



TTE-62406 Micro and Desktop Manufacturing

Answer to four questions. No literature.

Exam 15.5.2014, Jorma Vihinen

1. Describe the principle of laser ablation method. What types of lasers used in this process and what are their properties?
2. Explain the principle of hot embossing method. What are typical materials used in this method?
3. Describe the principle of LIGA method and the manufacturing steps.
4. Because of reduced dimensions and small weights, (mechanical) assembly of micro-components presents many challenges. Name as many of these challenges as you can and **shortly** describe the reasons and effects of these challenges.
5. Micro-part feeders singularising and orientating parts prior to station process are often a bottleneck in automation. What kinds of feeders can be used for feeding micro-parts? **Shortly** describe their operating principles and challenges.
6. This question has two sub questions and you are required to answer to both of them. In grading this question, both sub questions are equally important.
 - a) What kind of requirements or characteristics measurements (or testing) of micro scale parts typically have? What are the sources (or reasons) for these requirements?
 - b) Lasers are often used also in measurement applications. Name and describe different measurement techniques/methods that 1) are suitable for measuring micro-parts and 2) utilise lasers in some way.