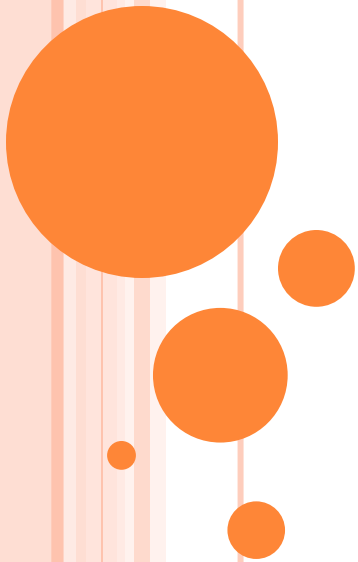


University of technology

Laser and optoelectronics eng. Dept.

LASER APPLICATION COURSE
4TH YEAR
LEC.4



QUESTIONS OF CHAPTER ONE

- Q1.1 What are material & laser parameters that affect laser processing?
- Q1.2: In each case, choose the best option:
- 1. Beam expander is an optical device increasing beam diameter and reducing divergence. Result a smaller focused spot for
 - (a) small distance between collimated lens and workpiece.
 - (b) more distance between collimated lens and workpiece.
 - (c) more distance between laser and workpiece.
 - (d) small distance between beam expander and collimated lens.
- 2. **Critical angle** represent the boundary between two different phenomenon, the:
 - (a) scattering & reflection. (c) absorption & reflection.
 - (b) refraction & transmission. (d) refraction & reflection.
- 3. The quantity L is called latent heat because this added or removed energy
 - (a) result in a temperature change
 - (b) result in a phase change
 - (c) dose not result in a phase change
 - (d) dose not result in a temperature change



- **Q1.3:** Explain in briefly form the reasons for Incorporating a beam expander into the optical focusing system.
- **Answer:** The reason for incorporating a beam expander into the optical system is that enables a smaller final spot to be obtained.
- **Q1.4:** Consider CO₂ laser beam ($\lambda=10.6\mu\text{m}$) which has a radius of (5mm), and which is focused using a lens of (100mm) focal length. *Calculate the minimum focused beam diameter & calculate depth of focus.*
- **Answer (= $67\mu\text{m}$, $Z = 0.6\text{mm}$)**
- **Q1.5:** The diameter of a beam emitted from He-Ne laser is (1.2mm). A Kepler beam expander is used made of two lenses with focal lengths of (2cm) & (10cm). Then the beam output from this expander inter to focusing lens $f = 1.5\text{cm}$. Calculate the focused spot size (W_o).
- **Answer (= $10\mu\text{m}$)**

