**2. Paper Outline:**

I. Introduction

A. Review of Related Survey Article

B. Contributions of This Article

C. Paper Organization

II. RF Energy Harvesting

1. RF-EH Circuit Design
2. Conditions for Efficient RF WPT
3. Typical Applications
4. Challenges
5. Summary and Insights

III. Wireless Power Transfer

1. Near-Field WPT
2. Far-Field WPT
3. Challenges and Future Work
4. Summary and Insights

IV. Simultaneous Information and Power Transfer

1. Separate Receiver
2. Time Switching Receiver
3. Power Splitting Receiver
4. Antenna Switching Receiver
5. Summary and Insights

V. Interference Exploitation In SWIPT

A. Interference in Communication Networks

B. Basic Analysis of Interference in a Two User Link

C. Interference Exploitation in SWIPT

D. Future Directions

E. Summary and Insights

VI. Emerging

**4. Applications:**

SWIPT have many applications that are useful for today’s world. Some of them are:

1. Mobile – Mobile power transfer
2. Wireless charging
3. Wireless Sensors
4. Electric Airplanes
5. Hybrid Cars (using vehicular network)
6. Robots

In the Real world these applications can be used in various forms, such as mobile to mobile transfer can be done by transferring the power from one mobile to another mobile without any wired communication in the same way as we share data, documents and messages. Whereas, wireless charging helps us to charge our mobile within a specified area where a single charger can charge two or more devices at the same time without any wired connection. In Hybrid cars the wireless technology can be used by transferring continuous power to a vehicle by using vehicular network.

These ideas can be useful in other fields such as military tech. where there is a huge requirement of power and wireless communication can give continuous power transmission. This technology can help in software world where the power consumption is more and can help the environment by using the RF energy. This technology is also used in industrial field where industries use sensors in a wired form which can be replaced to wireless further leading to cost reduction, less power wastage.

**6. Future Scope:**

As the future is all about wireless communications it is mandatory to address all the problems and get a better solution. Some of the problems that are to be discussed are:

**Efficiency:**

During the wireless transmission one cannot guarantee complete efficiency as there could be a packet loss during transmission, noise etc. which can effect the power transmission thereby reducing the efficiency.

**Frequency:**

As the power transfer require a different frequency because if it transfers power with the same frequency as the frequency used for data transmission which can further lead to network disturbance.

**Base Station:**

Mobile – Mobile power transmission always requires a nearby base station from/to which the RF signal is transferred or received.

**Low Power Transmission:**

As RF has low power sometimes the transmission will also be in low power which will not give a required power to device. This can be reduced by using the suitable amplifiers and packet transmission.

**7. What We Learned:**

**a) Importance of Wireless Power Transfer:**

In today’s every electrical device works with power so the wireless power transmission will bring an evolution to this technology. Wireless power transmission transfers device to device in the form of wireless communication. As we use Radio Frequency in communication the electrical power is converted into RF signal and is transmitted to the required device where again the RF signal is converted into electrical signal which provides charging to the device.

**b) Energy Harvesting:**

When the RF signal is converted into energy the device stores the energy and can be used in various ways as required in future. Generally, when an RF signal is converted into electricity some amount of energy is wasted, but that energy is captured and stored for future purposes. This is known as Energy Harvesting.

**c) 5G Technology:**

5G is the recent upgrade in the communications where it is the next level of 4G technology which provides higher bandwidth and highspeed data, low penetration capacity because of its high frequency when compared to other technologies(1G,2G,3G,4G).

**8. Five Most Important Points:**

1. Overview of Wireless Communications

2. Importance of Energy Harvesting

3. Future Scope of Wireless Power Transmission

4. Detailed Concept of Radio Frequency

5. Basic Concepts about Wireless Information