VITEEE 2024 Solution (April 19)

(Memory Based Questions)

Ques. In Meter bridge for measurement of resistance the known and the unknown resistances are changed the error removed is __?

Solu. In a meter bridge, the known resistance R_1 and the unknown resistance R_2 are adjusted until the null point is reached, where no current flows through the galvanometer. At this point, the ratio of the known resistance to the unknown resistance is equal to the ratio of the lengths of the bridge wire on either side of the jockey.
So, if the known and unknown resistances are interchanged, the null point will still be reached when the ratio of the resistances equals the ratio of the lengths, and the error is removed.

Ques. The radio-isotope used for treatment of thyroid disorders is

Solu. The radioisotope commonly used for the treatment of thyroid disorders is iodine-131 (\(^{131}\)I). This radioactive isotope emits beta particles and gamma rays, which can selectively destroy thyroid tissue, making it effective in treating conditions such as hyperthyroidism and thyroid cancer.

Ques. Synonym of alembicated
Solu. A synonym for "alembicated" is "distilled." Both terms refer to a process of purification or refinement, often associated with distillation.

Ques. Which of the following is used in optical fibres?

Solu. The following options are commonly used in optical fibers:

1. **Glass**: Optical fibers are primarily made of glass, typically a type called silica glass (silicon dioxide). This glass is highly transparent to light, allowing for efficient transmission of optical signals.
2. **Plastic**: While less common than glass fibers, plastic optical fibers (POF) are also used in some applications. They are typically made of polymethylmethacrylate (PMMA) or other plastic materials. Plastic fibers are easier to work with and cheaper than glass fibers but have higher signal attenuation and lower data transmission rates.

So, the correct answer would be either "Glass" or "Plastic", depending on the specific type of optical fiber being referred to.

Ques. Logic gates A and B were connected to OR gate which was connected to AND gate While C was connected directly to AND gate. Which one will give output 1?

Solu. To determine which combination of inputs (A, B, and C) will result in an output of 1 for the given setup, let's break it down:

1. Inputs A and B are connected to an OR gate.
2. The output of the OR gate is then connected to an AND gate along with input C.
3. Input C is connected directly to the AND gate.

To achieve an output of 1 from the AND gate, both of its inputs must be 1. Thus, for the given setup:

- If either A or B is 1 (or both), the OR gate output will be 1.
- If C is 1, it will also contribute to the AND gate output being 1.

So, to get an output of 1:

- Either A or B (or both) must be 1.
- Additionally, C must also be 1.

Therefore, the combinations of inputs that will result in an output of 1 are when either A or B (or both) are 1, and C is also 1.

Ques. If the work function is 8eV, then what will be the threshold wavelength?

Solu. We can calculate the threshold wavelength (λ_0) for a metal with a work function of 8 eV using the following relationship:

$hc / \lambda_0 = W_0$

where:

- h is Planck's constant (approximately 6.63 x 10^-34 J·s)
- c is the speed of light (approximately 3 x 10^8 m/s)
- λ_0 is the threshold wavelength (in meters)
- W_0 is the work function (in electron volts, eV)

Here's how to find the threshold wavelength:

1. Convert Work Function to Joules: First, convert the work function from electron volts (eV) to joules (J). We know 1 eV is equal to 1.602 x 10^-19 J. Therefore:

W_0 (in J) = 8 eV * (1.602 x 10^-19 J/eV) = 1.282 x 10^-18 J

2. Solve for Threshold Wavelength: Now, plug the values for h, c, and the converted W_0 into the equation and solve for λ_0:

$\lambda_0 = hc / W_0$

= (6.63 x 10^-34 J·s) * (3 x 10^8 m/s) / (1.282 x 10^-18 J)

≈ 1.55 x 10^-7 meters

Therefore, the threshold wavelength for the metal with a work function of 8 eV is approximately 1.55 x 10^-7 meters, which falls within the ultraviolet (UV) region of the electromagnetic spectrum.

Explanation:

The threshold wavelength represents the minimum wavelength (or maximum energy) of light required to eject electrons from the metal surface. Light with wavelengths longer than the threshold wavelength (lower energy) won't have enough energy to overcome the work function and liberate electrons.

Ques. Name reactions - hell volhard zelensky, Wolff kishner reduction

Solu.

1. Hell-Volhard-Zelinsky (HVZ):
    - Puts a bromine atom next to the carbonyl group in carboxylic acids.
    - Useful for making other functional groups.
2. Wolff-Kishner Reduction:
    - Turns aldehydes and ketones into simpler alkanes by removing the carbonyl group.
    - Good for reducing certain ketones.