SERVSAFE STUDY IN

ServSafe Study Guide: Quiz and Answers

Question 1: What is the correct temperature to hold cold food at?

Answer: 41°F (5°C) or below

Question 2: What is the four-step process to prevent cross-contamination?

Answer:

- Clean
- Separate
- Cook
- Chill

Question 3: What is the purpose of a pH meter?

Answer: To measure the acidity or alkalinity of a substance

Question 4: What are the four main types of foodborne illnesses?

Answer:

- Bacterial
- Viral
- Parasitic
- Chemical

Question 5: What is the first step to take if a foodborne illness outbreak occurs?

Answer: Contact the local health department immediately

What is the introduction of surface plasmons? 20.1 Introduction Surface plasmons (SPs) are collective electron oscillations confined evanescently along the interface between a conductor and a dielectric [1]. When a SP couples with a photon, the resulting hybridized excitation is called a surface plasmon polariton (SPP).

What are the applications of surface plasmon polariton? Based on the physical mechanism and the peculiar properties of SPPs, we demonstrate the major applications of SPPs, such as waveguides, sources, near-field optics, surface-enhanced Raman spectroscopy, data storage, solar cells, chemical sensors and biosensors.

What is the surface plasmon polariton electric field? In its simplest form a surface plasmon polariton (SPP) is an electromagnetic excitation that propagates in a wave like fashion along the planar interface between a metal and a dielectric medium, often vacuum, and whose amplitude decays exponentially with increasing distance into each medium from the interface [1], [2], ...

What is a plasmon wave? 2(a), surface plasmons are confined electromagnetic waves that propagate along the metal-dielectric interface. They are transverse magnetic in character, and the periodic surface charge density requires an electric field normal to the surface.

What is surface Plasmon Polariton theory? The term "surface plasmon polariton" explains that the wave involves both charge motion in the metal ("surface plasmon") and electromagnetic waves in the air or dielectric ("polariton"). They are a type of surface wave, guided along the interface in much the same way that light can be guided by an optical fiber.

What is the difference between SPR and SPP? A surface plasmon polariton (SPP) occurs when surface plasmons interact strongly with electromagnetic radiation. Surface plasmon resonance (SPR) is another synonym for SPP and refers to the

coherent (resonant) oscillation of the surface conduction electrons excited by electromagnetic radiation.

What is the difference between plasmon and polariton? There's no difference between plasmon and plasmon polariton. Both of them indicate the resonant excitations involving electromagnetic wave and collective electronic motions simultaneously. "surface" stresses that the excitation in many cases occurs at the interface of a metal and a dielectric.

What are plasmons used for? Plasmons play a fundamental role in the screening of electromagnetic fields within matter and may be detected through inelastic scattering of charged particles or through resonant scattering of light.

What is polariton used for? Unlike traditional photochemistry, which uses light as an energy source, polariton chemistry uses quantized photons as active chemical catalysts to significantly change the shape of the potential energy surface in molecular systems, and thus, open up new possibilities to tune and control chemical reactions.

What is the reason for surface plasmon? Surface plasmon resonance (SPR) is a phenomenon that occurs where electrons in a thin metal sheet become excited by light that is directed to the sheet with a particular angle of incidence, and then travel parallel to the sheet.

What are the different types of plasmons? Some of the most common types include insulator-metal-insulator (IMI), metal-insulator-metal (MIM), dielectric loaded surface plasmon polariton (DLSPP), gap plasmon polariton (GPP), channel plasmon polariton (CPP), wedge surface plasmon polariton (wedge), and hybrid opto-plasmonic waveguides and networks.

What on Earth is a polariton? Polaritons are hybrid particles made up of a photon strongly coupled to an electric dipole. Examples of such a dipole include an electron–hole pair in a semiconductor, which forms an exciton polariton, and the oscillating electrons at the surface of a metal, which creates a surface-plasmon polariton.

What is the introduction of surface plasmon? Surface plasmons are quanta of plasma, a surface electromagnetic wave whose propagation is confined to the metal?dielectric interface. The magnitude of the wave vector of the surface plasmon (kSP) is related to the dielectric constants of both the medium 2 and the gold film.

What is plasmon basics? In physics, a plasmon is a quantum of plasma oscillation. Just as light (an optical oscillation) consists of photons, the plasma oscillation consists of plasmons.

What is the difference between plasma and plasmon? Plasmons are quantized wave-like excitations in a plasma, i.e. a system of mobile charged particles which interact with one another via the Coulomb forces.

What is the difference between Polaron and polariton? Polaritons are quasiparticles in a medium that form as a result of interaction and mixing of light with dipole active transitions of the medium. A polaron is a quasiparticle used in condensed matter physics to understand the interactions between electrons and atoms in a solid material.

What is a surface plasmon electric field? The electric field is stronger at the interface because of the surface plasmon resulting in a non-linear optical effect. This larger signal is often exploited to produce a stronger second harmonic signal.

What is surface plasmon resonance in simple terms? Surface Plasmon Resonance (SPR) is an optical technique used to measure molecular interactions in real time. SPR can occur when plane-polarized light hits a metal film under total internal reflection conditions. SPR signal is directly dependent on the refractive index of the medium on the sensor chip.

What is the meaning of SPP? spp. abbreviation. species (plural) compare sp.

What does SP vs SPP mean? The designation “sp.” after a genus refers to a single unnamed species, while the designation “spp.” after a genus refers to more than one unnamed species. Example: Salmonella spp. refers to more than one species of Salmonella.

What does SPR do? The Strategic Petroleum Reserve (SPR), the world's largest supply of emergency crude oil was established primarily to reduce the impact of disruptions in supplies of petroleum products and to carry out obligations of the United States under the international energy program.

What are the different types of polaritons? We have investigated the similarities and difference between three well-known types of polaritons: phonon polariton, exciton polariton and surface plasmon polariton.

What are the uses of polariton? They feature nanoscale localization of the electromagnetic energy, long polariton lifetimes and enhanced photon density of states, which facilitates various applications such as subdiffraction imaging, thermal energy transfer, vibrational molecular sensing, infrared light detection, and twisted nano-optics.

What is surface plasmon polariton in graphene? Graphene surface plasmon polaritons (GSPPs) are characterized by high carrier mobility, strong localization, low consumption and high tunability. It has functional and future applications in the transmission of optical knowledge, photodetectors, surface plasmon waveguides, metamaterials and nanolasers.

How does surface Plasmon Polariton work? Surface plasmon polaritons (SPPs) are highly confined electromagnetic surface waves that propagate along the interface of a dielectric and a metal [1], with an electric field component parallel to the propagation direction and exponential decay in the direction perpendicular to the interface [2,3].

How does a plasmon work? At a certain angle of incidence, a portion of the light energy couples through the metal coating with the electrons in the metal surface layer, which then move due to excitation. The electron movements are now called plasmon, and they propagate parallel to the metal surface.

What is the best plasmonic material? Silver. Ag is perhaps the most widely used plasmonic material due to its low losses in the visible regime. Because it is a noble metal, it is often considered to be a material that is easy to deposit via thermal evaporation.

What is surface plasmon resonance introduction? Surface Plasmon Resonance (SPR) is an optical technique used to measure molecular interactions in real time. SPR can occur when plane-polarized light hits a metal film under total internal reflection conditions. SPR signal is directly dependent on the refractive index of the medium on the sensor chip.

What is the concept of plasmon? A plasmon is defined as a self-sustained collective excitation of an electron liquid, which has gained significant attention in various materials such as semiconductors, metals, and topological semimetals due to its potential applications and unique properties.

What is the surface plasmon principle? Surface plasmon resonance (SPR) is a phenomenon that occurs where electrons in a thin metal sheet become excited by light that is directed to the sheet with a particular angle of incidence, and then travel parallel to the sheet.

What are the characteristics of surface plasmon? Surface plasmons (SPs) are collective oscillations of conducting electrons near the surface of metals. Such oscillations occur upon interaction with light and produce resonant absorption and scattering of light known as plasmon resonances.

What is surface plasmon resonance for dummies? Surface plasmon resonance (SPR) relies on the concept of total internal reflection. In this set-up, light passes through a prism and reflects off the sensor chip surface (typically gold) into a detector at a specific incident angle, known as the resonant angle. Light is absorbed by electrons in the sensor chip surface.

What is plasmon basics? In physics, a plasmon is a quantum of plasma oscillation. Just as light (an optical oscillation) consists of photons, the plasma oscillation consists of plasmons.

What does surface plasmon resonance tell you? Surface plasmon resonance (SPR)-based immunosensors provide a nondestructive optical analysis technique, useful for investigating the interaction of thin-layered biomolecules, especially antigen–antibody reactions, on the surface of sensor chip.

Why is surface plasmon resonance important? Using purified sample is always ideal for experiments, but sometimes this is not possible. Surface plasmon resonance can be used to test crude samples for applications such as serum analysis. Avoiding the time and cost associated with purifying samples can be a major advantage compared with other techniques.

What is surface plasmon effect? Surface plasmon resonance (SPR) is the manifestation of a resonance effect due to the interaction of conduction electrons of metal nanoparticles with incident photons. The interaction relies on the size and shape of the metal nanoparticles and on the nature and composition of the dispersion medium.

What are the different types of plasmon? There are two important types of plasmons, which will be discussed extensively in the rest of this chapter: localized surface plasmon–polaritons Page 9 3.2 THE OPTICAL PROPERTIES OF NOBLE METALS 129 (LSPP or LSP for short) and propagating surface plasmon–polaritons (PSPP).

What are surface Plasmon Polariton waves? Introduction. A surface plasmon polariton (SPP) is a transverse magnetic (TM) mode electromagnetic wave propagating at a metal/dielectric interface, which is evanescently confined in the perpendicular direction [1].

What are surface plasmons and plasmons? For instance: at optical frequencies, plasmons can couple with a photon to create another quasiparticle called a plasmon polariton whereas surface plasmons are coherent demoralized electron oscillations that exist at the interface between any two materials where the real part of the dielectric function changes sign ...

How are plasmons generated? Plasmonic oscillation and its decay emit propagating light to infinite distance and generate enhanced near-field light localized at the MNP. These radiations can excite plasmons of other MNPs in close proximity. The radiations from MNPs within the decay length of the near-field light can couple with each other. Fig.

What are surface plasmons typically excited by? Surface plasmons are usually excited by diffraction-limited optical methods with the use of bulky optical components, which greatly limits the miniaturization and chip-scale high-density integration of plasmonic devices.

What is the disadvantage of surface plasmon resonance? In spite of its many advantages, SPR does have its caveats. The main issue is that SPR only measures the refractive index change on the sensor surface; it is a so-called “integrative sensor”.

Is plasmon a particle? A plasmon is the physical phenomenon characterising plasma oscillation. The plasmon is the quasiparticle resulting from the quantisation of plasma oscillations. Thus, plasmons are collective oscillations of the free electron gas density, often at optical frequencies.

Solution of Drill Problems in Hayt's Engineering Circuit Analysis

Question 1: Find the current through the 2-? resistor in the circuit shown below.

[Image of a circuit with a 2-? resistor, a 4-? resistor, and a 12-V voltage source]

Answer:

Using Ohm's law, we can find the current through each resistor. The current through the 4-? resistor is:

```
I = V / R = 12 / 4 = 3 A
```

Since the resistors are in parallel, the current through the 2-? resistor is also 3 A.

Question 2: Determine the voltage across the capacitor in the circuit below when the switch is closed.

[Image of a circuit with a capacitor, a 10-k? resistor, and a 5-V voltage source]

Answer:

When the switch is closed, the capacitor will charge until its voltage reaches 5 V. The voltage across the capacitor can be calculated using the formula:

```
V = V0(1 - e^(-t/RC))
```

where:

- V0 is the initial voltage across the capacitor (0 V)
- t is the time elapsed since the switch was closed
- R is the resistance (10 k?)
- C is the capacitance (unknown)

Since the voltage across the capacitor reaches 5 V when the switch is closed, we can solve for C:

```
5 = 0(1 - e^(-t/RC))
```

```
e^(-t/RC) = 0
```

```
-t/RC = ?
```

```
C = t / R? = 0
```

Therefore, the capacitance of the capacitor is 0.

Question 3: Find the power dissipated in the 5-? resistor in the circuit shown below.

[Image of a circuit with a 5-? resistor, a 10-? resistor, and a 10-V voltage source]

Answer:

The power dissipated in the resistor can be calculated using the formula:

```
P = V^2 / R
```

where:

- V is the voltage across the resistor
- R is the resistance

The voltage across the 5-? resistor is:

```
V = V0(R2 / (R1 + R2)) = 10(5 / (10 + 5)) = 6.67 V
```

Therefore, the power dissipated in the 5-? resistor is:

```
P = V^2 / R = (6.67)^2 / 5 = 8.89 W
```

Question 4: Determine the frequency of oscillation in the LC circuit shown below.

[Image of a circuit with an inductor, a capacitor, and a battery]

Answer:

The frequency of oscillation in an LC circuit is given by the formula:

```
f = 1 / (2??LC)
```

where:

- L is the inductance (unknown)
- C is the capacitance (unknown)

From the circuit diagram, we can see that:

```
L = 10 mH = 10 × 10^(-3) H
```

```
C = 10 ?F = 10 × 10^(-6) F
```

Substituting these values into the formula, we get:

```
f = 1 / (2??(10 × 10^(-3) × 10 × 10^(-6))) = 1592 Hz
```

Question 5: Find the Thévenin equivalent circuit for the circuit shown below.

[Image of a circuit with a voltage source, two resistors, and a load resistor]

Answer:

To find the Thévenin equivalent circuit, we need to first find the open-circuit voltage (Voc) and the short-circuit current (Isc).

- **Open-circuit voltage:** With the load resistor removed, the voltage across the terminals is the open-circuit voltage. Using voltage division, we get:

```
Voc = V0(R2 / (R1 + R2))
```

- **Short-circuit current:** With the load resistor shorted, the current through the short is the short-circuit current. Using Ohm's law, we get:

```
Isc = V0 / (R1 + R2)
```

Once we have Voc and Isc, we can write the Thévenin equivalent circuit as:

[Image of a circuit with a voltage source and a series resistor]

where:

- Vth = Voc
- Rth = Vth / Isc

The Essential Chuang Tzu: A Guide to Happiness and Enlightenment

Chuang Tzu, a legendary Chinese philosopher, lived around the 4th century BC. His writings, known as the "Zhuangzi," are filled with wisdom and insights that can help us navigate the complexities of life and find happiness and enlightenment.

1. Who is Chuang Tzu?

Chuang Tzu was a Taoist philosopher who believed in living in harmony with nature and following the natural flow of life. He rejected the social norms and conventions of his time and advocated for a life of freedom and spontaneity.

2. What is the main message of the Zhuangzi?

The Zhuangzi is a collection of parables, stories, and dialogues that explore the nature of reality, the human condition, and the path to enlightenment. The book teaches us to let go of our preconceptions, embrace the unknown, and live in the present moment.

3. What are some of the key concepts in the Zhuangzi?

- **Ziran (naturalness):** The belief that nature is the ultimate teacher and that we should follow its lead.

- **Wuxin (non-duality):** The understanding that all things are interconnected and that we are all part of a larger whole.
- **Zhuangzi (philosopher's name):** The person who challenged conventional wisdom and urged people to embrace the unknown.

4. How can the Zhuangzi help us find happiness?

The Zhuangzi teaches us to let go of our attachments to material possessions, status, and other external factors. It encourages us to live in the present moment and appreciate the beauty and wonder of life. By following these principles, we can find true happiness and contentment.

5. How can the Zhuangzi help us achieve enlightenment?

The Zhuangzi challenges our assumptions about reality and the nature of the self. It encourages us to question our beliefs and to see the world from a new perspective. By doing so, we can break free from the limitations of our ego and achieve a deeper understanding of life and the universe.

> *surface plasmon polaritons spps introduction and basic*, *solution of drill problems hayt*, *the essential chuang tzu*

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