

Course outline

How does an NPTEL online course work?

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Week 5

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Week 8

Week 9

Week 10

Wavelength modulated sensors - 3

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Wavelength modulated sensors - 5

Optical Fiber Sensors : Week 10 Feedback Form

Quiz : Assignment 10

Assignment 10 solutions

Week 11

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Assignment 10

The due date for submitting this assignment has passed.

Due on 2021-03-31, 23:59 IST.

As per our records you have not submitted this assignment.

- 1) Photosensitivity of a fiber decreases with increasing concentration of GeO_2 1 point
- True
- False

No, the answer is incorrect.
Score: 0
Accepted Answers:
False

- 2) Period of fiber Bragg grating is _____ as that of phase mask 1 point
- Same
- Twice
- Half
- Independent

No, the answer is incorrect.
Score: 0
Accepted Answers:
Half

- 3) Using phase mask technique, FBGs are fabricated by overlapping of _____ diffraction orders 1 point
- +1,0,-1
- +1,-1
- +2,1,0,-1,-2
- +2,-1,1,+2

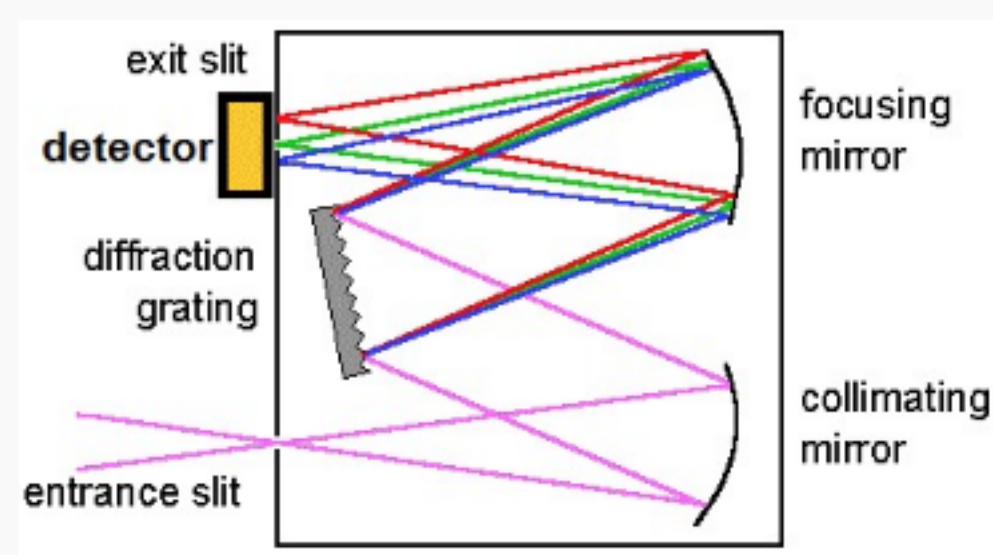
No, the answer is incorrect.
Score: 0
Accepted Answers:
+1,-1

- 4) Which of the following statements are correct? 1 point
- In Gaussian apodized gratings, sidelobes can be observed at lower wavelengths in the FBG reflection spectrum
- In Gaussian apodized gratings, sidelobes can be observed at higher wavelengths in the FBG reflection spectrum
- In Gaussian apodized gratings, sidelobes can be observed at both higher and lower wavelengths in the FBG reflection spectrum
- In Gaussian apodized gratings, sidelobes are absent in the FBG reflection spectrum
- In uniform gratings, sidelobes can be observed at both higher and lower wavelengths in the FBG reflection spectrum
- In uniform gratings, sidelobes can be observed at lower wavelengths in the FBG reflection spectrum

No, the answer is incorrect.
Score: 0
Accepted Answers:
In Gaussian apodized gratings, sidelobes can be observed at lower wavelengths in the FBG reflection spectrum
In uniform gratings, sidelobes can be observed at both higher and lower wavelengths in the FBG reflection spectrum

The following information are common for questions 5 and 6.

A schematic of the spectrometer used for a particular FBG based temperature monitoring system is shown in the figure below. Assume that the wavelength range of the spectrometer is 1520 - 1580 nm and FBG temperature coefficient is $13 \frac{pm}{deg C}$



- 5) You are provided with a $14 \mu m$ pitch, 2048 element photodetector array. The minimum temperature change that could be measured is _____ °C (two decimal accuracy)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 2.0,2.5

1 point

- 6) Calculate minimum temperature change measurement you would achieve if you use a CCD array with 16384 pixels and pixel pitch of 70 pm, the minimum temperature change that could be measured is _____ °C (two decimal accuracy)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.24,0.30

1 point

The following information is common for questions 7-10

You are asked to design a diffraction based spectrometer and provided with a grating element which has grating period of $15 \mu m$. The range of the spectrometer is 1510 nm to 1590 nm. The range should be covered with a 512 CCD elements. The pitch of the CCD elements is $5 \mu m$

- 7) The total length of the CCD array is _____ μm (rounded value)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 2304,2816

1 point

- 8) The measurement resolution supported by the spectrometer is _____ pm (rounded value).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 151,170

1 point

- 9) Interpolation improves the resolution of the spectrometer without changing the number of CCD elements

- True
- False

No, the answer is incorrect.
Score: 0
Accepted Answers:
True

1 point

- 10) If the spectrometer takes $1 \mu s$ to read each pixel value, the maximum measurement frequency that would be supported by the spectrometer is _____ kHz (one decimal accuracy)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 1.8,2.2

1 point