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Barasat, Kolkata -700125

## BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – BCA-2022

Course Name – Introduction to Internet of Things (IoT)

Course Code - BCAE602A

( Semester VI )

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) What are the core functionality of IoT systems?
- |   |   |
|---|---|
| a) Collecting and transmitting data from connected devices    | b) Storing large amounts of data in cloud storage |
| c) Enabling devices to communicate without human intervention | d) Allowing devices to be manually controlled     |
- (ii) Show the difference between an IoT-enabled system and a traditional embedded system.
- |  |   |
|--|---|
| a) IoT systems involve cloud connectivity, while embedded systems are standalone | b) IoT systems are smaller in scale than embedded systems                                     |
| c) IoT systems do not use sensors, while embedded systems do                     | d) Embedded systems focus on simple tasks, whereas IoT systems handle complex data processing |
- (iii) Identify which communication model in IoT enables real-time analytics and decision-making.
- |                                   |                                  |
|-----------------------------------|----------------------------------|
| a) Device-to-Device Communication | b) Device-to-Cloud Communication |
| c) Cloud-to-Device Communication  | d) Edge-to-Cloud Communication   |
- (iv) The network layer's role in enhancing IoT efficiency can be explained as
- |   |  |
|---|--|
| a) By facilitating data routing and device addressing | b) By providing security and privacy for data          |
| c) By enabling fast device-to-device communication    | d) By connecting IoT devices directly to cloud servers |
- (v) Choose the most significant challenge in IoT scalability.
- |   |   |
|---|---|
| a) Managing the complexity of large device networks | b) Handling the volume of generated data                      |
| c) Securing device communications                   | d) Integrating IoT systems with traditional IT infrastructure |

- (vi) Which protocol is specifically designed for constrained IoT devices?  
a) HTTP b) CoAP  
c) FTP d) SMTP
- (vii) Choose the role Artificial Intelligence plays in IoT ecosystems.  
a) AI analyzes and processes data for predictive insights b) AI enables IoT devices to communicate with minimal human input  
c) AI optimizes cloud storage for IoT-generated data d) AI facilitates the remote control of devices
- (viii) Choose the type of communication model that is best suited for real-time IoT applications.  
a) Client-Server b) Publish-Subscribe  
c) Peer-to-Peer d) Request-Response
- (ix) Choose the role of a feedback loop in an IoT-controlled system.  
a) Improve response time b) Maintain system stability  
c) Reduce data redundancy d) Enhance device authentication
- (x) What determines the efficiency of an IoT-controlled system?  
a) The processing power of the IoT gateway b) The network topology  
c) The communication protocol used d) The type of sensor employed
- (xi) How does an IoT network maintain resilience against cyber threats?  
a) By using encryption and secure communication protocols b) By limiting the number of devices connected to the network  
c) By ensuring that devices operate independently of each other d) By controlling access to the network through a central hub
- (xii) Relate the importance of self-calibration in smart sensors.  
a) Enhances accuracy and reliability b) Decreases sensitivity  
c) Increases manual intervention d) Reduces signal strength
- (xiii) Demonstrate how screen printing is used in sensor electrode fabrication.  
a) Allows rapid and scalable production b) Requires excessive manual labor  
c) Has no impact on sensor performance d) Eliminates the need for calibration
- (xiv) Describe the importance of encryption in IoT security.  
a) Ensures data confidentiality and integrity b) Increases network congestion  
c) Reduces processing power d) Slows down device communication
- (xv) Outline the key components of IoT security architecture.  
a) Authentication, encryption, access control b) Increased cloud storage  
c) Faster sensor response d) Larger power consumption

#### Group-B

(Short Answer Type Questions)

3 x 5=15

2. Assess potential security vulnerabilities in IoT-enabled healthcare systems and propose mitigation strategies. (3)
3. Define IoT. (3)
4. Identify the key components of an IoT ecosystem. (3)
5. Illustrate the IoT levels with an example. (3)
6. Analyze the functional differences between microcontrollers and microprocessors. (3)

OR

Demonstrate how microcontrollers interface with sensors, highlighting the key steps involved in the process. (3)

#### Group-C

(Long Answer Type Questions)

5 x 6=30

7. Analyze the key components of smart sensors and their role in IoT applications. (5)
8. Develop a fabrication workflow for manufacturing high-precision sensors for environmental monitoring. (5)
9. Evaluate the advantages and challenges of IoT in modern technological advancements. (5)
10. How does screen printing contribute to electrode fabrication in smart sensors? (5)
11. Compare the advantages of physical and chemical vapor deposition for smart sensor fabrication. (5)
12. Evaluate different electrode fabrication techniques and their impact on sensor performance. (5)

**OR**

Justify the selection of specific sensor fabrication techniques for different industrial applications. (5)

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