

Unit 12 - Week 9 Lectures

Course outline

How to access the portal

Week- 0

Week 1 Lectures

Week 2 Lectures

Week 3 Lectures

Week 4 Lectures

Week 5 Lectures

Week 6 Lectures

Week 7 Lectures

Week 8 Lectures

Week 9 Lectures

Erbium-doped fiber amplifier

Photodetectors

Noise in Photodetectors

Introduction to WDM components

Couplers, Circulators, FRM and Filters

Quiz : Assignment-9

Assignment-9 Solutions

Week 10 Lectures

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Assignment-9

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-10-02, 23:59 IST.

- 1) An Erbium ion absorbs a photon having wavelength 1480 nm and gets excited to a higher energy state. The energy gap between the excited state and the ground state is **1 point**
- 1.26 eV
 0.84 eV
 0.55 eV
 1.10 eV

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.84 eV

- 2) In an optical power amplifier having gain (G) of 15 dB and operating at the wavelength of 1550 nm, the power spectral density of single polarization is (Assume $n_{sp} = 1.5$) **1 point**
- $1.17 \times 10^{-17} \text{ W/Hz}$
 $2.86 \times 10^{-17} \text{ W/Hz}$
 $5.89 \times 10^{-18} \text{ W/Hz}$
 $2.96 \times 10^{-18} \text{ W/Hz}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $5.89 \times 10^{-18} \text{ W/Hz}$

- 3) In Question 2, if bandwidth of transmission is 0.15 nm, the ASE noise power in two polarizations is approximately (in nW) **1 point**
- 221
 110.32
 147.25
 294.50

No, the answer is incorrect.
Score: 0

Accepted Answers:
221

- 4) In Question 2, if the output optical signal power is 0 dBm, the optical signal to noise (both polarization) ratio (OSNR) is **1 point**
- 25.67 dB
 0 dB
 34.74 dB
 36.56 dB

No, the answer is incorrect.
Score: 0

Accepted Answers:
36.56 dB

- 5) An optical amplifier operating at 1550 nm has ASE power spectral density of $5.73 \times 10^{-17} \text{ W/Hz}$ in both polarizations. The gain G is (Assume $n_{sp} = 1.5$) **1 point**
- 21.76 dB
 150 dB
 43.24 dB
 35 dB

No, the answer is incorrect.
Score: 0

Accepted Answers:
21.76 dB

- 6) A photodiode should be forward biased in order to detect incident light. **1 point**
- True
 False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

- 7) The probability that a single photon is observed on a certain time interval T, when an average number of photon pulses observed over multiple cycles of T is 2, is **1 point**
- 0.13
 0.27
 0.5
 0.35

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.27

- 8) If input power of 1 dBm is incident on a photodiode with responsivity of 0.5 A/W, the shot noise RMS current at the operating wavelength of 1550 nm for a bandwidth of 0.1 nm is **1 point**
- $1.59 \mu A$
 $0.79 \mu A$
 $1.41 \mu A$
 $1.32 \mu A$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $1.59 \mu A$

- 9) In Question 8, the SNR is **1 point**
- 60 dB
 51.97 dB
 76.34 dB
 30 dB

No, the answer is incorrect.
Score: 0

Accepted Answers:
51.97 dB

- 10) The thermal noise current generated in a photodiode circuit with load resistance of 100Ω and bandwidth of 5 GHz at 25°C is **1 point**
- $0.907 \mu A$
 $0.225 \mu A$
 $0.262 \mu A$
 $0.868 \mu A$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $0.907 \mu A$