UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Java IoT Developer   Semester: IV
Program: BCA-SPZ-IOT   Time: 03 hrs.
Course Code: CSBC2117   Max. Marks: 100

Instructions:

SECTION A

1. Each Question will carry 4 Marks
2. Instruction: Write short answers for the following questions. (60-70 words)

S. No.		Marks	CO
Q1	What is the role of a constructor in a java class? Briefly discuss.	4	CO1
Q2	Briefly discuss and present the key characteristics of Internet of Things?	4	CO3
Q3	Discuss the four protocols of Internet of things?	4	CO2

Q4	A constructor for a java class known as Person is as follows:
	
	Public class Person{
	
	    Private int age;
	
	    Private string name;
	
	    Public Person(int age, String name){
	
	        this.age = age;
	
	        this.name = name;
	
	    }
	
	}
	
	Create a class on Python with the same constructor?
		4	CO1

Q5	What are the four pillars of Object-Oriented Programming? And also discuss their use in Java?	3	CO1

Please Turn Over

	Discuss with examples encapsulation and inheritance in Python?	1	

SECTION B

1. Each question will carry 10 marks.
2. Instruction: Write short / brief notes (100-150 words)
3. For question 6 choose between part a and b.
4. Attempt any one question for question 6
5. There is no such option for other questions in this section

Q6	Discuss different type of inheritance in Java? Discuss different types of inheritance in Python? What are the various types of inheritance that are valid in python but not in Java? Provide suitable examples. OR	3 3 2 2	CO1
	What is the role of encapsulation in Java? What are the different access modifiers in Java? How can the access modifiers be used in Python? Provide suitable examples?	3 3 2 2	
Q7	Write a java program to mimic the functionality of various devices such as smartTV, smartwatch, smartphone and smartGlass. The hierarchy of the devices should be such that a device must be implemented as an interface, the two interfaces wearable and non-wearable must extend the device interface. The concrete classes smartTV, smartWatch, smartphone and smartglass must implement suitable interfaces? Note that the concrete classes must have fields such as ID, name etc. Furthermore, the device has additional fields such as sensors etc.	10	CO1, CO3, CO4
Q8	The java program written for question 7 follows a hierarchical structure. Display the storage of all the devices in a record management system (It can be some file). Write a program to read the devices from the file and store it in a data structure provided by the java collections framework. You may choose between an ArrayList or a LinkedList. Now write a java program to search for a particular device (based on a device ID) by iterating over the data structure by using customized device access method?	5 5	CO4
Q9	Discuss the benefits of cloud computing with respect to Internet of Things? Discuss the key benefits of Model View Controller architectural pattern and justify how the design pattern can be used to create an IoT application in java? Provide example code in Java.	3 7	CO3, CO4

SECTION-C

1. Each Question carries 20 Marks.
2. Instruction: Write long answer. (Up to 350 words while explaining)

Please Turn Over

3. For question 10 choose between part a and b **4. Attempt any one question for question 10.** **5. There is no such option for other question 11.**			
Q10.	An IoT network consists of a set of devices and set of connections. Write a java program to show the creation of a network. The network is formed of an interface called as an Abstract Network. The Abstract Network is implemented by a java class called as Concrete Network. The Concrete network consists of devices and connections create these classes. Furthermore, device and connection classes have appropriate methods. Discuss these methods and present them as a java code.	**8**	CO1, CO3, CO4
	After the network has been connected demonstrate the deletion of devices from the network. You must discuss the three cases that a device can only be deleted if the device exists in the network, if the device is connected or if it is not connected. Create a method in the Concrete Network class that can be used to delete a device.	**12**	
	OR An IoT network consists of a set of devices and set of connections. Write a java program to show the creation of a network. The network is formed of an interface called as an Abstract Network. The Abstract Network is implemented by a java class called as Concrete Network. The Concrete network consists of devices and connections create these classes. Furthermore, device and connection classes have appropriate methods. Discuss these methods and present them as a java code.	**8**	
	After the network has been created. Create a class called as Data in Java and then demonstrate the sending of data from a source device to a target device which are part of Concrete Network. The Device class has to be modified so that it takes objects of type Data as an additional field.	**12**	

Q11.	Modify the java program written for question 8 and demonstrate the use of MVC architectural pattern. Create a controller to process the data provided by the model and pass it to the view. Also create a model module that can be used to fetch data from the data source.
	
	 Code for creating the frame (part of view) in java swings is as follows:
	
	 JFrame frame = new JFrame("FILE PICKER");
	 frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
	 ExtractFilesConsole myPanel = new ExtractFilesConsole();
	 frame.getContentPane().add(myPanel);
	 //add instance of MyGUI to the frame
	 frame.pack();
	 //resize frame to fit our Jpanel
	 //Position frame on center of screen
	 Toolkit tk = Toolkit.getDefaultToolkit();
		14
		
		 6
			CO4

Please Turn Over

Dimension d = tk.getScreenSize();
int screenHeight = d.height;
int screenWidth = d.width;
frame.setLocation(new   Point((screenWidth/2)-(frame.getWidth()/2),
(screenHeight/2)-(frame.getHeight()/2)));
//show the frame
frame.setVisible(true);

Note: You do not need to implement the frame.

Write the code for creating the panel and then add appropriate components such as buttons and a list view in the JPanel. Add appropriate Action Listener interface to demonstrate the use of appropriate methods that correspond to button clicks.