Reg. No.																

Question Paper Code	13106

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Fifth Semester

Computer Science and Engineering (IoT)

20CIPC501 - IOT ARCHITECTURE AND PROGRAMMING IN IoT

Regulations - 2020

Duration: 3 Hours Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	What is a key consideration for businesses implementing IoT solutions? (a) Increased data isolation (b) Data security and privacy (c) Reduced data analytics (d) Limited scalability	1	K1	CO1
2.	To ensure scalability, IoT systems should be designed with a ____. (a) monolithic architecture (b) modular architecture (c) centralized architecture (d) proprietary architecture	1	K1	CO1
3.	How does narrowband IoT (NB-IoT) benefit wide area IoT deployments? (a) High data rate (b) Low power consumption (c) Limited coverage (d) High latency	1	K1	CO1
4.	In an IoT system, what type of service does the IoT service FC provide for sensor resources? (a) Services that manage device components like sensing and actuation (b) Services that interface with users and physical Things (c) Services that translate high-level identifiers to MAC addresses (d) Services that return Sensor Resource values in synchronous or asynchronous fashion	1	K1	CO2
5.	_____ functional group contains standalone application. (a) Application (b) Device (c) Virtual Entity (d) Communication	1	K2	CO2
6.	Who are the main concerns addressed by the reference architecture in an IoT system? (a) Only the concrete IoT architect (b) All stakeholders equally (c) The stakeholders with the least concerns (d) The stakeholders with the most technical concerns	1	K1	CO2
7.	Which method is best to choose a secure framework will ensure that your confidential or third-party data and information is safe and secure? (a)IoT platform with breach (b)Secure IoT Network (c)Intruder based IoT Network (d)Man in the middle IoT Network	1	K1	CO3
8.	The following are one of the proprietary services of IoT network. (a)AWS (b)Azure (c)Cisco (d)All of the above	1	K1	CO3
9.	The following factors are to be considered for choosing an OS. 1.Device Constraints, 2.Real-Time Requirements,3.Connectivity and Networking, 4. Microcode Updates (a)1 and 2 only (b)1,2and 3 only (c)1,2,3,and 4 (d) none of the above	1	K2	CO3
10.	To load firmware onto an XBEE module using ----- (a)DIGI CTU (b)No software needed (c)ZenC (d)X-Digi	1	K1	CO4
11.	How is data read from an XBee module in the provided code snippet? (a) Via USB connection (b) Via wireless connection (c) Via a ZigBee Coordinator (d) Via Ethernet connection	1	K1	CO4
12.	In the function get_remote_device(), the xbee_network.discover_device() searches for the _____ on the network using the node ID provided. (a) Gateway device (b) Remote node (c) Communication protocol (d) Sensor node	1	K1	CO4
13.	To put the ESP8266 board in the bootloader mode, connect pin GPIO 0 to _____. (a) 3.3V (b) Ground (c) GPIO 2 (d) GPIO 5	1	K1	CO5

14. Outline the purpose of adding the URL http://arduino.esp8266.com/stable/package_esp8266com_index.json in the Arduino IDE Preferences. *1 K2 CO5*
    (a) To update the IDE interface
    (b) To install additional plugins for ESP8266 support
    (c) To access free online tutorials for Arduino programming
    (d) To download sample projects for ESP8266 development
15. What should the switches of the components be set to in order to avoid damaging the chip? *1 K1 CO5*
    (a) 1.8V (b) 3.3V (c) 5V (d) 2.5V
16. Why is using the Arduino IDE recommended for programming the ESP8266 module? *1 K1 CO5*
    (a) It provides a direct hardware interface with the module
    (b) Arduino IDE includes dedicated ESP8266 programming functions
    (c) It eliminates the need for setting up hardware connections manually
    (d) Arduino IDE allows reuse of existing Arduino libraries for ESP8266
17. Which board would be suitable for a project requiring higher performance than the ESP-12? *1 K1 CO6*
    (a) ESP-01 (b) ESP-07 (c) ESP-32 (d) ESP-8266
18. Rephrase the need of the provided code aim which aims to achieve? *1 K2 CO6*

```
// Import required libraries
#include <ESP8266WiFi.h>

// WiFi parameters

constchar* ssid = "your_wifi_name";
constchar* password = "your_wifi_password";

void setup(void)
{
// Start Serial
Serial.begin(115200);
// Connect to WiFi
WiFi.begin(ssid, password);
while (WiFi.status() != WL_CONNECTED) {
    delay(500);
Serial.print(".");
  }
Serial.println("");
Serial.println("WiFi connected");
// Print the IP address
Serial.println(WiFi.localIP());
}

void loop() {

}
```

    (a) Establish connection to a local Wi-Fi network (b) Control an external device
    (c) Communicate with other modules (d) Print random IP addresses
19. Relate why is it necessary to have a dedicated power supply to power the ESP8266 chip during programming? *1 K2 CO6*
    (a) To save energy (b) To prevent overheating
    (c) To avoid compatibility issues (d) To increase programming speed
20. Where a wire should be connected in the Olimex board for programming purposes later on? *1 K1 CO6*
    (a) Ground pin (b) VCC pin (c) GPIO 0 pin (d) Reset pin

PART - B (10 × 2 = 20 Marks)

Answer ALL Questions

21.	Demonstrate with an example the conceptual elements and actual elements that are needed in architectural design.	2	K2	CO1
22.	In data and Information layers, outline the role of KMF? Mention its significance.	2	K2	CO1
23.	Draw IoT-A Functional Model.	2	K2	CO2
24.	Relate and compute the trust level/score of an entity in IoT.	2	K2	CO2
25.	Compare Open Source vs. Proprietary OS.	2	K2	CO3
26.	Compare the need of volatile RAM and Flash memory for IoT data storage.	2	K2	CO3
27.	Show the packet structure of XBEE by using API Mode for real time communication using IoT.	2	K2	CO4
28.	List out some advantages of using Rasperry-pi.	2	K2	CO4
29.	Develop with a suitable code where capacitors and resistors may be necessary for stabilization.	2	K3	CO5
30.	Identify the following comment line //Connection successful, print the IP address using a suitable code.	2	K3	CO6

PART - C (6 × 10 = 60 Marks)

Answer ALL Questions

31.	a)	Explain the functional layers and capabilities of an IoT solution with detailed description about individual layers involved.	10	K2	CO1
		OR			
	b)	Illustrate how Capillary networks are typically autonomous, self-contained systems of M2M devices that may be connected to the cloud.	10	K2	CO1
32.	a)	Consider the following: The case that an HTTP Client sends an HTTP request to a CoAP server through a Gateway Device hosting an HTTP-CoAP Cross Proxy. Explain the possible configurations and IETF core proxy.	10	K2	CO2
		OR			
	b)	Summarize the need of safety model, privacy, trust and security model.	10	K2	CO2
33.	a)	"The need for an operating system (OS) in an Internet of Things (IoT) platform is crucial for several reasons"-Interpret the above statement with real time examples.	10	K2	CO3
		OR			
	b)	Outline the needs of FPU (Floating Point Unit) Upgrade Path for IoT.	10	K2	CO3
34.	a)	Illustrate the process which is used for loading firmware onto an XBEE module, and how does it enhance its capabilities.	10	K2	CO4
		OR			
	b)	Explain the importance of basic communications that sends information between an Arduino and an XBEE module to send and receive data.	10	K2	CO4
35.	a)	Illustrate the procedure for connecting ESP8266 to WI-FI Module.	10	K2	CO5
		OR			
	b)	Demonstrate, Control of servo motor with an ESP8266 or ESP32.	10	K2	CO5
36.	a)	Develop a suitable micro python code to generate red, green and blue colours and also to interface servomotor in real time communication in IoT.	10	K3	CO6
		OR			
	b)	Identify how software is needed to program IoT for different applications using ESP8266.	10	K3	CO6