

Roll No - 8 :-

T.Y.B.Sc. IT

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[Q1] Answer any three :-

a) What is internet of things? Explain its components and applications?

Answer :-

- [•] Internet of things is a group of hardware components when put together can interact with the environment, user and other similar devices and be somehow be used and connected by the internet, to make our life easier and comfortable, as & the main aim.
- [•] It has sensors, actuators, wireless configuration hardwares to connect to the internet, some processing unit, and modularity upgradation possibilities, it has.
- [•] It has various applications like :-
 - [+] Medical Industry - In high precision machines, in notification critical condition machines, etc..
 - [+] Military Applications like - Radars, etc..
 - [+] Home Applications like - Smart lights, etc..
- [•] Thus, these are some of the applications of Internet of things, respectively.

(Q6) What are the major players in the IoT industry? Explain their contributions?

Answer:-

- [•] IoT is a growing sector so, there can be a possibility of more players in the future, but currently as a global major players, there are ~~8~~ ^{several} players, respectively, they are:-
- [•] Google - Google is the topmost player in the IoT industry.
 - [+] With its Google Home platform and, Android development platform.
 - [+] Google invests hundreds of millions of dollars each year for R&D in IoT industry.
- [•] Amazon - Amazon with its Alexa platform and AWS platform is dominating the space, very much.
- [•] Cisco - Cisco also dominates the market share in IoT industry.
 - [+] It has its own IoT development platform.
- [•] Intel - Intel is nowhere behind and contributes to the market capture share of the IoT.
- [•] Thus, these were some of the top players, in the IoT sector right now, respectively, many more to come.

c) How can privacy and security be ensured in IoT devices? Explain the challenges and solutions.?

Answer:-

[•] Challenges to privacy and security are:-

- [+] Data Security
- [+] Data privacy
- [+] Data integrity
- [+] Authentication

[•] Solution:-

- [+] Encryption.
- [+] Authentication
- [+] Frequent update of source code.
- [+] Establishing protocols for Authentication.

[•] Respectively, these are the challenges and its solutions, in Internet of Things, respectively.

Q2) Answer any three :-

[C, E, F]

(Qc) What are electronics, sensors and actuators in IoT devices?

Explain their function and Types?

Answer :-

[•] Electronics are parts on which when different modularities &/ modular parts are applied, becomes a device for some specific application or general purpose, in itself.

[•] Sensors :

[+] They take information from the environment and convert it into digital signals.

[+] They are electronic devices.

[+] They can be modular as well as independent devices.

[•] Actuators :

[+] They convert digital signals into a physical movement.

[+] They are electronic devices.

[+] They can be modular as well as independent devices.

[+] Usually, they work in mutual with Sensors, to operate or finish a certain task, respectively.

d] How can embedded computing be scaled up for IoT devices?
Explain the challenges and solutions?

Answer:-

- [+] Cloud computing can be used to scale up IoT devices.
- [o] Some challenges can be :-
 - [+] Lack of resources,
 - [+] Hardware
 - [+] Internet connectivity
 - [+] Proper user.
 - [+] Security and Privacy issue of data.
 - [+] Data Analysis challenges.
 - [+] Data processing and storage problems.

[o] Some Solutions to the respected challenges can be :-

- [+] Good budget
 - [+] Good pre-planning before scaling, to avoid sunk cost fallacy.
 - [+] Looking for resources in free markets.
- [+] For Security and Privacy issue.
 - [+] Good encryption technology should be used
 - [+] Good Authentication policies and processes, should be in place.
- [+] Data Analysis challenge can be tackled through cloud computing, or some centralised server.
- [+] For data processing and storage, good standardised cloud computing service can be used or some centralised server.

c] How can Software be developed on Arduino and Raspberry Pi? Explain the programming languages and tools used?

Answer:-

[•] To develop Software on Arduino and Raspberry Pi, steps are :-

[+] To choose a text editor or IDE of our choice, Like,

- [—] Visual Studio Code
- [—] Sublime Text Editor
- [—] Vim
- [—] Nano
- [—] Atom
- [—] Kate, etc...,

[+] Then to choose a programming language, which we are comfortable to use.

[—] Like C++,

[—] micropython (Derivative of python for arduino and Raspberry Pi, programming, explicitly).

[+] Then using a programming language and text-editor, we can write simple to complex programs, for some applications, for it to function.

[•] Thus, these were some programming languages and tools used to develop Arduino and Raspberry Pi, respectively.

- [f] What are the benefits of openness in Arduino and Raspberry Pi?
Explain the role of open source software and hardware?

Solution:-

- [+] Open source hardware and software has several advantages, they are.
- [+] A programmer/developer don't have to waste time and resources to reinvent the wheel again and again.
- [+] It is efficient.
- [+] It is mostly reliable, as contributors to open source software and hardware are many.
- [+] It saves up money, and resources, and time, in short.
- [+] Thus, open source has a very quite a positive role weighing its negative points in hardware and software operations of Arduino and Raspberry Pi, respectively.

[•] Role of open Source Software and hardware:-

- [+] It has huge community support.
- [+] It can be buggy sometimes.
- [•] Thus, we can use it free, for commercial as well as personal use, without worrying about legal issues.
- [•] Thus, these were some roles and benefits of openness in Arduino and Raspberry Pi, respectively.

Q3]

a] What is physical prototyping?

Explain its importance in IoT design?

Answer:

[•] Physical prototyping is a iterative testing solution, to arrive at a working model for a particular required solution, through trial and error - method.

[•] Importance of physical prototyping in IoT is :-

[+] It is useful to arrive at a working solution, through trial and error,

[+] Prototype is like a working model, just like designed or thought of.

[+] Thus, prototyping is like a rough working solution to a problem which can be good.

c) What are hinges and joints? How are they used in IoT design?

Answer:-

- [e] Hinges are hinges.
- [e] Joints are joints which joins together two things.
- [e] They are very useful in IoT designing especially.

Qe] What is an API? Explain its importance in IoT design?

Answer:- API stands for Application Protocol Interface.

They are very useful in IoT..

Q5

f) What are some common infrastructure challenges faced by IoT startups? How can they be addressed?

Answer:-

[o] Some common IT infrastructure challenges are :-

[+] Lack of testing gears and environment.

[+] Lack of sat space

[o] Solutions to them can be :-

[+] Government providing funds or infrastructure to take care of the possible causes for a particular country having the problem, respectively.