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 CO_2 laser beam (λ=10.6μm) 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 (= 67μm, Z = 0.6mm)***
- **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 =1.5cm. Calculate the focused spot size (W_o).
- **Answer (= 10μm)**