

CBS-2021 General Science & Ability

PART-II (SECTION-A)

Question no. 2:

(A)
Answer: Difference Between A Star
and A Planet:

Star	Planet
<p>* A star is a celestial body that produces light and reflects light on its own.</p>	<p>* A planet is a celestial body that does not have an internal source of light. They receive light from external sources, like Sun.</p>
<p>* There are millions and billions of stars present in the Universe.</p>	<p>* Our solar system that is part of the known Universe has only eight planets.</p>
<p>* Stars are huge in size and have high temperature.</p>	<p>* Planets have relative small size and low temperature.</p>
<p>* Stars move freely in the Universe, with a twinkling effect. They do not revolve around any other star or planet.</p>	<p>* Every star, like our Sun, has planets revolving around it in orbits.</p>

Star	Planet
<p>★ Stars undergo a life cycle.</p> <p>★ Some examples of stars are Sun, Barnard's Star (closest red dwarf star), Sirius Star (brightest star in night sky).</p>	<p>★ Planets do not have life cycle.</p> <p>★ Some examples of planets are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto.</p>

Magnitude of Star: The measure of the brightness of a star is called the magnitude of a star. It is measured with a stellar magnitude scale that ranges from +30 to -30. On this scale, the brightest object has the smallest number, and the faintest object has the largest number. For instance, the star of magnitude -10 is brighter than

star of magnitude +10.

Example: Sirius is the brightest star with a magnitude of -1.46.

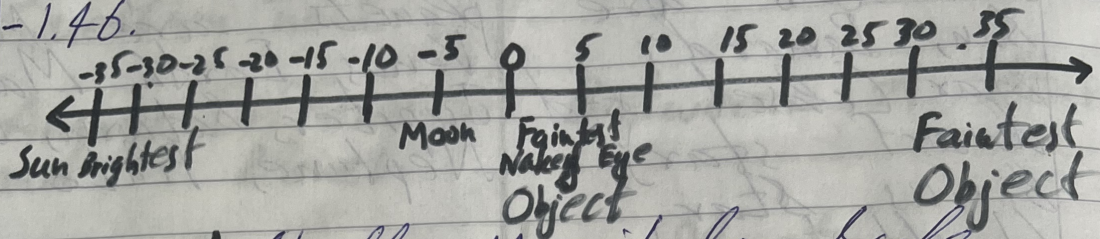


Figure A: Stellar Magnitude Scale.

Relation Between The Colour And Temperature of A Star: The surface temperature of a star determines the colour it emits. The colour, in turn, depends on wavelength, and wavelength depends on a given magnitude. According to Planck's equation;

$$E \propto 1/\lambda$$

Where E = energy and λ = wavelength of emitted light.

Hence, the blue stars - with a low wavelength - have high energy and high temperature, and thus are hot. Whereas the red stars - with a high wavelength - low energy and low temperature, thus are cold.

For instance, Sirius is a hot star emitting blue light, and Betelgeuse is a cold star that emits red light.

Red Blue
COLD HOT
Increasing Energy and Temperature

Figure B: Increasing energy and temperature of stars.

(B)
Answer: Semiconductors: Semiconductors are the type of material that has electrical resistance between the resistance of metals (conductors) and the resistance of insulators, as the name indicates "semi-conductor." It is sometimes referred to as an integrated circuit or microchip made from pure elements like silicon and germanium or compounds like gallium and arsenide.

Semi-Conductors in Modern Electronics:

It is an irrefutable fact that semi-conductors are critical components of millions of electronic devices used in computing, telecommunication, household appliances, banking, security, healthcare, transportation, and manufacturing, etc.

★ Computing: Microchips, as used in computers, became the first modern means of computation. Depending on the type of chip, a semiconductor uses binary codes to launch a program or download and save a document.

★ Telecommunication: The principle of semiconductors for telecommunication is the same as in computing. A smartphone's semiconductor chips affect its display, navigation, battery use, 4G reception, and a lot more features. Not just mobile phones, all modern means of communication use semiconductors to function.

★ Household Appliances: Refrigerators, microwave ovens, washing machines, air conditioners, and other machines around homes and offices operate properly, thanks to semiconductors, in which different chips control temperature, timer, and other automated features.

★ Banking: Considering the banking sector, banks are the major investors in microchips as banks deal with digital accounting, cloud platforms, cash withdrawal via ATMs, security cameras, and even

automated locking mechanisms.

★ **Health care:** Medical professionals, nowadays, make use of advanced technology (semiconductor-based) while carrying out complex surgical procedures, like heart surgeries or organ transplants for accuracy, precision, and safety. Even having discussions with patients, getting their history, and diagnosing them is possible via video conferencing.

In short, semiconductors have, undoubtedly, revolutionized modern electronics and, thus, the way we live.