



*The Abdus Salam*  
**International Centre for Theoretical Physics**



**SMR 1826 - 6**

**Preparatory School**  
to the  
**Winter College on Fibre Optics, Fibre Lasers and  
Sensors**

5 - 9 February 2007

**EXERCISE # 3 (Optical Sources and  
Photodetectors)**

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**Preparatory School to the Winter College on Fibre Optics,  
Fibre Lasers and Sensors  
5<sup>th</sup> – 9<sup>th</sup> February 2007  
ICTP, Trieste Italy**

**EXERCISE # 3 (Optical Sources and Photodetectors)**

**Time: 10 minutes**

**Name: \_\_\_\_\_**

Q. 1. What type of semiconductor is doped with impurities that create holes as current carriers?

- a. intrinsic
- b. n-type
- c. p-type
- d. insulating
- e. None of above.

Q. 2. Which of following is a quaternary III –V semiconductors?

- a. InGaAsP
- b. PbSnSSe
- c. GaAlAs
- d. GaAs
- e. NSbAsP

Q. 3. What type of semiconductor junction can function as a laser?

- a. Unbiased Junction
- b. Forward –biased Junction
- c. Reversed –biased Junction
- d. all of above
- e. None of the above

Q. 4. A semiconductor has a band gap of 1.5 electron volts. At about what wavelength will it emit light if it can operate as a laser?

- a. 1.5 mm
- b. 1000 nm
- c. 827 nm
- d. 678 nm
- e. 667 nm

Q. 5. How does a semiconductor laser operate when the drive current is below laser threshold?

- a. As a reversed- biased diode
- b. As a photodetector
- c. As an LED
- d. As a perfect insulator
- e. None of above

Q. 6. What gives a double-heterostructure laser better efficiency than a homostructure laser?

- a. Reverse biasing
- b. Better confinement of stimulated emission in the active layer
- c. Restriction of current flow to the active layer
- d. Lower levels of spontaneous emission
- e. A homostructure laser is more efficient.

GOOD LUCK