Assignment 5

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Due on 2019-04-03, 23:59 IST.

1) Given core radius = 4.5 μm, core and cladding refractive indices $n_1=1.41$ and $n_2=1.40$. Answer questions 1-3 assuming an operating wavelength of 1550 nm.

Find the V-number at the given operating wavelength.

- 2.405
- 3.064
- 6.128
- 1.021

No, the answer is incorrect.
Score: 0
Accepted Answers: 3.064

2) The fiber is __________.

- SMF
- MMF

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

3) Find the minimum wavelength for which fiber is single-moded.

- 1550 nm
- 1975 nm
- 3950 nm

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4) For incident angle greater than critical angle, the rate of decay for the evanescent wave

- Increases with the incident angle
- Decreases with the incident angle
- Doesn't change

No, the answer is incorrect.
Score: 0
Accepted Answers:
Increases with the incident angle

5) The condition in symmetric slab waveguide for even TE mode is

- \( \tan(\kappa a) = \frac{\gamma}{\kappa} \)
- \( \tan(\kappa a) = -\frac{\kappa}{\gamma} \)
- \( \tan(\kappa a) = \frac{\kappa}{\gamma} \)
- \( \tan(\kappa a) = \gamma \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( \tan(\kappa a) = \frac{2}{\pi} \)

6) In a symmetric slab waveguide for \( k_n n_2 > \beta \)

- Guided modes exist
- Radiation modes exist
- \( TE_0 \) mode exists
- \( TM_0 \) mode exists

No, the answer is incorrect.
Score: 0
Accepted Answers:
Radiation modes exist

7) The dominant mode in a rectangular waveguide is \( TE_{10} \), because this mode has

- The highest cutoff wavelength
- No attenuation
- No magnetic field component
- No cut-off

No, the answer is incorrect.
Score: 0
Accepted Answers:
The highest cutoff wavelength

8) A rectangular metal waveguide filled with a dielectric material of relative permittivity \( = 2.2 \)

- has the inside dimensions 3 cm x 2 cm. The cut-off frequency for the dominant mode is

- 5 GHz
9) Find the width of smallest square waveguide capable of propagating the $TM_{11}$ mode, if the frequency corresponds to a free-space wavelength of 10 cm.

- 14.14 cm
- 3.53 cm
- 7.07 cm
- 10 cm

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

10) Consider an air-filled rectangular waveguide with dimensions $a=2.5$ cm and $b=1$ cm. The increasing order of the cut-off frequencies for different modes is

- $TE_{10} < TE_{20} < TE_{01} < TE_{11}$
- $TE_{20} < TE_{10} < TE_{01} < TE_{11}$
- $TE_{10} < TE_{20} < TE_{11} < TE_{01}$
- $TE_{10} < TE_{01} < TE_{11} < TE_{20}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$TE_{10} < TE_{20} < TE_{01} < TE_{11}$