**Question Bank**

**Unit 4**

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| **Q.No.** | **Questions** |
|  | What are direct bandgap and indirect bandgap type of semiconductors? Give atleast two examples of each. Which of these are more suitable for fabricating LEDs? Give reasons. |
|  | 1. What are homojunctions and hetrojunctions?
2. Discuss unique properties of the PNP double hetrostructure LED and sketch (with proper labeling) the energy level diagram of such a configuration.
 |
|  | 1. Derive the threshold condition for laser action.
2. On what factors does the gain coefficient of a semiconductor laser depend?
 |
|  | Define the quantum efficiency and responsivity of a p-n diode. How are the two related to each other? |
|  | Distinguish between a p-n diode, p-i-n diode and APD. Is it possible to make these three types of photodiodes using the same semiconductor? |

**Unit 5**

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| **Q.No.** | **Questions** |
|  | 1. Explain the basic principle of operation of semiconductor optical amplifiers.
2. What requirements must be met so that a semiconductor DH functions efficiently as an optical amplifier?
 |
|  | Distinguish between the amplification processes in 1. EDFA
2. Fiber Raman Amplifier
 |
|  | 1. What is the origin of gain saturation in fiber Raman amplifiers? Derive an approximate expression for the saturated amplifier gain.
2. What are the flexibilities available in fiber Raman amplifiers that are not available in SOAs and EDFAs?
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|  | Explain the principle of operation of a 2 x 2 directional coupler and an N x N star coupler. |
|  | Discuss link budget calculations in detail for a fiber optic link. |

**Unit 6**

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| **Q.No.** | **Questions** |
|  | Distinguish between WDM and DWDM. What is the base frequency and channel spacing specified by ITU for DWDM? |
|  | What are non-linear effects in optical fiber communication? What is significance of effective length and effective area? |
|  | Explain SPM and XPM and discuss their mitigation techniques. |
|  | Discuss solition based communication in detail. |

**\*Solve numerical examples for above topics.**