Seat No.	

Set P

M.Sc. Electronics (IOT) (Semester - II) (New) (NEP CBCS) Examination: March/April - 2025
Interfacing & Embedded System Design using - AVR & PIC Microcontrollers (2315201)

Day & Date: Wednesday, 14-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Draw neat diagrams and write equations wherever necessary.
3) Figures to the right indicate full marks.
4) Use of log-tables and calculator is allowed.
5) use of Mobil is strictly prohibited.

Q.1 A) Multiple choice Questions: **08**

1) Which memory type in embedded systems retains data even when power is off?
a) RAM b) ROM
c) Cache d) Register

2) What does the TRIS register do in a PIC microcontroller?
a) Timer control b) Port direction control
c) Interrupt setup d) ADC enable

3) Which of the following is NOT a characteristic of embedded systems?
a) Compact size b) Multitasking
c) Dedicated function d) Real-time operation

4) What is the primary interface protocol used by DS1307 RTC?
a) I2C b) SPI
c) UART d) PWM

5) Which microcontroller family does PIC belong to?
a) ARM b) Microchip
c) Intel d) Texas Instruments

6) In PIC microcontroller, what is the purpose of the OPTION_REG register?
a) To configure timer and pull-ups b) To enable interrupts
c) To handle I/O ports d) To control watchdog timer

7) What type of signal does a DAC output?
a) Digital only b) Analog only
c) Both d) None

8) What is the significance of watchdog timer in embedded systems?
   a) To store sensor data
   b) To generate PWM signals
   c) To reset the system on software fault
   d) To boost CPU speed

B) State True or False: **04**
   a) PIC microcontrollers are widely used in real-time applications.
   b) PIC stands for Peripheral Internal Controller.
   c) The I2C protocol allows multiple master and slave devices.
   d) A solenoid generates a magnetic field when energized.

Q.2 Answer the following. (Any Six) **12**

a) Define the term microcontroller.
b) List any two advantages of using embedded systems.
c) Mention the role of the interrupt in PIC microcontrollers.
d) Explain the use of timers in embedded systems.
e) Define signal conditioning in the context of sensor interfacing.
f) What is the function of the watchdog timer in embedded systems?
g) What is the use of PORTA in PIC microcontrollers?

Q.3 Answer the following. (Any Three) **12**

a) Describe interfacing steps for a Dot Matrix display with a AVR / PIC microcontroller.
b) Explain how ADC is initialized and used to read analog sensor values in AVR /PIC.
c) Discuss keyboard interfacing with AVR / PIC microcontroller.
d) Describe the role of OPTION_REG in controlling internal pull-ups and timers in AVR /PIC microcontroller.

Q.4 Answer the following questions (Any Two) **12**

a) Describe how to program and interface a solid-state relay with a PIC microcontroller for AC load control.
b) Explain the complete interfacing of a servo motor using PWM technique in PIC microcontroller.
c) Describe the process of serial communication using the TX/RX pins of PIC microcontroller.

Q.5 Answer the following questions (Any Two) **12**

a) Explain how a scrolling message display system can be developed using a Dot Matrix and PIC microcontroller.
b) Describe how to design a time and temperature monitoring system using DS1307 and LM35 with PIC microcontroller.
c) Discuss the design and control of a 3D LED cube using a PIC microcontroller.

SLR-AB-8

Seat No.	

Set P

M.Sc. Electronics (IOT) (Semester - II) (New) (NEP CBCS) Examination: March/April - 2025
Fundamentals of Internet of Things (2315202)

Day & Date: Friday, 16-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Draw neat diagrams and write questions wherever necessary.
3) Figures to the right indicate full marks.
4) Use of log-tables and calculator is allowed.
5) Use of Mobile is strictly prohibited.

Q.1 A) Choose the correct alternative. **08**

1) Which of the following is NOT a UAV network constraint?
a) Frequent link breakages
b) prone to malfunction
c) very complex
d) None of these

2) Which one of the following is based on Request-Response model between the end points?
a) MQTT b) CoAP
c) XMPP d) SMQTT

3) In MQTT, _____controls the publish-subscribe messaging pattern.
a) Message broker b) Publisher
c) Subscriber d) User

4) _____ contains information which is readable by other devices, however, it cannot read information itself.
a) Active NFC devices b) Dumb NFC devices
c) Passive NFC devices d) all of these

5) During remote server access by Raspberry Pi, where Raspberry Pi acts as a client, the client needs the following.
a) Only IP address of the server
b) only port number
c) only client IP address
d) both server IP address and port number

6) What is the full-form of GPIO pins used on Raspberry Pi device?
a) Global Purpose Input Output
b) Geo Purpose Input Output
c) General Public Input Output
d) General Purpose Input Output

7) Which among the following is a popular protocol implementing SDN?
a) Open switch b) Open flow
c) Open stack d) Open edge

8) The network topology supported by IEEE802.15.4 is _____
a) star b) mesh
c) star and mesh d) tree

B) Fill in the blanks or Write true/false **04**

1) Statement: Super-frames in HART consist of grouped 20 millisecond wide time slots. (True or False)
2) Statement: Paging in Bluetooth is the process of forming a connection between two Bluetooth devices. (True or False)
3) Statement: Raspberry Pi provides configuration options for camera. (True or False)
4) Statement: Cloud computing models don't allow different users to share the same physical resources. (True or False)

Q.2 Answer the following question (Any Six) **12**

a) Give the concept of multi-homing.
b) List different types of sensors and actuators used in IoT.
c) What are data mules in MWSN?
d) How connection is established in blue-tooth devices.
e) Name any four languages supported by Raspberry Pi.
f) What is interoperability?
g) What id cloud computing?
h) Give the benefits of Smart Grid?

Q.3 Answer the following question (Any Three) **12**

a) Compare IPv4 and IPv6 identification protocols for building IoT.
b) Write a note on Z-wave technology.
c) Compare FANETs and VANETs.
d) Explain Arduino-IDE overview.

Q.4 Answer the following question (Any Two) **12**

a) Explain the application of Raspberry-Pi for remote data logging of temperature and humidity data on remote server. List the programming steps only (without coding).
b) Explain how smart water-management using IoT is achieved in agriculture sector.
c) Explain the terms - Public-cloud, Private-cloud, Hybrid-cloud, Community-cloud and Distributed-cloud.

Q.5 Answer the following question (Any Two) **12**

a) Explain the components, methods and applications of MQTT data protocol.

b) Explain Single-Source-Single-Object and Single-Source-Multiple-Object detection application in Wireless Sensor Network (WSN).

c) Explain M2M Service-platform, Device-platform, User-platform and Application-platform.

SLR-AB-9

Seat No.	

Set P

M.Sc. Electronics (IOT) (Semester - II) (New) (NEP CBCS) Examination: March/April - 2025
Application Development using Arduino, NodeMCU & LORA (2315207)

Day & Date: Tuesday, 20-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose the correct alternatives: (MCQ) 08

1) Which of the following is used to set a pin as an input or output in Arduino?
a) Digital Write () b) Analog Read ()
c) Pin Mode () d) Delay ()

2) What data type is typically used to store true or false values?
a) int b) Bool
c) Float d) Char

3) Which function in Arduino sets a PMW signal on a pin?
a) Analog Write () b) Analog Read ()
c) Digital Write () d) Delay ()

4) The serial. begin () function is used to:
a) Start analog communication b) Start serial communication
c) Read digital values d) Write digital values

5) The Node MCU operates primarily on:
a) GSM communication
b) Wi-Fi communication
c) Zigbee communication
d) Bluetooth communication

6) The LoRa module SX1278 is used for:
a) Short-range communication
b) Audio signal processing
c) Long-range wireless communication
d) Data storage

7) Which function returns the square root of a value?
a) Pow() b) Tan()
c) Sin() d) Sqrt()

8) the command digital Read () is used to:
   a) Set a digital value on pin
   b) Read an analog signal
   c) Read a digital value from a pin
   d) Delay a function

B) Fill in the blanks/ Write True or False: **04**

1) The function pin Mode() is used to configure a pin as either ____ or ____.
2) True or False: The Arduino loop () function executes only once.
3) The ESP8266 on NodeMCU supports ____ communication.
4) True or False: The Analog Write () function generates PWM signals on digital pins.

Q.2 Answer the questions. (Any Six) **12**

a) Explain the use of variable in Arduino.
b) What is the purpose of control statements in an Arduino sketch?
c) Describe the analogRead() function and its usage.
d) Explain the concept of digital and analog pins in Arduino.
e) How does 12C communication work in Arduino?
f) Define Pulse Width Modulation (PWM) in Arduino.
g) Describe key features of the NodeMCU board.
h) Explain the applications of the LoRa SX1278 module.

Q.3 Answer the following: (Any Three) **12**

a) Describe the basic program structure in Arduino, including setup () and loop () functions.
b) Explain the advanced I/O functions available in Arduino.
c) How can a temperature sensor be interfaced with Arduino?
d) Explain the block diagram and pin layout of the NodeMCU.

Q.4 Attempt the following: (Any Two) **12**

a) Discuss different types of Arduino boards and their applications.
b) Explain the features, pin description, and interfacing method of the LoRa RF Module-SX1278.
c) Describe the various sensors compatible with Arduino and their interfacing techniques.

Q.5 Attempt the following: (Any Two) **12**

a) Explain the working and interfacing of the PIR sensor with Arduino.
b) Describe DC motor speed control using PWM and Arduino.
c) Explain wireless communication options available in Arduino, including Bluetooth and Wi-Fi.

Seat No.	

Set **P**

M.Sc. Electronics (IOT) (Semester - III) (New) (NEP CBCS) Examination: March/April - 2025
Introduction to Raspberry Pi (2315301)

Day & Date: Thursday, 15-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Draw neat diagrams and write equations wherever necessary.
3) Figures to the right indicate full marks.
4) Use of log-tables and calculator is allowed.
5) Use of Mobile is strictly prohibited.

Q.1 A) Choose correct alternatives from the options. **08**

1) What type of processor is used in the Raspberry Pi 4?
a) Dual-core ARM Cortex-A7
b) Quad-core ARM Cortex-A72
c) Single-core ARM Cortex-M
d) Hexa-core ARM Cortex-A53

2) What is the primary purpose of the HDMI port on a Raspberry Pi?
a) To connect storage devices
b) To provide network connectivity
c) To output audio and video to displays
d) To interface with external peripherals

3) What is the first step to boot a Raspberry Pi 4?
a) Connect peripherals like a keyboard and mouse
b) Install an operating system on an SD card
c) Power on the Raspberry Pi
d) Configure GPIO pins

4) What does operating the Raspberry Pi in "headless mode" mean?
a) Using the Raspberry Pi without an SD card.
b) Operating the Raspberry Pi without a power supply
c) Using the Raspberry Pi without a direct monitor, keyboard, or mouse
d) Booting the Raspberry Pi directly into the GUI interface

5) What is the purpose of Pulse Width Modulation (PWM) in Raspberry Pi GPIO programming?
a) To process audio signals
b) To provide constant digital signals
c) To store data in memory
d) To control analog devices like servos and LEDs with variable intensity

6) How do you configure a GPIO pin as an output in the RPi.GPIO library?
a) GPIO.configure_output()
b) GPIO.setup(pin,GPIO.OUT)
c) GPIO.pin_mode_output()
d) GPIO.output_configure(pin)

7) Which component is used to control high-power devices like motors with the Raspberry Pi GPIO?
a) Relay b) LED
c) Resistor d) Capacitor

8) What is the role of PWM (Pulse Width Modulation) in motor control using Raspberry Pi?
a) To provide constant voltage to the motor
b) To control the speed of the motor by varying duty cycle
c) To stop the motor
d) To switch the motor on or off

B) State True or False. **04**

1) The Raspberry Pi B+ board has Two USB 2.0 ports.
2) The Raspberry Pi 3 board has 1 GB RAM.
3) An SD card must be formatted and loaded with an operating system image before booting a Raspberry Pi.
4) Tkinter is used to create graphical user interfaces for controlling the GPIO pins on the Raspberry Pi.

Q.2 Answer the following questions. (Any Six) **12**

a) What are the main differences between Raspberry Pi 3 and Raspberry Pi 4?
b) What is the purpose of GPIO pins on a Raspberry Pi?
c) What are the steps to boot Raspberry Pi 4 for the first time?
d) How do you download an operating system for Raspberry Pi?
e) What is the RPi.GPIO library, and why is it used?
f) Name two Python libraries used for accessing GPIO pins on Raspberry Pi.
g) Compare Raspberry Pi 4 and Rock Pi 4 in terms of processor architecture.

Q.3 Answer the following questions. (Any Three) **12**

a) What is the significance of SoC architecture in Raspberry Pi, and which SoCs are used in its models?
b) Describe the steps involved in downloading, formatting, and booting an operating system on a Raspberry Pi 4.
c) What is the RPi.GPIO library, and how is it used to control GPIO pins?
d) Describe the steps for flashing an LED using a GPIO pin and Python code.

Q.4 Answer the following questions. (Any Two) **12**

a) What are the key on-board components of the Raspberry Pi, and how do they support its functionality?

b) Describe the steps for flashing an LED using a GPIO pin and Python code.

c) How can hardware peripherals be interfaced with the Raspberry Pi, and what configurations are required?

Q.5 Answer the following questions. (Any Two) **12**

a) Describe how the RPi.GPIO library helps in accessing GPIO pins programmatically.

b) Describe the process of reading data from a DHT11 temperature and humidity sensor using Raspberry Pi.

c) What are the considerations for choosing a Raspberry Pi alternative for Al and robotics applications?

SLR-AB-13

Seat No.	

Set P

M.Sc. Electronics (IOT) (Semester - III) (New) (NEP CBCS) Examination: March/April - 2025
Fundamentals of Sensor Networks (2315302)

Day & Date: Saturday, 17-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) Which protocol is commonly used for wired sensor network communication?
a) SPI b) Zigbee
c) Bluetooth d) NFC

2) In which topology are all nodes connected to a central hub?
a) Ring b) Star
c) Bus d) Mesh

3) Which component acts as a coordinator in a Wireless Sensor Network (WSN)?
a) End Device b) PFD
c) FFD d) USB

4) Which of the following is a standard for low-power wireless personal area networks?
a) IEEE 802.3 b) IEEE 802.11
c) IEEE 802.15.4 d) IEEE 802.16

5) Which protocol operates at the MAC layer in WSNs?
a) TCP b) IEEE 802.15.4
c) Ethernet d) USB

6) The main purpose of the physical layer in WSN is:
a) Signal encoding and decoding
b) Data routing
c) Frame formatting
d) Error checking

7) In WSN routing, the proactive routing protocol is known for:
a) Storing and maintaining routes continuously
b) Creating routes only on-demand
c) Prioritizing location-based routing
d) Relying on cluster heads for communication

8) HAN technology in WSNs is primarily used in:

a) Industrial applications b) Home automation

c) Healthcare monitoring d) Environmental monitoring

B) Fill in the blanks OR Write True/False. **04**

1) ____ is a wired communication protocol widely used for connecting sensors in embedded systems.
2) In a star topology, all nodes connect to a central hub or switch. (True/False)
3) The main architecture of WSNs includes nodes such as____ and Partial Function Device (PFD).
4) In sensor networks, ____ technology is suitable for long-range, low-power communications over large areas.

Q.2 Answer the following (Any Six). **12**

a) Define the characteristics and requirements of wired sensor networks.
b) Explain the function of sensor interfacing and signal conditioning.
c) List the components of a wired sensor node.
d) Describe the architecture of Wireless Sensor Networks (WSN).
e) What are the different types of Wireless Sensor Networks?
f) Briefly explain synchronization and timing issues in wired networks.
g) Describe any one protocol used in wired sensor networks (e.g., SPI, USB).
h) Explain the purpose of TCP/IP protocol stack in sensor networks.

Q.3 Answer the following (Any Three). **12**

a) Describe the MAC layer in Wireless Sensor Networks with a focus on the IEEE 802.15.4 standard.
b) Explain the architecture of a wireless sensor node and the roles of end devices and coordinators.
c) What are the main characteristics of the ISM band used in WSN protocols?
d) Compare the different routing protocols used at the network layer of WSN (Data-centric, Proactive, On-demand).

Q.4 Answer the following (Any Two). **12**

a) Discuss the applications and challenges of wired sensor networks in real-world scenarios.
b) Describe the architecture and application of Zigbee in wireless sensor technology.
c) Explain the various network topologies used in wired sensor networks, such as star and ring.

Q.5 Answer the following (Any Two). **12**

a) Explain how Wireless Sensor Networks are applied in Air Quality monitoring systems.

b) Describe the architecture of Bluetooth Low Energy and its role in wireless sensor technology.

c) Describe the design considerations for creating a sensor node with RFID and LoRa technologies.

Seat No.	

Set P

M.Sc. Electronics (IOT) (Semester - III) (New) (NEP CBCS) Examination: March/April - 2025
Programming in Python and Application Development (2315306)

Day & Date: Monday, 19-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Draw neat diagrams and write equations wherever necessary.
3) Figures to the right indicate full marks.
4) Use of log-tables and calculator is allowed.
5) Use of Mobile is strictly prohibited.

Q.1 A) Choose the correct alternative **08**

1) What is the output of this expression, 3*1**3?
a) 27 b) 9
c) 3 d) 1

2) Which of these is not a core data type?
a) Lists b) Dictionary
c) Tuples d) Class

3) What does $3^{\wedge}4$ evaluate to?
a) 81 b) 12
c) 0.75 d) 7

4) What will be the output of the following Python code?
```
i = 5
while True:
    if i%11 ==0:
        break
print(i)
i+= 1
```
a) 5 6 7 8 9 10 b) 5 6 7 8
c) 5 6 d) Error

5) What will be the output of the following Python statement?
>>>"abcd"[2:]
a) a b) ab
c) cd d) dc

6) Suppose list 1 is [2445,133,12454,123], what is max(list1)?
   a) 2445 b) 12454
   c) 133 d) 123

7) What will be the output of the following Python code?
```
>>> t=(1,2,4,3)
>>>t[1: -1]
```
   a) (1,2) b) (1,2,4)
   c) (2,4) d) (2,4,3)

8) Which of the following statements create a dictionary?
   a) d={}
   b) d={“john”:40, “peter”:45}
   c) d = {40:”john”, 45:’’peter”}
   d) All of the mentioned

B) Fill in the blanks or Write true/false **04**

1) In Python, 'Hello', is the same as "Hello" (True/False)

2) Which method can be used to remove any whitespace from both the beginning and the end of a string?

3) {"apple", "banana", "cherry"} This statement defines a Tuple. (True/False)

4) Which collection does not allow duplicate members? (Tuple, List or Set)

Q.2 Answer the following (any six - two marks each) **12**

a) What is the difference between Python Arrays and lists?

b) Briefly explain the meaning of Break and Continue statements with suitable example.

c) What is the __ init __() function in Phyhon?

d) What are Membership Operators? Illustrate with example.

e) How can you create and use a Module in Python?

f) What is a class in Python, and how do you use it?

g) What is the difference between merge, join, and concatenate?

h) How is Split Function used in Python?

Q.3 Answer the following (Any three- four marks each) **12**

a) What are the basic data types in Python?

b) Write a program to Calculate the Factorial of a number in Python.

c) How do you create a function in Python? Explain with example.

d) What is a module in Python and how to use it? Explain with example.

Q.4 Answer the following (Any two – six marks each) **12**

a) What are the different types of operators in Python? Explain any three with examples.

b) Write a python program to make following operations on a file. 1. read an entire text file 2. append the text to a file 3. read a file line by line and store it into a list

c) Write a python program to display the squares of prime numbers in range 1 to 50.

d) Write a program to Create a list of tuples from given list having number and its cube in each tuple and to find the size of a tuple.

Q.5 Answer the following (Any two – six marks each) **12**

a) Explain the application of Python, using Raspberry Pi, in water level controller.

b) How to build an MQTT Server using Raspberry Pi in Python.

c) What are the Basic Data Structures in Python (List, Tuple, Set, Dictionary, String)? Explain with suitable examples.

Seat No.	

Set P

M.Sc. Electronics (IOT) (Semester - IV) (New) (NEP CBCS) Examination: March/April - 2025
Data Analytics & Industrial IoT (2315401)

Day & Date: Wednesday, 14-May-2025 Max. Marks: 60
Time: 11:00 PM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Draw neat diagrams and write equations wherever necessary.
3) Figures to the right indicate full marks.
4) Use of log-tables and calculator is allowed.
5) use of Mobil is strictly prohibited.

Q.1 A) Multiple choice Questions:

1) What is the process of transforming raw data into a structured format suitable for analysis called?
a) data aggregation b) data wrangling
c) data imputation d) data integration

2) Which data modeling approach is commonly used for representing data as a hierarchy with parent-child relationship?
a) Relational modeling
b) hierarchal modeling
c) object oriented modeling
d) Entity Relationship modeling

3) Which of the following are types of Unicode character string types in SQL?
a) nstring b) nchar
c) ntext d) both b and c

4) What does BLOB in SQL stand for?
a) Big Large Objects
b) Binary Language for Objects
c) Binary Large Objects
d) Big-data Language for Objects

5) If machine learning model output involves target variable, then that model is called?
a) Descriptive model b) Predictive model
c) Reinforcement Learning model d) all of these

6) How many variables are required to represent a Linear Regression model?
a) 3 b) 4
c) 2 d) 1

7) What is Smart Factory?
   a) Robots will replace Humans
   b) factories and logistic systems that will operate and organize themselves without human interaction
   c) factories and logistic systems that will operate and organize themselves with human interaction
   d) all of these

8) Lean manufacturing is a ____.
   a) Fad
   b) method for reducing labor
   c) way to improve customer value
   d) efficiency improvement technique

B) Fill in the blanks or Write true/false **04**

a) To represent flow of data ____ diagram is used in data modeling.
b) ____ statement is used in SQL to delete a table.
c) A cancer detection problem can be solved by Logistic Regression. (True or False)
d) In Lean manufacturing, the Cycle-time is the amount of time the machine runs. (True or False)

Q.2 Answer the following questions. (Any Six) **12**

a) What is relational database?
b) What is the purpose of data modeling?
c) What is SQL?
d) What is data profiling?
e) What is cross-validation?
f) What is Industry 4.0?
g) Give an example of I-IoT application in energy sector.
h) Key difference between IoT and I-IoT.

Q.3 Answer the following questions. (Any Three) **12**

a) Explain the purpose of Database?
b) Describe the data types in SQL.
c) Explain the purpose and importance of Data Analysis.
d) Write a note on Big Data Analysis.

Q.4 Answer the following questions. (Any Two) **12**

a) Explain the key components of an I-IoT system and their roles.
b) Explain the terms Primary key, Foreign key, Unique constraint and Clustered index in reference to SQL.
c) Explain the process of designing a relational database hence discuss the role of E-R modeling and normalization.

Q.5 Answer the following questions. (Any Two) **12**

a) Explain Supervised, Unsupervised and Reinforcement learning models with suitable examples.

b) What is Industry 4.0 and how does it differ from previous industrial revolutions? Explain.

c) Discuss the benefits of implementing I-IoT in an industrial environment.

Seat No.	

Set **P**

M.Sc. Electronics (IOT) (Semester - IV) (New) (NEP CBCS) Examination: March/April - 2025
Advanced Wireless Sensor Networks (2315402)

Day & Date: Friday, 16-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks

Q.1 A) Choose the correct alternative. **08**

1) Which topology ensures minimal energy consumption due to direct communication with a central hub?
   a) Star b) Mesh
   c) Ring d) Peer-to-peer

2) Data integrity in WSN ensures:
   a) Data is unaltered during transmission
   b) Nodes are authenticated
   c) Energy is conserved
   d) Network topology remains static

3) Secure localization ensures:
   a) Encryption of all transmitted data
   b) Accurate node positioning without malicious interference
   c) Energy-efficient routing
   d) Node authentication

4) A key design issue in WSN OS is:
   a) Limited memory and processing power
   b) High-resolution graphics support
   c) Multi-user functionality
   d) Large file storage

5) Traffic management in WSN addresses:
   a) Reducing node cost
   b) Increasing node transmission range
   c) Prioritizing critical data packets
   d) Enhancing encryption

6) TinyGALS ensures concurrency using:
   a) Time-division multiplexing
   b) Thread-based parallelism
   c) Centralized scheduling
   d) Globally asynchronous, locally synchronous components

7) Cross-layer design in WSN improves:
   a) Node battery size
   b) Coordination between protocol layers for efficiency
   c) Physical durability of sensors
   d) Encryption standards

8) Wireless Multimedia Sensor Networks (WMSN) require:
   a) Static routing protocols
   b) Low-cost scalar sensors
   c) High bandwidth for video/audio transmission
   d) Centralized control only

B) Fill in the blanks OR true/false. **04**

1) LEACH stands for _____.
2) The primary goal of _____ is to minimize energy consumption in WSN.
3) A _____ attack disrupts network services by flooding nodes with traffic.
4) _____ simulators evaluate node-level performance.

Q.2 Answer the following. (Any Six) **12**

a) Name two features of TinyOS.
b) Why is traffic management critical in WSN?
c) Name two network simulator tools for WSN.
d) State two disadvantages of a Ring topology in WSN.
e) What is the role of “EnviroTrack”?
f) Define “secure aggregation” in WSN.
g) Give an application of Wireless Underground Sensor Networks.
h) Why is hierarchical routing preferred in WSN?

Q.3 Answer the following. (Any Three) **12**

a) Why hierarchical routing preferred in WSN? Discuss with an example.
b) Define data integrity in the context of WSN security.
c) Explain traffic management issues in WSN with examples.
d) Compare passive and active attacks in WSN with examples.

Q.4 Answer the following. (Any Two) **12**

a) Analyse the challenges in deploying WSNs in extreme environments (e.g., underwater, underground).
b) Compare node-centric programming and database approaches in WSN.
c) Explain the role of system power management in prolonging WSN lifetime.

Q.5 Answer the following. (Any Two) **12**

a) Describe the SPIN protocol and its data dissemination strategies. How does it address the “implosion problem”?
b) Discuss the challenges in designing an OS for resource-constrained WSN nodes.
c) Evaluate the potential of WMSN in real-time surveillance and disaster management.

SLR-AB-19

Seat No.	

Set P

M.Sc. Electronics (IOT) (Semester - IV) (New) (NEP CBCS) Examination: March/April - 2025
Java Programming for Mobile Application Development (2315406)

Day & Date: Tuesday, 20-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat diagrams and write equations wherever necessary.
4) Use of log-tables and calculator is allowed.

Q.1 A) Choose correct alternative. **08**

1) What is a Fragment in Android?
a) A component that runs independently
b) A type of layout
c) A part of the Ul that can be reused
d) A service used for background tasks

2) What is the purpose of the Android Manifest file?
a) To write Java code
b) To declare application components
c) To store user data
d) To compile the app

3) Which component displays Ul and handles user interaction?
a) Service b) ContentProvider
c) Broadcast Receiver d) Activity

4) How do you remove a Fragment from an activity?
a) FragmentTransaction.Remove ()
b) RemoveFragment ()
c) RemoveTransaction ()
d) PopFragment ()

5) Which method is used to add a fragment to an activity?
a) AddTransaction () b) FragmentTransaction ()
c) BeginTransaction () d) AddFragment ()

6) What layout arranges views in a single column or row?
a) Relative Layout b) Table Layout
c) Linear Layout d) Grid Layout

7) What does an Activity represent in Android?
a) A Java class b) A layout file
c) A user interface screen d) A thread

8) What is the role of Fragment Transaction in Android?
a) It manages the Fragment lifecycle
b) It handles Ul updates for Fragments
c) It allows the addition, removal, or replacement of fragments
d) It initializes Fragments

B) Write the true or false. **04**

1) A Fragment can be added to an Activity dynamically at runtime.
2) The on Detach() method is called when a fragment is no longer in use.
3) Android applications can only have one layout file.
4) A Fragment can have its own lifecycle methods separate from the Activity lifecycle.

Q.2 Answer the following. (Any Six) **12**

a) What are the advantages of using Java for Android development?
b) Define Fragment Transaction.
c) What is the role of main() method in Java?
d) What is an AVD?
e) Define Layout in Android.
f) What is the purpose of onCreate() method in Activity lifecycle?
g) Write a simple Java program and explain each line.
h) What is the difference between JDK and JRE?

Q.3 Answer the following. (Any Three) **12**

a) Explain the complete process of installing Java JDK and configuring it.
b) Discuss the Android application components with examples.
c) Write a program to demonstrate how to add a Fragment to an Activity and pass data to it.
d) Describe the differences between LinearLayout and RelativeLayout.

Q.4 Answer the following. (Any Two) **12**

a) Explain the complete Fragment lifecycle with appropriate code examples.
b) Describe the process of creating and launching an Android Activity.
c) Write a detailed explanation of how data can be shared between two Fragments using a common Activity.

Q.5 Answer the following. (Any Two) **12**

a) Explain how Fragments can be used to create reusable Ul components in Android.
b) Discuss the concept of Fragment Manager and how it is used in managing Fragments.
c) Write a code snippet to demonstrate how to replace a Fragment in an Activity.