a circle using a switch statement. The radius of the circle and switch argument are to be entered as parameters of the function.
5. Create a function to read and write files and display it's contents

ANNEXURE-B

Instructions:

1. Create a “Mathfunctions” class object named as your first name.
2. Using a class object function, compare 14532 and 125342 and print the larger number.
3. Print the string “My name is [Your name]” 5, 10 and 20 times using the same class function.
4. Print values from 0 to 20 in descending order using a class function.
5. Calculate the perimeter of a circle having radius 3.6 using a class function.
6. Given a hello_world.txt file, read the file, edit the “hello_world” to “finally_done” and write the file using the created function.

Self-Assessment Checklist

Candidate Name	
Registration No.	
Qualification	National Vocational Certificate Level 3 - Artificial Intelligence Data Technician
Competency Standards	061900929 Setup Environment
Assessment Task	Create a folder and change its name to your registration number. Then, create a virtual environment in that folder and install the following packages: Numpy, Pandas and Beautifulsoup. Create a .py file in the folder, import the installed packages and run the file.

I can.....

Performance Criteria	Yes	No
1. Open terminal/cmd	<input type="checkbox"/>	<input type="checkbox"/>
2. Change directories	<input type="checkbox"/>	<input type="checkbox"/>
3. Rename files	<input type="checkbox"/>	<input type="checkbox"/>
4. Move files from one directory to another	<input type="checkbox"/>	<input type="checkbox"/>
5. Copy files from one directory to another	<input type="checkbox"/>	<input type="checkbox"/>
6. Select/delete only particular types of files	<input type="checkbox"/>	<input type="checkbox"/>
7. Open a file	<input type="checkbox"/>	<input type="checkbox"/>
8. Open an application	<input type="checkbox"/>	<input type="checkbox"/>
9. Zip and unzip files/folders	<input type="checkbox"/>	<input type="checkbox"/>
10. Download files from a source (network location)	<input type="checkbox"/>	<input type="checkbox"/>
11. Connect to a server using ssh	<input type="checkbox"/>	<input type="checkbox"/>
12. Install virtual environment with pip	<input type="checkbox"/>	<input type="checkbox"/>
13. Create a virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
14. Activate a virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
15. Deactivate a virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
16. Check if the environment is active for a python/pip version	<input type="checkbox"/>	<input type="checkbox"/>

17. Install packages in virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
18. Run scripts in virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
19. Select an appropriate package to install	<input type="checkbox"/>	<input type="checkbox"/>
20. Open terminal/cmd	<input type="checkbox"/>	<input type="checkbox"/>
21. Activate a virtual environment if required	<input type="checkbox"/>	<input type="checkbox"/>
22. Use “pip install <package name>” command to install the package	<input type="checkbox"/>	<input type="checkbox"/>
23. Import package in a python environment	<input type="checkbox"/>	<input type="checkbox"/>
24. Uninstall a package with “pip uninstall <package name>” command	<input type="checkbox"/>	<input type="checkbox"/>

Candidate’s Signature: Assessor’s Signature:

.....

Date:

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 – Artificial Intelligence Data Technician	CS Code:	Level:	Version: 02
Competency Standard Title: • Setup Environment	Assessment Date (DD/MM/YY):		

Candidate Details	Name:
	Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Create a folder and change its name to your registration number. Then, create a virtual environment in that folder and install the following packages: Numpy, Pandas and Beautifulsoup. Create a .py file in the folder, import the installed packages and run the file.</p>
Time: 120 min	During a practical assessment, under observation by an assessor, you are required to perform above task by demonstrating the following criteria:
Minimum Evidence Required	<ol style="list-style-type: none"> 1. Open terminal/cmd 2. Change directories 3. Rename files 4. Move files from one directory to another 5. Copy files from one directory to another 6. Select/delete only particular types of files 7. Open a file 8. Open an application 9. Zip and unzip files/folders 10. Download files from a source (network location) 11. Connect to a server using ssh 12. Install virtual environment with pip 13. Create a virtual environment 14. Activate a virtual environment 15. Deactivate a virtual environment 16. Check if the environment is active for a python/pip version 17. Install packages in virtual environment 18. Run scripts in virtual environment 19. Select an appropriate package to install 20. Open terminal/cmd 21. Activate a virtual environment if required 22. Use “pip install <package name>” command to install the package 23. Import package in a python environment 24. Uninstall a package with “pip uninstall <package name>” command

Assessors Judgment Guide (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Qualification	National Vocational Certificate Level 03 - Artificial Intelligence Data Technician
Competency Standard(s)	1. Setup Environment
Candidate Details	Name: Registration/Roll Number: Candidate Signature:
Assessment Outcome	<p>COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/></p> <p>Name of the Assessor:..... Assessor's code:</p> <p>Signature of the Assessor:</p>

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Nature of Activity							
Practical Skill Demonstration			✓				
Knowledge Assessment		✓					
Other Requirement							

Observation Checklist

Assessment Task	Description of assessment			
Assessment Task 1	Create a folder and change its name to your registration number. Then create a virtual environment in that folder and install the following packages: Numpy, Pandas and Beautifulsoup. Create a .py file in the folder, import the installed packages and run the file.			
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Open terminal/cmd			
2.	Change directories			
3.	Rename files			
4.	Move files from one directory to another			
5.	Copy files from one directory to another			
6.	Select/delete only particular types of files			
7.	Open a file			
8.	Open an application			
9.	Zip and unzip files/folders			
10.	Download files from a source (network location)			
11.	Connect to a server using ssh			
12.	Install virtual environment with pip			
13.	Create a virtual environment			
14.	Activate a virtual environment			
15.	Deactivate a virtual environment			
16.	Check if the environment is active for a python/pip version			
17.	Install packages in virtual environment			
18.	Run scripts in virtual environment			
19.	Select an appropriate package to install			
20.	Open terminal/cmd			

21.	Activate a virtual environment if required			
22.	Use “pip install <package name>” command to install the package			
23.	Import package in a python environment			
24.	Uninstall a package with “pip uninstall <package name>” command			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Test Yourself (Multiple Choice Questions)

MODULE 1

- Question 1** How do we install packages in python
- A Pip.
 - B Numpy.
 - C Pandas.
 - D Clc.
- Question 2** Why do we use virtual environments
- A To make the app run faster.
 - B To avoid conflicts with other python applications
 - C To keep the app from crashing.
 - D To prevent viruses.
- Question 3** What does activating an environment mean?
- A Installing packages in the environment.
 - B Installing that environment.
 - C Initializing all the variables.
 - D Switching to that virtual environment.

- Question 4** Which library is used for dealing with arrays?
- A Beautifulsoup.
 - B Pandas.
 - C Numpy.
 - D Anaconda.
- Question 5** What does ssh do?
- A Allows you to run a python 2 app in python 3.
 - B Speed up downloading of files.
 - C Access a computer over the internet remotely.
 - D Allocate more ram for the application.
- Question 6** What is the maximum number of virtual environments that you can make?
- A 5.
 - B 16.
 - C 3.
 - D No limit.
- Question 7** Can you run more than one virtual environment simultaneously?
- A Yes.
 - B No.
 - C Only if you have enough ram.
 - D Only in python 2.

Question 8 What is BeautifulSoup used for?

- A Changing python 3 code to Python 2.
- B Working with arrays.
- C Scraping data from the web.
- D Plotting graphs.

Question 9 What is the command "cd" used for?

- A Viewing the current download.
- B Changing the display settings.
- C Changing the directory.
- D Printing the current directory.

Question 10 What does the command "pwd" do?

- A Print the name of the current environment.
- B View the downloads.
- C Allow you to change the password.
- D Print the working directory.

Answers

- | | | | |
|-------------|---|--------------|---|
| Question 1: | A | Question 6: | D |
| Question 2: | B | Question 7: | A |
| Question 3: | D | Question 8: | C |
| Question 4: | B | Question 9: | C |
| Question 5: | C | Question 10: | A |

Knowledge Assessment

Qualification	National Vocational Certificate Level 03 - Artificial Intelligence Data Technician
Competency Standard(s)	Code in programming language suitable for AI
Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Candidate's response is not required to be identical, but similar concepts and/or keywords must be used. Oral questioning may be used to clarify candidate understanding of topic and its application.

	Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	Satisfactory	Not Satisfactory
1.	Explain what is python? <hr/>		
2.	Indicate the python file extension? <hr/>		
3.	Contrast python 2 and python 3? <hr/>		
4.	Explain purpose of "for loop" in python? <hr/>		
5.	Illustrate the basic syntax of 'for loop' in python?		

6.	Explain the purpose of “while” loop in python?		
7.	Differentiate between Switch and If-else statements?		
8.	Explain basic functionality of “def” and “try” statements?		
9.	Write the command used for installing packages?		
10.	Contrast ‘r’ and ‘w’ flag?		

6.	List the python commands to create activate/deactivate virtual environment respectively		
7.	Describe what the command "cd" does		
8.	Summarize the purpose of indentation within python		
9.	Define variables		
10.	List three variable types		

Self-Assessment Checklist

Candidate Name	
Registration No.	
Qualification	National Vocational Certificate Level 3 - Artificial Intelligence Data Technician
Competency Standards	<ul style="list-style-type: none"> • 061900928 Code in Programming Language suitable for AI • 061900929 Setup Environment
Assessment Task	<p>Assessment Task 1:</p> <p>Create a folder and change its name to your registration number.</p> <p>Assessment Task 2:</p> <p>Create a virtual environment in that folder and install required packages for performing the following task:</p> <p>Assessment Task 3:</p> <p>Create a class named “MathFunctions” and implement the functions provided in Annex-A. When done, validate the working of your class by executing instructions found in Annex-B.</p>

I can.....

Performance Criteria	Yes	No
1. Navigate to python website to Downloads	<input type="checkbox"/>	<input type="checkbox"/>
2. Choose an appropriate Python version	<input type="checkbox"/>	<input type="checkbox"/>
3. Check system requirements	<input type="checkbox"/>	<input type="checkbox"/>
4. Download the chosen Python setup files	<input type="checkbox"/>	<input type="checkbox"/>
5. Double click on the downloaded setup files	<input type="checkbox"/>	<input type="checkbox"/>
6. Enter admin username-password to authorize installation	<input type="checkbox"/>	<input type="checkbox"/>
7. Choose appropriate install options	<input type="checkbox"/>	<input type="checkbox"/>
8. Click install	<input type="checkbox"/>	<input type="checkbox"/>
9. Click add python to PATH environment variable	<input type="checkbox"/>	<input type="checkbox"/>
10. Code a python program	<input type="checkbox"/>	<input type="checkbox"/>
11. Save the text file as .py file	<input type="checkbox"/>	<input type="checkbox"/>
12. Open terminal/cmd application	<input type="checkbox"/>	<input type="checkbox"/>
13. Navigate to directory containing python program	<input type="checkbox"/>	<input type="checkbox"/>

14. Run the program with python	<input type="checkbox"/>	<input type="checkbox"/>
15. Code an “if” statement	<input type="checkbox"/>	<input type="checkbox"/>
16. Code an “elif” statement	<input type="checkbox"/>	<input type="checkbox"/>
17. Code an “else” statement	<input type="checkbox"/>	<input type="checkbox"/>
18. Code a “while” loop	<input type="checkbox"/>	<input type="checkbox"/>
19. Code a “for” loop	<input type="checkbox"/>	<input type="checkbox"/>
20. Write a “switch” statement	<input type="checkbox"/>	<input type="checkbox"/>
21. Use “continue” & “break” statements in loops	<input type="checkbox"/>	<input type="checkbox"/>
22. Write a “def” statement to define a function	<input type="checkbox"/>	<input type="checkbox"/>
23. Write a “class” statement to create a class with multiple functions and data elements	<input type="checkbox"/>	<input type="checkbox"/>
24. Define a “try” block	<input type="checkbox"/>	<input type="checkbox"/>
25. Apply some error prone code in try block	<input type="checkbox"/>	<input type="checkbox"/>
26. Handle the possible exceptions using “except” block	<input type="checkbox"/>	<input type="checkbox"/>
27. Apply “finally” block to statements that will always run	<input type="checkbox"/>	<input type="checkbox"/>
28. Open a python script file	<input type="checkbox"/>	<input type="checkbox"/>
29. Open a file with “r” flag in read mode using “open” statement	<input type="checkbox"/>	<input type="checkbox"/>
30. Read the file line by line or all at once into a python variable	<input type="checkbox"/>	<input type="checkbox"/>
31. Open a file with “w” flag in write mode	<input type="checkbox"/>	<input type="checkbox"/>
32. Write a python variable into the opened file	<input type="checkbox"/>	<input type="checkbox"/>
33. Select an appropriate package to install	<input type="checkbox"/>	<input type="checkbox"/>
34. Open terminal/cmd application	<input type="checkbox"/>	<input type="checkbox"/>
35. Use “pip install <package name>” command to install the package	<input type="checkbox"/>	<input type="checkbox"/>
36. Uninstall a package with “pip uninstall <package name>” command	<input type="checkbox"/>	<input type="checkbox"/>
37. Open terminal/cmd	<input type="checkbox"/>	<input type="checkbox"/>
38. Change directories	<input type="checkbox"/>	<input type="checkbox"/>
39. Rename files	<input type="checkbox"/>	<input type="checkbox"/>
40. Move files from one directory to another	<input type="checkbox"/>	<input type="checkbox"/>
41. Copy files from one directory to another	<input type="checkbox"/>	<input type="checkbox"/>
42. Select/delete only particular types of files	<input type="checkbox"/>	<input type="checkbox"/>
43. Open a file	<input type="checkbox"/>	<input type="checkbox"/>

44. Open an application	<input type="checkbox"/>	<input type="checkbox"/>
45. Zip and unzip files/folders	<input type="checkbox"/>	<input type="checkbox"/>
46. Download files from a source (network location)	<input type="checkbox"/>	<input type="checkbox"/>
47. Connect to a server using ssh	<input type="checkbox"/>	<input type="checkbox"/>
48. Install virtual environment with pip	<input type="checkbox"/>	<input type="checkbox"/>
49. Create a virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
50. Activate a virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
51. Deactivate a virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
52. Check if the environment is active for a python/pip version	<input type="checkbox"/>	<input type="checkbox"/>
53. Install packages in virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
54. Run scripts in virtual environment	<input type="checkbox"/>	<input type="checkbox"/>
55. Select an appropriate package to install	<input type="checkbox"/>	<input type="checkbox"/>
56. Open terminal/cmd	<input type="checkbox"/>	<input type="checkbox"/>
57. Activate a virtual environment if required	<input type="checkbox"/>	<input type="checkbox"/>
58. Use “pip install <package name>” command to install the package	<input type="checkbox"/>	<input type="checkbox"/>
59. Import package in a python environment	<input type="checkbox"/>	<input type="checkbox"/>
60. Uninstall a package with “pip uninstall <package name>” command	<input type="checkbox"/>	<input type="checkbox"/>

Candidate’s Signature: Assessor’s Signature:
.....

Date:

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 – Artificial Intelligence Data Technician	CS Code:	Level:	Version: 02
Competency Standard Title: <ul style="list-style-type: none"> • Code in Programming Language suitable for AI • Setup Environment 	Assessment Date (DD/MM/YY):		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Create a folder and change its name to your registration number.</p> <p>Assessment Task 2: Create a virtual environment in that folder and install required packages for performing the following task:</p> <p>Assessment Task 3: Create a class named “MathFunctions” and implement the functions provided in Annex-A. When done, validate the working of your class by executing instructions found in Annex-B.</p>
Time: 120 min	<p>During a practical assessment, under observation by an assessor, you are required to perform above mentioned task demonstrating the following criteria:</p> <ol style="list-style-type: none"> 1. Navigate to python website to Downloads 2. Choose an appropriate Python version 3. Check system requirements 4. Download the chosen Python setup files 5. Double click on the downloaded setup files 6. Enter admin username-password to authorize installation 7. Choose appropriate install options 8. Click install 9. Click add python to PATH environment variable 10. Code a python program 11. Save the text file as .py file 12. Open terminal/cmd application 13. Navigate to directory containing python program 14. Run the program with python 15. Code an “if” statement

<p>Minimum Evidence Required</p>	<ol style="list-style-type: none"> 16. Code an “elif” statement 17. Code an “else” statement 18. Code a “while” loop 19. Code a “for” loop 20. Write a “switch” statement 21. Use “continue” & “break” statements in loops 22. Write a “def” statement to define a function 23. Write a “class” statement to create a class with multiple functions and data elements 24. Define a “try” block 25. Apply some error prone code in try block 26. Handle the possible exceptions using “except” block 27. Apply “finally” block to statements that will always run 28. Open a python script file 29. Open a file with “r” flag in read mode using “open” statement 30. Read the file line by line or all at once into a python variable 31. Open a file with “w” flag in write mode 32. Write a python variable into the opened file 33. Select an appropriate package to install 34. Open terminal/cmd application 35. Use “pip install <package name>” command to install the package 36. Uninstall a package with “pip uninstall <package name>” command 37. Open terminal/cmd 38. Change directories 39. Rename files 40. Move files from one directory to another 41. Copy files from one directory to another 42. Select/delete only particular types of files 43. Open a file 44. Open an application 45. Zip and unzip files/folders 46. Download files from a source (network location) 47. Connect to a server using ssh 48. Install virtual environment with pip 49. Create a virtual environment 50. Activate a virtual environment 51. Deactivate a virtual environment 52. Check if the environment is active for a python/pip version 53. Install packages in virtual environment 54. Run scripts in virtual environment 55. Select an appropriate package to install 56. Open terminal/cmd 57. Activate a virtual environment if required 58. Use “pip install <package name>” command to install the package 59. Import package in a python environment 60. Uninstall a package with “pip uninstall <package name>” command
----------------------------------	---

Assessors Judgment Guide (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Qualification	National Vocational Certificate Level 03 - Artificial Intelligence Data Technician
Competency Standard(s)	1. Code in programming language suitable for AI 2. Setup Environment
Candidate Details	Name: Registration/Roll Number: Candidate Signature:
Assessment Outcome	<p>COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/></p> <p>Name of the Assessor:..... Assessor's code:</p> <p>Signature of the Assessor:</p>

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Nature of Activity							
Practical Skill Demonstration			✓				
Knowledge Assessment		✓					
Other Requirement							

Observation Checklist

Assessment Task	Description of assessment			
Assessment Task 1	Create a folder and change its name to your registration number.			
Assessment Task 2	Create a virtual environment in that folder and install required packages for performing the following task.			
Assessment Task 3	Create a class named "MathFunctions" and implement the functions provided in Annex-A. When done, validate the working of your class by executing instructions found in Annex-B.			
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Navigate to python website to Downloads			
2.	Choose an appropriate Python version			
3.	Check system requirements			
4.	Download the chosen Python setup files			
5.	Double click on the downloaded setup files			
6.	Enter admin username-password to authorize installation			
7.	Choose appropriate install options			
8.	Click install			
9.	Click add python to PATH environment variable			
10.	Code a python program			
11.	Save the text file as .py file			
12.	Open terminal/cmd application			
13.	Navigate to directory containing python program			
14.	Run the program with python			
15.	Code an "if" statement			
16.	Code an "elif" statement			
17.	Code an "else" statement			
18.	Code a "while" loop			
19.	Code a "for" loop			
20.	Write a "switch" statement			
21.	Use "continue" & "break" statements in loops			

22.	Write a "def" statement to define a function		
23.	Write a "class" statement to create a class with multiple functions and data elements		
24.	Define a "try" block		
25.	Apply some error prone code in try block		
26.	Handle the possible exceptions using "except" block		
27.	Apply "finally" block to statements that will always run		
28.	Open a python script file		
29.	Open a file with "r" flag in read mode using "open" statement		
30.	Read the file line by line or all at once into a python variable		
31.	Open a file with "w" flag in write mode		
32.	Write a python variable into the opened file		
33.	Select an appropriate package to install		
34.	Open terminal/cmd application		
35.	Use "pip install <package name>" command to install the package		
36.	Uninstall a package with "pip uninstall <package name>" command		
37.	Open terminal/cmd		
38.	Change directories		
39.	Rename files		
40.	Move files from one directory to another		
41.	Copy files from one directory to another		
42.	Select/delete only particular types of files		
43.	Open a file		
44.	Open an application		
45.	Zip and unzip files/folders		
46.	Download files from a source (network location)		
47.	Connect to a server using ssh		

48.	Install virtual environment with pip			
49.	Create a virtual environment			
50.	Activate a virtual environment			
51.	Deactivate a virtual environment			
52.	Check if the environment is active for a python/pip version			
53.	Install packages in virtual environment			
54.	Run scripts in virtual environment			
55.	Select an appropriate package to install			
56.	Open terminal/cmd			
57.	Activate a virtual environment if required			
58.	Use “pip install <package name>” command to install the package			
59.	Import package in a python environment			
60.	Uninstall a package with “pip uninstall <package name>” command			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Test Yourself (Multiple Choice Questions)

M
C
D
U
L
L
E

Q 1
u
e
s
t
i
o
n

If Ali has to write a function to choose from a given set of options. Which of the following statements should he use?

A “If” statement

B “Switch” statement

C “While” statement

D “For” statement

Q 2
u
e
s
t
i
o
n

You have to display a sequence of numbers. Which statement should you use?

A “If” statement

B “Switch” statement

C “While” statement

D “For” statement

Q 3
u
e
s
t
i
o
n

Which of the following is a conditional loop statement?

- A "If" statement
- B "Switch" statement
- C "While" statement
- D "For" statement

Q 4
u
e
s
t
i
o
n

You are tasked with creating a function which keeps on printing a given integer until one of two conditions are met. Which comparative statement should be used?

- A and
- B or
- C not
- D >=

Q 5
u
e
s
t
i
o
n

A number 5.6 is changed into an integer with a command `rint()`. What value would you get?

A 6

B 5

C 4

D 3

Q 6
u
e
s
t
i
o
n

Which of the following is the symbol for not equal to?

A \leq

B \geq

C \neq

D $==$

Q 7
u
e
s
t
i
o
n

What statement/ combination of statements would be suited to take factorial of a number:
Factorial of 5 = $5*4*3*2*1$

- A "For" statement with range()
- B "While" statement with range()
- C "If" statement with range()
- D "Switch" statement with range()

Q 8
u
e
s
t
i
o
n

How would you check if one of 3 integers is the largest?

- A Use "for" within a "for" statement
- B Use "while" within a "while" statement
- C Use "switch" within a "switch" statement
- D Use "if" within an "if" statement

Q 9
u
e
s
t
i
o
n

Ali has to compare two items in terms of it's price, color, shape and size. How many if statements should he use.

A 2

B 3

C 4

D 5

Q 10
u
e
s
t
i
o
n

Consider a function, which is extracting text from a file, editing it and printing its contents a specified number of times. Which of the following would this function definitely use.

A "If" statement

B "For" statement

C "While" statement

D "Switch" statement

M 2
C
D
U
L
L
E
Q 1
u
e
s
t
i

How do we install packages in python

A Pip.

o
n

B Numpy.

C Pandas.

D Clc.

Q 2 Why do we use virtual environments

u
e
s
t
i
o
n

A To make the app run faster.

B To avoid conflicts with other python applications.

C To keep the app from crashing.

D To prevent viruses.

Q 3 What does activating an environment mean? A Installing packages in the environment.

u
e
s
t
i
o
n

B Installing that environment.

C Initializing all the variables.

D Switching to that virtual environment.

Q 4 Which library is used for dealing with arrays? A Beautifulsoup.

u

e
s
t
i
o
n

- B Pandas.
- C Numpy.
- D Anaconda.

Q 5
u
e
s
t
i
o
n

What does ssh do?

- A Allows you to run a python 2 app in python 3.
- B Speed up downloading of files.
- C Access a computer over the internet remotely.
- D Allocate more ram for the application.

Q 6
u
e
s
t
i
o
n

What is the maximum number of virtual environments that you can make?

- A 5.
- B 16.
- C 3.
- D No limit.

Q 7
u
e
s
t
i
o
n

Can you run more than one virtual environment simultaneously?

A Yes.

B No.

C Only if you have enough ram.

D Only in python 2.

Q 8
u
e
s
t
i
o
n

What is BeautifulSoup used for?

A Changing python 3 code to Python 2.

B Working with arrays.

C Scraping data from the web.

D Plotting graphs.

Q 9
u
e
s
t
i
o
n

What is the command "cd" used for?

A Viewing the current download.

B Changing the display settings.

- C Changing the directory.
- D Printing the current directory.

Q 10
u
e
s
t
i
o
n

What does the command “pwd” do?

- A Print the name of the current environment.
- B View the downloads.
- C Allow you to change the password.
- D Print the working directory.

Answers

Module 1		Module 2	
Question 1	B	Question 1:	A
Question 2	D	Question 2:	B
Question 3	C	Question 3:	D
Question 4	B	Question 4:	B
Question 5	B	Question 5:	C
Question 6	C	Question 6:	D
Question 7	A	Question 7:	A
Question 8	D	Question 8:	C
Question 9	C	Question 9:	C
Question 10	B	Question 10:	A

ANNEXURE-A

Instructions:

1. Create a function named “comparison” to compare any two given integers and print the greater integer.
2. Create a function named “print_loop” to print any given string any given number of times.
3. Create a function named “print_descend” which takes in a positive integer, decrements it by one iteratively and print its value until it becomes less than zero.
4. Create a function named “switch_fn” using switch statement which either prints area or parameter of a circle using a switch statement. The radius of the circle and switch argument are to be entered as parameters of the function.
5. Create a function to read and write files and display it’s contents

ANNEXURE-B

Instructions:

1. Create a “Mathfunctions” class object named as your first name.
2. Using a class object function, compare 14532 and 125342 and print the larger number.
3. Print the string “My name is [Your name]” 5, 10 and 20 times using the same class function.
4. Print values from 0 to 20 in descending order using a class function.
5. Calculate the perimeter of a circle having radius 3.6 using a class function.
6. Given a hello_world.txt file, read the file, edit the “hello_world” to “finally_done” and write the file using the created function.

7.	Differentiate between Switch and If-else statements?		
8.	Explain basic functionality of “def” and “try” statements?		
9.	Write the command used for installing packages?		
10.	Contrast ‘r’ and ‘w’ flag?		
11.	Describe the purpose of a virtual environment		
12.	State the purpose of packages		
13.	Write the python command for installation of package		
14.	Write the python command for package uninstallation		
15.	Describe the important parameter for setting up environment for python		
16.	List the python commands to create activate/deactivate virtual environment respectively		
17.	Describe what the command “cd” does		
18.	Summarize the purpose of indentation within python		
19.	Define variables		
20.	List three variable types		

