

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

(Summative Assessment)

Dec 2021



**National Vocational & Technical
Training Commission**

Title of Qualification: Level 3 National Qualification Certificate, in Internet of Things (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Develop program and frontend using framework Develop and integrate database with web applications Make rectifier using Diodes Use of bipolar junction transistor (BJT) and MOSFET in circuits Apply Thyristors (Uni Junction Transistor, Silicon Control Rectifier, Diac and Triac) in various Applications Verify Truth table of Digital Gates Construct and Verify Combinational Logic Circuits Construct and Verify Function of Flipflops Use 555 IC as multi-Vibrators Construct Shift Register and counters with the help of flip flop Configure Arduino Configure NodeMCU Configure Raspberry Pi Configure ESP-32 with LoRa	Assessment Date (DD/MM/YY): Assessment Time: 3.5 Hours		

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: Candidate is required to create a full adder circuit using basic gates ICs and verify its truth table.</p> <p>Assessment Task 2: Candidate is required to configure Arduino board with Arduino IDE and burn sample LED code.</p> <p>And complete:</p> <ol style="list-style-type: none"> Knowledge assessment test (Written or Oral) Portfolios at the time of assessment (if any)

Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Place (AND gate IC) on bread board.</p> <p>Performance Criteria 2: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 3: Connect LED to the output pin of IC and apply different logics ant input pins.</p> <p>Performance Criteria 4: Record & verify the output result against each given input.</p> <p>Performance Criteria 5: Place (OR gate IC) on bread board.</p> <p>Performance Criteria 6: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 7: Connect LED to the output pin of IC and apply different logics at input pins.</p> <p>Performance Criteria 8: Record & verify the output result against each given input.</p> <p>Performance Criteria 9: Place (NOT gate IC) on bread board.</p> <p>Performance Criteria 10: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 11: Connect LED to the output pin of IC and apply different logics ant input pins.</p> <p>Performance Criteria 12: Record & verify the output result against each given input.</p> <p>Performance Criteria 13: Place (NAND gate IC) on bread board.</p> <p>Performance Criteria 14: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 15: Connect LED to the output pin of IC and apply different logics ant input pins.</p> <p>Performance Criteria 16: Record & verify the output result against each given input.</p> <p>Performance Criteria 17: Place (NOR gate IC) on bread board.</p> <p>Performance Criteria 18: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 19: Connect LED to the output pin of IC and apply different logics ant input pins.</p> <p>Performance Criteria 20: Record & verify the output result against each given input.</p> <p>Performance Criteria 21: Place (X-OR gate IC) on bread board.</p> <p>Performance Criteria 22: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 23: Connect LED to the output pin of IC and apply different logics ant input pins.</p>
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	<p>Performance Criteria 24: Record & verify the output result against each given input.</p> <p>Performance Criteria 25: Place (X-NOR gate IC) on bread board.</p> <p>Performance Criteria 26: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 27: Connect LED to the output pin of IC and apply different logics ant input pins.</p> <p>Performance Criteria 28: Record & verify the output result against each given input.</p> <p>Performance Criteria 29: Apply Boolean algebra & Karnaugh mapping to simplify SOP & POS.</p> <p>Performance Criteria 30: Construct logic circuits with simplified SOP & POS.</p> <p>Performance Criteria 31: Design, Construct, and test a half-adder circuit using one XOR gate and two NAND gates.</p> <p>Performance Criteria 32: Design, Construct, and test a full-adder circuit using two ICS, &7486 and &7400.</p> <p>Performance Criteria 33: Connect LED to the output pin of IC and apply different logics at input pins.</p> <p>Performance Criteria 34: Record & verify the output result against each given input</p> <p>Performance Criteria 35: Identify faults in different combinational logic circuits IC's.</p> <p>Performance Criteria 36: Find the faults.</p> <p>Performance Criteria 37: Troubleshoot the faults.</p> <p>Assessment Task 2</p> <p>Performance Criteria 1: Install Arduino IDE</p> <p>Performance Criteria 2: Select Serial Port on which Arduino is connected</p> <p>Performance Criteria 3: Select the relevant board from tools.</p> <p>Performance Criteria 4: Verify the connectivity of board from computer</p> <p>Performance Criteria 5: Select and Run Basic Example Project as guided by instructor</p> <p>Performance Criteria 6: Burn the code on Arduino</p> <p>Performance Criteria 7: Identify that code is uploaded successfully.</p> <p>Performance Criteria 8: Troubleshoot configurations of Arduino IDE (If required)</p> <p>Performance Criteria 9: Connect LED to digital pin</p> <p>Performance Criteria 10: Burn blink code from example projects</p>
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	<p>Performance Criteria 11: Check LED is blinking. If not, check its connection and rectify</p> <p>Performance Criteria 12: Connect LED to PWM pin</p> <p>Performance Criteria 13: Burn fade code from example projects</p> <p>Performance Criteria 14: Verify LED is fading.</p>
	<p>Portfolios required at the time of assessment (if any) for</p> <p>Performance Criteria 1: Diary log or any other evidence of work completed on Develop program and frontend using framework</p> <p>Performance Criteria 2: Diary log or any other evidence of work completed on Develop and integrate database with web applications</p> <p>Performance Criteria 3: Diary log or any other evidence of work completed on Make rectifier using Diodes</p> <p>Performance Criteria 4: Diary log or any other evidence of work completed on Use of bipolar junction transistor (BJT) and MOSFET in circuits</p> <p>Performance Criteria 5: Diary log or any other evidence of work completed on Apply Thyristors (Uni Junction Transistor, Silicon Control Rectifier, Diac and Triac) in various Applications</p> <p>Performance Criteria 6: Diary log or any other evidence of work completed on Verify Truth table of Digital Gates</p> <p>Performance Criteria 7: Diary log or any other evidence of work completed on Construct and Verify Combinational Logic Circuits</p> <p>Performance Criteria 8: Diary log or any other evidence of work completed on Construct and Verify Function of Flipflops</p> <p>Performance Criteria 9: Diary log or any other evidence of work completed on Use 555 IC as multi-Vibrators</p> <p>Performance Criteria 10: Diary log or any other evidence of work completed on Construct Shift Register and counters with the help of flip flop</p> <p>Performance Criteria 11: Diary log or any other evidence of work completed on Configure Arduino</p> <p>Performance Criteria 12: Diary log or any other evidence of work completed on Configure Nodemcu</p> <p>Performance Criteria 13: Diary log or any other evidence of work completed on Configure Raspberry Pi</p> <p>Performance Criteria 14: Diary log or any other evidence of work completed on Configure ESP-32 with LoRa</p>

Continued on following page

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

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:

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

Each Assessment Task (with performance criteria)				
Assessment Task 1		Description of assessment task 1		
		Candidate is required to create a full adder circuit using basic gates ICs and verify its truth table.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	Place (AND gate IC) on bread board.			
2	Identify the input, output, Vcc and ground pin.			
3	Connect LED to the output pin of IC and apply different logics ant input pins.			
4	Record & verify the output result against each given input.			
5	Place (OR gate IC) on bread board.			
6	Identify the input, output, Vcc and ground pin.			
7	Connect LED to the output pin of IC and apply different logics at input pins.			
8	Record & verify the output result against each given input.			
9	Place (NOT gate IC) on bread board.			
10	Identify the input, output, Vcc and ground pin.			
11	Connect LED to the output pin of IC and apply different logics ant input pins.			
12	Record & verify the output result against each given input.			
13	Place (NAND gate IC) on bread board.			
14	Identify the input, output, Vcc and ground pin.			
15	Connect LED to the output pin of IC and apply different logics ant input pins.			
16	Record & verify the output result against each given input.			
17	Place (NOR gate IC) on bread board.			
18	Identify the input, output, Vcc and ground pin.			
19	Connect LED to the output pin of IC and apply different logics ant input pins.			
20	Record & verify the output result against each given input.			
21	Place (X-OR gate IC) on bread board.			
22	Identify the input, output, Vcc and ground pin.			
23	Connect LED to the output pin of IC and apply different logics ant input pins.			

24	Record & verify the output result against each given input.			
25	Place (X-NOR gate IC) on bread board.			
26	Identify the input, output, Vcc and ground pin.			
27	Connect LED to the output pin of IC and apply different logics ant input pins.			
28	Record & verify the output result against each given input.			
29	Apply Boolean algebra & Karnaugh mapping to simplify SOP & POS.			
30	Construct logic circuits with simplified SOP & POS.			
31	Design, Construct, and test a half-adder circuit using one XOR gate and two NAND gates.			
32	Design, Construct, and test a full-adder circuit using two ICS, &7486 and &7400.			
33	Connect LED to the output pin of IC and apply different logics at input pins.			
34	Record & verify the output result against each given input			
35	Identify faults in different combinational logic circuits IC's.			
36	Find the faults.			
37	Troubleshoot the faults.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Each Assessment Task (with performance criteria)				
Assessment Task 2		Description of assessment task 2 Candidate is required to configure Arduino board with Arduino IDE and burn sample LED code.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	Install Arduino IDE			
2	Select Serial Port on which Arduino is connected			
3	: Select the relevant board from tools.			
4	Verify the connectivity of board from computer			
5	Select and Run Basic Example Project as guided by instructor			
6	Burn the code on Arduino			
7	Identify that code is uploaded successfully.			
8	Troubleshoot configurations of Arduino IDE (If required)			
9	Connect LED to digital pin			
10	Burn blink code from example projects			
11	Check LED is blinking. If not, check its connection and rectify			
12	Connect LED to PWM pin			
13	Burn fade code from example projects			
14	Verify LED is fading.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

KNOWLEDGE ASSESSMENT

Title of Qualification: Level 3 National Qualification Certificate, in Internet of Things (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Develop program and frontend using framework Develop and integrate database with web applications Make rectifier using Diodes Use of bipolar junction transistor (BJT) and MOSFET in circuits Apply Thyristors (Uni Junction Transistor, Silicon Control Rectifier, Diac and Triac) in various Applications Verify Truth table of Digital Gates Construct and Verify Combinational Logic Circuits Construct and Verify Function of Flipflops Use 555 IC as multi-Vibrators Construct Shift Register and counters with the help of flip flop Configure Arduino Configure NodeMCU Configure Raspberry Pi Configure ESP-32 with LoRa	Assessment Date (DD/MM/YY): Assessment Time: 30min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor:Assessor's code:

	Signature of the Assessor:.....
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Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
Define PEAR in PHP	
What is Debugging	
Difference between HTML and CSS	
Define ACID property	
Write the use of oscilloscope.	
What is biasing?	
Define SCR?	
Difference between NAND, AND GATES	
Define JK/T flip flop.	

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
Define function of registers, and counters in digital circuits	
Define Microcontrollers.	
Basic Understanding of LoRa and ESP-32	

ANSWER KEY

Sr.	Answers
1	PHP Extension and Application Repository is a framework and distribution system for reusable PHP components
2	Debugging is the process of finding and resolving bugs (defects or problems that prevent correct operation) within computer programs, software, or systems.
3	HTML is used to structure the content on the web page. CSS is used to add style to the content of a web page.
4	ACID refers to the four key properties of a transaction: atomicity, consistency, isolation, and durability.
5	An oscilloscope is an instrument that graphically displays electrical signals and shows how those signals change over time. It is also used to measure voltage waves.
6	Biasing is the application of dc voltage in a circuit to establish a fixed level of voltage or current.

7	The electric name of Silicon controlled or the semiconductor controlled rectifier (SCR) is Thyristor. SCRs are responsible for conducting the flow of current in a single direction.
8	<p>In digital electronics, a NAND gate (NOT-AND) is a logic gate which produces an output which is false only if all its inputs are true.</p> <p>AND gate is an electrical circuit that combines two signals so that the output is on if both signals are present.</p>
9	T flip-flop (Toggle) is modified version of JK flip-flop. JK inputs of JK flip-flop combine together to form a single input T. This flip-flop is called T flip-flop.
10	A register can hold data, and it can be used for temporary storage. A counter is a special case of a register. it can only be loaded, stored, or incremented, or used for the stack or as the program counter.
11	A control device which incorporates a microprocessor.
12	It's a perfect, low-cost tool for monitoring a dozen-or-so LoRa devices, and relaying their messages up to the cloud. ESP32 LoRa 1-Channel Gateway