**Q1**

**A close-up of a purple and yellow image

AI-generated content may be incorrect.**

**Phenomenon Name: *Star Formation in the Eagle Nebula (M16)***

**Short Description:**

This image shows a dense stellar field within the **Eagle Nebula**, an active **star-forming region** located in the constellation **Serpens**. The bright yellow-white spots represent **young, hot stars** formed from collapsing clouds of gas and dust, while the darker purple regions indicate **cool interstellar material**. The variation in brightness (pixel intensity) reveals how intense radiation from new stars ionizes nearby hydrogen gas, creating **emission regions** and shaping the surrounding nebula. This process—known as **stellar feedback**—is fundamental to how galaxies evolve and recycle matter through successive generations of stars.

Q2

A close-up of a galaxy

AI-generated content may be incorrect.

**Phenomenon Name: *Dark Nebula (Interstellar Dust Cloud)***

**Short Description:**

This image displays a **dark nebula**, a dense region of **cold interstellar gas and dust** that blocks the background starlight and appears as a dark patch against a brighter field of stars. The purple region represents **light absorption**, where thick dust prevents visible light from passing through, while the yellow areas indicate **emission from nearby stars** or ionized gas. Such clouds are the **birthplaces of new stars** — gravity within them can cause material to collapse and form **protostars**. Studying these regions helps astronomers understand the **early stages of star formation** and the structure of the interstellar medium.

Q3

A close-up of a galaxy

AI-generated content may be incorrect.

**Phenomenon Name: *Supernova Remnant (Crab Nebula Type)***

**Short Description:**

This image shows a **supernova remnant** — the expanding cloud of gas and dust left behind after a **massive star exploded**. The bright yellow region represents high-intensity emissions from **ionized gases**, mainly hydrogen and oxygen, energized by the central **neutron star (pulsar)**. The outer purple halo shows **shock waves** interacting with interstellar material. Such remnants are key to understanding how supernovae **enrich the galaxy with heavy elements** and **trigger new star formation** in nearby clouds.

Q4

A close-up of a galaxy

AI-generated content may be incorrect.

**Phenomenon Name: *Active Galactic Nucleus (AGN) / Quasar***

**Short Description:**

This image represents an **active galaxy** whose central region emits an intense amount of energy due to a **supermassive black hole** accreting gas and dust. The bright central spot corresponds to the **AGN core**, while the surrounding smaller points are stars and companion galaxies. The emission is produced as matter spirals into the black hole, heating up to extreme temperatures and radiating across multiple wavelengths. AGNs and quasars help astronomers study **black hole growth**, **galaxy evolution**, and the **energetic processes in the early universe**.

Q5

A close-up of a galaxy

AI-generated content may be incorrect.

**Phenomenon Name: *Planetary Nebula***

**Short Description:**

This image shows a **planetary nebula**, which forms when a **sun-like star reaches the end of its life** and expels its outer layers into space. The bright yellow core represents the **hot central white dwarf** illuminating the surrounding gases, while the purple halo shows the **expanding shell of ionized gas**. These nebulae glow due to ultraviolet radiation from the remnant star and are crucial for enriching the interstellar medium with elements like carbon, nitrogen, and oxygen—building blocks for future stars and planets.

Q6

A galaxy with a yellow spiral

AI-generated content may be incorrect.

**Phenomenon Name: *Spiral Galaxy***

**Short Description:**

This image shows a **spiral galaxy**, a massive rotating system of **billions of stars, gas, and dust** organized into graceful spiral arms. The bright central region (the galactic bulge) contains **older stars** and possibly a **supermassive black hole**, while the arms are rich in **young, blue stars and star-forming nebulae**. The yellow regions correspond to high-intensity light from dense stellar clusters, while darker purple regions indicate less luminous interstellar space. Spiral galaxies like this one are crucial to understanding **galactic evolution, rotation dynamics, and star formation cycles** across cosmic time.

Q7

A yellow and purple image of a star

AI-generated content may be incorrect.

**Phenomenon Name: *Elliptical Galaxy***

**Short Description:**

This image depicts an **elliptical galaxy**, a massive, roughly spherical system composed mostly of **older, red stars** and very little interstellar gas or dust. The bright yellow central region represents a dense stellar core, while the smooth gradient toward the edges reflects the gradual drop in star density. Unlike spiral galaxies, elliptical galaxies lack distinct arms and have **little to no ongoing star formation**. They are typically found in **galaxy clusters** and represent an advanced stage of **galactic evolution** following the merging of smaller galaxies.

Q8

A close-up of a galaxy

AI-generated content may be incorrect.

**Phenomenon Name: *Edge-On Spiral Galaxy (Sombrero Galaxy Type)***

**Short Description:**

This image shows an **edge-on spiral galaxy**, where the galactic disk is viewed from the side. The bright yellow bulge in the center contains **dense clusters of older stars**, while the dark horizontal band across it represents **dust lanes** that absorb visible light. This structure reveals the **thin, rotating disk** typical of spiral galaxies. Observing such galaxies helps astronomers study the **distribution of dust, star formation rates, and galactic dynamics** from a unique perspective.

Q9

A close-up of a galaxy

AI-generated content may be incorrect.

**Phenomenon Name: *Radio Galaxy / Relativistic Jets***

**Short Description:**

This image represents a **radio galaxy** featuring **bipolar jets** — narrow streams of energetic particles launched from the region surrounding a **supermassive black hole**. The bright yellow center marks the galactic core, while the faint extended lobes on either side indicate **relativistic outflows** interacting with surrounding intergalactic gas. Such phenomena are crucial to understanding **black hole feedback**, where the outflowing energy regulates **star formation and galaxy evolution**.

Q10

A close-up of a blue and yellow image

AI-generated content may be incorrect.

**Phenomenon Name: *Quasar (Quasi-Stellar Object)***

**Short Description:**

This image shows a **quasar**, a distant and extremely luminous **active galactic nucleus** powered by a **supermassive black hole** at its center. The bright yellow core represents intense energy emitted as matter spirals into the black hole, producing radiation across visible, X-ray, and radio wavelengths. Quasars are among the **most energetic and distant** objects in the universe, serving as cosmic beacons that help astronomers study the **early stages of galaxy formation** and **black hole growth**.