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NPTEL

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Courses » Optical Communications

Announcements

Course

Ask a Question

Progress

Mentor

Unit 12 - OFC-Week 10 lectures

Course outline

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Optical amplifiers-I

Optical amplifiers-II

Noise in optical amplifiers

Noise in optical amplifiers (contd.)

ASE induced limitations

Quiz : ASSIGNMENT-10

Week 10 Solution

OFC-Week 11 lectures

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ASSIGNMENT-10

The due date for submitting this assignment has passed.

Due on 2016-09-27, 23:59 IST.

Submitted assignment

1)
An optical amplifier operating at 1550 nm has a one-sided ASE power spectral density of 5.73×10^{-17} W/Hz in both polarizations. The gain G is (Assume $n_{sp} = 1.5$)

NOTE: Answer must be in integer form

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 150

3 points

2)
An optical amplifier at 1550 nm has a noise figure of 4.5 dB. The signal output of the amplifier is 0 dBm, which is incident on a photodetector. Calculate the amplifier gain if the standard deviation of the signal-ASE beat noise current is 0.066 mA. Assume $R = 0.9$ A/W, $B_e = 7.5$ GHz, and the optical filter is absent

NOTE: Answer must be in integer form

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 992

3 points

3)
In a cavity-type SOA, the cavity length is 500 μm , $R_1 = R_2 = 0.32$, and the peak gain is 15 dB. The single-pass gain is (Assume $n = 3.2$)

- 1.67
 2.52
 3.86
 None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

2.52

3 points

4) In the above question the 3-dB bandwidth is (Assume $n = 3.2$) 3 points

- 6.44 Ghz
- 3.2 Ghz
- 9 Ghz
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

6.44 Ghz

5)

3 points

An SOA operating at a signal wavelength of $1.55 \mu\text{m}$ produces a gain of 30 dB with an optical bandwidth of 1 THz. The device has a spontaneous emission factor of 4 and the mode number is equal to 2.2 when the net gain coefficient over the length of amplifier is 200. Then the length of the device is

- 13.9 mm
- 27.2 mm
- 34.6 mm
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

34.6 mm

6) In the above question The noise power spectral density P_{ASE} is 3 points

- 1.13 mW
- 3.21 mW
- 9.12 mW
- None of these

No, the answer is incorrect.

Score: 0

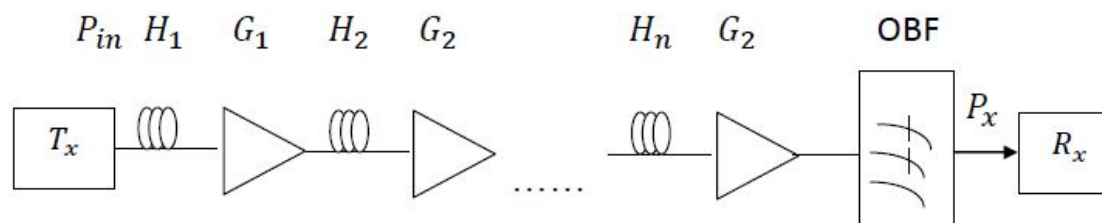
Accepted Answers:

1.13 mW

7)

4 points

A $1.55 \mu\text{m}$ long haul based on NRZ-OOK shown in fig.



80 identical amplifiers are placed periodically with a spacing of 80 km. The mean fiber launch power = -3 dBm , fiber loss coefficient $\alpha = 0.0461 \text{ km}^{-1}$, amplifier loss is fully compensated by the amplifiers, $n_{sp} = 1.5$. Electrical filter bandwidth, $f_e = 7 \text{ GHz}$ and $f_e < f_o$. Then OSNR in a reference bandwidth of 0.1 nm is

- 9 dB
- 13.21 dB

- 15.19 dB
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

15.19 dB

8)

3 points

In the above question, The Q -factor is
Ignore shot noise, thermal noise, and spontaneous-spontaneous beat noise.

- 7.71
- 2.11
- 5
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

7.71

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