prepare 10 questions based on *"a paper.docx"*
Maryam Saeedmehr
Stud. NO : 9629373

Q1. **What are the advantages of using PTS ?**
Answer : By using PTS, provides two significant advantages; these include slow group velocity and extremely high optical confinement for a propagating wave through the PCW.

Q2. **What does slow light phenomenon provides ?**
Answer : ultra compact, low loss, and highly sensitive devices

Q3. **Name some applications that have used excitation of slow light?**
Answer : Electromagnetically induced transparency ,
stimulated Brillouinscattering ,
stimulated Raman scattering ,
waveguides ,
hotonic beamformer circuits ,
etc.

Q4. **Why photons in a PC experience a periodic behavior when they pass through such a medium?**
Answer : PC is a medium wherein the refractive index changes periodically; consequently, it possesses a position-dependent refractive index. Hence, photons in a PC experience a periodic behavior when they pass through such a medium.

Q5. **Why do we use the Kerr effect ?**
Answer : the Kerr effect is employed to control the refractive index of PTS by the intensity of the incident wave

Q6. **What features should the materials have for ultra-fast switching applications?**
Answer : For ultra-fast switching applications, materials must satisfy some figures of merit. First of all, they must exhibit a large and nonresonant nonlinear refractive index necessary to satisfy the condition of $n_2 > 10^{-12}$ cm^2 /W . Secondly, they must provide a π phase shift over 1/e attenuation distances when the device throughput is reasonable.

Q7. **What are two of the most commonly used configurations for PCs ? Explain briefly about it**
Answer : Two of the most commonly used configurations for PCs are rectangular and triangular lattices. The rectangular lattice PCs consist of suspended Si rods in air which can only support TE propagation modes (for these modes, the electric field is polarized along the rods). In contrast, the triangular lattice PCs are made of air holes drilled in the Si substrate, which can support both TE and TM propagation modes.

Q8. **What is the resean of propagation losses in a PC-based meandering delay line?**
Answer : Most of propagation losses in a PC-based meandering delay line are caused due to multiple reflections and scattering losses at the associated bent PCWs. C

Q9. **How we can reduce propagation losses in a PC-based meandering delay line as much as possible ?**

Answer : Consequently, some modifications should be applied at all corners to reduce propagation losses as much as possible

Q10. **What should we consider in order to compute the band diagram related to the PCs ?**

Answer : In order to compute the band diagram related to the PCs, some considerations should be noted. First, the selection of the unit cell observed in Fig. 1 should be taken into account. Second, it is necessary to excite the unit cells by appropriate sources; in this study, some dipole sources are placed in the unit cells. However, the location of dipole sources should be chosen so that all possible modes could be excited.