

Mansoura University
Faculty Of Engineering
Prod. and Mech.Des. Dept.

Final Exam
16 Sept. 2013
M.Sc.

Fine Measurements
Time : 3 Hrs.
Marks : 100

ANSWER ALL QUESTIONS

Question One:-(24 Marks)

- a) What are the symbols for tolerance characteristics of the following items: (use a neat drawing). (8Marks)
Flatness – Profile of line—parallelism – concentricity – coaxiality and total run-out .
- b) What are the definitions of the following items (give example for interpretation):
*Straightness tolerance * Cylindricity tolerance * Parallelism tolerance * Angularity tolerance.
*Position tolerance of a line and Circular run-out radial.(8Marks)
- c) Explain the possible causes of each of the various types of irregularities found in surfaces having the same numerical assessment may have different properties and texture. (8 Marks)

Question Two:-(25Marks)

- a) There are two types of roundness measuring instruments; state the advantages and limitations of each.(9Marks)
- b) State the different applications which illustrate the versatility of roundness measuring instruments in fields not directly associated with general engineering.(8Marks)
- c) Explain the different methods used to assess the roundness errors from the graph.(use a neat sketch for each method).(8Marks)

Question Three:-(26Marks)

- a) Define the difference between the performance and the function; Also explain the relationship between the surface roughness parameters and the machined surfaces functions.
- b) Define the following items; Bearing ratio ; Average wave length; Lay ; Sample length; Meter cut-off value ; Roughness average ; Ten-point height ;(8Marks)
- c) What is the function of the transducer (pick-up) of the TALYSURF (draw a schematic diagram to illustrate the different elements of the pick-up).(8Marks)

Question Four:-(25Marks)

- a) What are the basic elements of a fringe-counting measurement cycle? (use a neat sketch to illustrate the different elements)?(8Marks)
- b) What are the different factors affecting the ultimate measuring accuracy of the laser transducer system. ? (9Marks)
- c) Show how the laser system can be used to measure the flatness and X-axis positioning for machine tools (use a neat sketch for each set-up).(8Marks)

With My Best Wishes