

Supernovae

I. Physical Characteristics

1. Define the term supernovae.

Supernovae - stellar explosion of a high-mass star

2. How often do Supernovae occur in galaxies?

2-3 per century

3. What causes a Supergiant Star to become a Supernova?

- ① Re-ignition of a dead core
- ② Collapse of a massive star core

4. The luminosity of a Supernova can outshine an entire galaxy.

Circle One : True False

5. Shockwaves of supernovae :

Move at a speed of : 67,000,000 miles / hour

Trigger the formation of : new stars

II. Examples of Supernovas

1. List the constellations in which the following Supernovae can be located.

1. SN 185 : Circinus (Compass) / Centaurus (The Centaur)

2. SN 1006 : Lupus (The Wolf)

3. SN 1054 : Taurus (The Bull)

4. SN 1572 : Cassiopeia (The Queen)

5. SN 1604 : Ophiuchus (The Serpent Bearer)

6. SN 1987A : Dorado (The Swordfish)

III. Existence & Fate of Supernovae

1. How long do Supernovae typically exist?

A few million years

2. How long does each stage of a typical supernova explosion last?

Core collapse : Less than $\frac{1}{4}$ second

Explosion : 100 seconds

Shockwave reaches surface : Few hours

Reaches maximum brightness : Few months

Fade Away : Few years

3. What stage of stellar evolution do Supernovae exist?

Near the end of star life

4. What is the future of a Supernova after its existence?

1. Black Hole 2. Neutron Star

IV. Supernovae Discovery

1. What is the significance of each Supernova?

SN 185 : Discovered by Chinese Astronomers

SN 1006 : Discovered by Islamic + Chinese Astronomers

SN 1054 : Produced the Crab Nebula

SN 1572 : Discovered by Tycho Brahe

SN 1604 : Discovered by Johannes Kepler

2. Identify characteristics of each type of Supernovae.

Type Ia : Binary star system with a white dwarf
(Runaway fusion of carbon + hydrogen) (No hydrogen)

Type II : Nuclear fuel exhausted
(Hydrogen present)

3. The nearest supernova threat to the Earth is :

IK Pegasi (Binary System = 150 light years away)