

Lecture -2

Part -1 Choose the correct answers:

- 1) The components used in modern optical networks are:
 - i) Couplers.
 - ii) Laser.
 - iii) Photodetectors.
 - iv) optical amplifiers.
 - v) optical switches.
 - vi) filters and multiplexers.
 - vii) None of these.
- 2) Photodetector convert the optical signal into:
 - i) Electrical domain.
 - ii) Light domain.
 - iii) Amplified light domain.
 - iv) Can do all of these.
- 3) Lasers are the main transmitters used in:
 - i) Optical communication systems.
 - ii) Microwave communication systems.
 - iii) RF communication systems.
 - iv) All of these.
- 4) Wavelength converters, which are used to convert:
 - i) signals from one wavelength to another, at the edges of the optical network.
 - ii) signals from one wavelength to another, inside the network.
 - iii) None of these.
- 5) A directional coupler is used:
 - i) To combine and split signals in an optical network.
 - ii) To combine optical signals in series.
 - iii) To amplifying optical signals.
- 6) The coupler can be designed to be:
 - i) Wavelength selective.
 - ii) Wavelength independent (sometimes called wavelength flat).
 - iii) Both of them.
- 7) The simplest example in coupler can be used to:
 - i) distribute an input signal equally among two output ports.
 - ii) Mix an input signal with output.
 - iii) None of these.
- 8) Wavelength selective, meaning that its coupling coefficient will:
 - i) Depend on the wavelength of the signal.
 - ii) Independ on the wavelength of the signal.
 - iii) None of these.
- 9) In a wavelength-independent device
 - i) α is independent of the wavelength.
 - ii) α is dependent of the wavelength.
 - iii) None of these.
- 10) The main function of isolator is:

- i) To allow transmission in one direction through it but block all transmission in the other direction.
 - ii) To allow transmission in one direction through it but block all transmission in the other direction.
 - iii) it but sometimes allow transmission in the other direction.
 - iv) To allow transmission in both directions through the fiber.
- 11) Isolators are used in systems at the output of optical amplifiers and lasers primarily to:
- i) Prevent reflections from entering these devices.
 - ii) Allow reflections from entering these devices.
 - iii) Guide the optical signal when entering these devices.
- 12) The key parameters of an isolator are:
- i) Its insertion loss, which is the loss in the forward direction and which should be as small as possible.
 - ii) Its isolation, which is the loss in the reverse direction and which should be as large as possible.
 - iii) Its insertion loss, which is the loss in the forward direction and which should be as large as possible.
- 13) A circulator is:
- i) Similar to an isolator, except that it has multiple ports, typically three or four.
 - ii) Not similar to an isolator, except that it has multiple ports, typically three or four.
 - iii) Similar to an isolator, except that it has two ports only.
- 14) Dynamic waveguide crossconnect (WXC) can be constructed:
- i) by combining optical switches with multiplexers and demultiplexers.
 - ii) by combining optical switches with multiplexers only.
 - iii) by combining optical switches with demultiplexers.
- 15) Good optical filters should have:
- i) Low insertion losses.
 - ii) Zero insertion losses.
 - iii) High insertion losses.
- 16) The passband of a filter should be:
- i) Insensitive to variations in ambient temperature.
 - ii) Sensitive to variations in ambient temperature.
 - iii) Insensitive to variations in high temperature.

Part -2 Draw these diagrams:

- 1) A directional coupler. The coupler is typically built by fusing two fibers together>
- 2) A star coupler with eight inputs and eight outputs made by combining 3 dB couplers.
- 3) Functional representation of three-port and four-port circulators.
- 4) Principle of operation of an isolator.
- 5) A static wavelength crossconnect that's routes signals from an input port to an output port based on the wavelength.