1. What is appium and what are its key features?

Answer: Appium is a open source, test automation tool for mobile application. Appium uses a WebDriver protocol making it more flexible to interact with mobile devices.

Key features:

a. Cross platform: Single test suite can be used in both ioS and Android because it supports both Android and ioS. Appium is used to test native, Web and Hybrid apps.
b. Multi-Language Support: It supports programming languages like python, java, javascript etc.
c. No need to Source code during the test.
d. Supports Native, Hybrid and Web Apps:
   Native Apps: The apps which are created using SDKs of Android studio.
   Hybrid Apps: This apps includes both Natives and Web apps where Web Apps are embedded in the Native apps.
   Web Apps: These apps are accessed through websites.
e. Supports Real and virtual emulators: Appium can directly interact with the real device using the USB debugger and can interact with te emulator created by Android studio or called by file with extension(*.bat).
f. Testing Cloud based devices: Appium Supports testing the devices in the cloud using the services like sauce labs, BrowserStack etc.

2. What is the role of Appium Server in Mobile Automation testing?

Answer: Appium Server plays a crucial role in Mobile Automation Testing as it acts as the bridge between User created scripts and emulators\simulators(Real or Virtual Devices).
Appium Server load the specific driver based on the desired Capabilities provided. For the Android it's UiAutomator2 or Espresso and for iOS is XCUITest.
Logs and debugging: Appium server provides the details logs which in turn helps testers to debug issues.
Logs represents the commands that receive, sent or processed which is helpful for troubleshooting.

3. What are Desired Capabilites in Appium? Provide an example using JavaScript.

Answer. Desired Capabilites are key value pairs that is useful to create a session where appium server interact with the devices.
For getting values of appPackage and appActivity we need install external app called App Info for android.
Example using JavaScript:

```
const capabilities = {
    platformName: "Android",
    platformVersion: "12.0",
    deviceName: "emulator-5554",
    app: "/path/to/your/app.apk",
    automationName:"UiAutomator2",
    appPackage: "com.example.myapp",
    appActivity: "com.example.myapp.MainActivity",
    noReset: true
};
```

4. How does Appium interact with Mobile devices (Both Physical and Emulated)?

Answer. Choosing a correct Driver:

For Android:

- UiAutomator: driver for Android version 5 and above.
- Selendroid: For older version of Android driver.
- Espresso: for fast and native driver for Android.

For iOS:

- XCUITest: driver for iOS 9.3 and above.
- UIAutomation: for iOS older version.

Appium has ability to do communication between real Devices and Emulators\Simulators.

5. What is the role of an Emulator?

Answer. An emulator can be hardware or software tool that behaves almost as a real device. Emulator is done by the Android Studio. Emulator is widely used for software testing, console games, development etc.

Reduces cost as it virtual and no need to buy the actual hardware which may be costly.