

**Final Term Exam – BK192 / 2019-2020**

**Subject: Application Development based on IoTs**  
**Lecture: Lê Trọng Nhân**  
**Exam Code: 1921**

**Duration: 75 minutes**  
**Date: 02-08-2020**

There are 110 points in this exam!!!

I. Multiple choice (40 points): Pick **ONLY ONE** correct answer into the table bellow.

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20

1. Some critical issues in Internet of Things network are:
  - (a) The energy sources for a huge number of connected devices
  - (b) There are many wireless standards and none of them is the best for many kinds of IoTs applications
  - (c) The network topology is normally changed due to mobility devices
  - (d) All of above
2. Among following communication techniques, which one belongs to asynchronous transmission?
  - (a) UART
  - (b) SPI
  - (c) I2C
  - (d) All of above
3. One of drawbacks of embedded systems compared to micro-controller systems is:
  - (a) Resource management is limited
  - (b) The real-time operations are not guaranteed
  - (c) Embedded systems are not flexible
  - (d) All are not correct
4. Method that is called to clean up any resources used by services is
  - (a) stopSelf()
  - (b) onStop()
  - (c) onDestroy()
  - (d) stopService()
5. Android Things operating system is based on:
  - (a) Android 4 (KitKat)
  - (b) Android 5 (Lollipop)
  - (c) Android 6 (Marshmallow)
  - (d) Android 7 (Nougat)
6. In android studio, in order to add a library, such as the simple graph view or the okhttp for network requests (e.g. implementation 'com.jjoe64:graphview:4.2.2'), the library is added in:
  - (a) AndroidManifest.xml
  - (b) res/values
  - (c) build.gradle
  - (d) res/layout
7. Android component that shows part of an activity on screen is called
  - (a) intent
  - (b) fragment
  - (c) view
  - (d) manifest

8. For a monitoring application based on IoTs and Android Things, what are the typical components?
  - (a) Sensor nodes and Smart phone app
  - (b) Sensor nodes, gateway and Server
  - (c) Sensor nodes, gateway, Server and Smart phone app
  - (d) None of the above
9. A type of layout elements that allows all included elements in order is
  - (a) ConstraintLayout
  - (b) TextViewLayout
  - (c) LinearLayout
  - (d) RelativeLayout
10. According to following protocol, which one has the best communication distance?
  - (a) UART
  - (b) SPI
  - (c) I2C
  - (d) USB
11. What is the most correct statement about ListView in Android Studio?
  - (a) Displays a collection of views based on listview adapter
  - (b) Data must be filled to ListView by an Adapter
  - (c) User can customize the adapter for a new listview item UI
  - (d) All are correct
12. Concerning some wireless modules, such as Wifi, GPRS, Zigbee and Lora, what is the most supported interface?
  - (a) UART
  - (b) SPI
  - (c) I2C
  - (d) RF
13. In android studio, main activity for application must be declared in
  - (a) <intent>
  - (b) <intent-filter>
  - (c) <intent-layout>
  - (d) <intent-activity>
14. By default in android studio during app development, file that holds information about app's fundamental features and components (e.g. permissions, activity list, intents,...) is
  - (a) AndroidManifest.xml
  - (b) res/values
  - (c) build.gradle
  - (d) res/layout
15. A method that is used to handle what happens after clicking a button is
  - (a) onCreate
  - (b) onSelect
  - (c) onClick
  - (d) onDo
16. Layout or design of an android application is saved in
  - (a) .text file
  - (b) .java file
  - (c) .dex file
  - (d) .xml file
17. Method is called when service was created first-time using onStartCommand() or onBind() is
  - (a) onStart()
  - (b) onCreate()
  - (c) onRestart()
  - (d) startService()
18. For some applications based on IoTs require a large cover area (e.g. larger than 1km range), what is the best wireless standard for communications?
  - (a) Wifi connection
  - (b) Zigbee
  - (c) LoRa
  - (d) Bluetooth 5.0
19. In android, functionality of one class can be used in other class by using option
  - (a) extends
  - (b) extended
  - (c) extending
  - (d) extend

20. Which components listed below can be used to fill the data to ListView?

- (a) ArrayAdapter
- (b) BaseAdapter
- (c) CustomAdapter by user
- (d) All are correct

## II. Essay (70 points): Student presents your answers in **Examination Paper**

In this part, students are required to design a Monitoring application based on Internet of Things architecture. In this application, sensory data including the temperature and light level are required to upload to a cloud server. These sensor values are supported by MicroBit platforms. Student provide the answers for following questions:

1. (20 points) Present the architecture of the whole system by using block diagram. Explain the function of each block and present the connection between blocks (e.g. wire connection or Internet connection).
2. (20 points) Present the format of the data, sent from sensors node to the gateway. Please explain each data filed in your format.
3. (20 points) In the case ThingSpeak is used for the server, explain the drawbacks of the system, including the upload sensory data from the gateway to the server and the request to display historical data on the smart phone.
4. (10 points) In the case MQTT server is used for the server, present your solution to display the historical sensory data (e.g. for the most recent 5 points)?

END.

Head of Department

Lecturer

Lê Trọng Nhân

# Answer 1921

I. Multiple choice (40 points): Pick **ONLY ONE** correct answer into the table bellow.

- |         |         |
|---------|---------|
| 1. (d)  | 11. (d) |
| 2. (a)  | 12. (a) |
| 3. (b)  | 13. (b) |
| 4. (c)  | 14. (a) |
| 5. (d)  | 15. (c) |
| 6. (c)  | 16. (d) |
| 7. (b)  | 17. (b) |
| 8. (c)  | 18. (c) |
| 9. (c)  | 19. (a) |
| 10. (b) | 20. (d) |

II. Essay (70 points): Student presents your answers in **Examination Paper**

- 1.
- 2.
- 3.
- 4.