

## Extended definition: full example

Take a look at the following extended definition of optical fibers. The method of amplification has been labeled in each sentence. This text may be a helpful example to look at when you write your subsequent assignment, an extended definition.

- 1) Full sentence definition <sup>1</sup>An **optical fiber** is a glass or plastic fiber that carries light along its length. <sup>2</sup>Optical fibers **are widely used in** fiber-optic communications, which permits transmission over longer distances and at higher data rates (i.e., bandwidth) than other forms of communications. <sup>3</sup>Fibers are used **instead of** metal wires because signals travel along them with **less loss**, and they are also immune to electromagnetic interference. <sup>4</sup>Optical fibers are also used for illumination and, when wrapped in bundles, can be used to carry images, thus allowing viewing in tight spaces. <sup>5</sup>Specially designed fibers **are used for** a variety of **other applications**, including sensors and fiber lasers.
- 2) Applications & Advantages
- 3) Advantages
- 4) Applications & Advantages
- 5) Applications
- 6) Applications <sup>6</sup>Optical fibers **are used by** many telecommunications companies to transmit telephone signals, Internet communication, and cable television signals. <sup>7</sup>Due to much lower attenuation and interference, optical fiber has large **advantages** over existing copper wire in long-distance and high-demand applications. <sup>8</sup>**However**, due to the difficulties and expense of installing and operating fiber-optic systems in cities, fiber-optic communication systems have primarily been installed in long-distance applications, where they can be used to their full transmission capacity, thus compensating for the higher cost. <sup>9</sup>Since the year 2000, the prices for fiber-optic communications have dropped considerably. <sup>10</sup>The price for rolling out fiber to the home has currently become more cost-effective than that of rolling out a copper based network. <sup>11</sup>Prices have dropped to \$850 per subscriber in the US and lower in countries like The Netherlands, where digging costs are low.
- 7) Advantages
- 8) Disadvantages
- 9) Disadvantages
- 10) Disadvantages
- 11) Disadvantages
- 12) Analysis of parts <sup>12</sup>An optical fiber **consists of** a core, cladding, and a buffer (a protective outer coating), in which the cladding guides the light along the core by using the method of total internal reflection. <sup>13</sup>The core and the cladding (which has a lower-refractive-index) are usually **made of** high-quality silica glass, although they can both **be made of** plastic as well. <sup>14</sup>Two optical fibers **can be connected by** fusion or mechanical splicing, requiring **special skills and interconnection technology** due to the microscopic precision required to align the fiber cores.
- 13) Physical description
- 14) Operating principles? Problems?
- 15) Analysis of types <sup>15</sup>Two types of optical fiber are used in **fiber optic communications**: *multi-mode* and *single-mode* optical fibers. <sup>16</sup>A *multi-mode* optical fiber has a larger core ( $\geq 50$  micrometres), allowing less precise, cheaper transmitters and receivers to connect to it, as well as cheaper connectors. <sup>17</sup>**However**, multi-mode fiber introduces multimode distortion, which often limits the bandwidth and length of the link. <sup>18</sup>**Moreover**, because of its higher dopant content, multimode fibers are usually expensive and exhibit higher attenuation. <sup>19</sup>**In contrast**, the core of a *single-mode fiber* is smaller ( $<10$  micro-metres) and requires more expensive components and interconnection methods but allows much longer, higher-performance links.
- 16) Physical description
- 17) Problems
- 18) Problems
- 19) Physical description.