The Past, Present and Future of Laser Technology 1



The following questions are based on the contents of the session. Watch the session and answer each question.

[1] Explain the properties of laser light.

- Laser is a coherent light.
- A laser beam has one color and travels in a single direction.
- Laser light waves are synchronized in the same phase.

[2] Where can we find lasers in our everyday life?

- Laser pointers are used in classrooms when people explain things.
- DVD players use red lasers and Blue-ray discs use blue lasers.
- We can see bar code readers which use red lasers in supermarkets.
- Telecommunication make use of laser transmission over optical fiber.
- We can see lasers in the Internet technology in which laser light is transmitted through optical fibers.

[3] What are the advantages of ultrafast lasers?

- Ultrafast lasers concentrate all the pulse energy within a very short time, and therefore can provide extremely high peak power.
- The properties of ultrafast lasers are very useful and important in many applications that were not possible with standard lasers, such as micromachining to make very tiny holes without generating heat.

[4] Explain the history of innovation in pulsed laser technology.

• The first ultra-short pulsed laser, which used a technique called "mode-locking," was invented in 1965. The first practical pulsed laser was the Titanium-Sapphire laser, invented in 1982. This laser was very expensive and very large. In 1986, the first optical fiber amplifier and laser were invented, which was an important innovation that made lasers much smaller, more reliable and more practical. This technology powered the Internet. The first carbon nanotube ultrafast fiber laser was invented in 2003, enabling a very compact laser that could be held in the palm of your hand. Research in a lab at the University of Tokyo contributed to this invention.

[5] Explain how optical fiber is used in our daily life.

 Optical fiber is the backbone of our Internet society right now. It supports all Internet communications, mobile phone networks, data centers, banking, trading, and most recently online-meetings and education, among other things.



[1] The following is a summary of the session. Write down the appropriate words in the blanks in the passage.

Laser is a (coherent) (light). (Different) (from)
natural light, laser has the properties of being a (single) (color),
traveling in (one) (direction), and being synchronized in the same	ıe
(phase). The first laser was invented in 1960. Since then	Ι,
(various) (kinds) of lasers have been invented and use	d
(in) our daily life. We can see laser (pointers) in classroom	ıs
and in (bar) (code) readers in supermarkets.	
(Optical) (fiber) lasers are very important for our Internet society	ty
today. An (ultrafast) (pulsed) laser operates in a very short time	e
period known as a (pico-second), so it can provide extremely high pea	k
(power). Pulsed lasers in the past were very expensive and very large	Э,
but now they have become (cheaper), (smaller) and more	е
(energy-efficient). Therefore, they are now used in many (fields).	