

Mansoura University	Final Exam Full Mark : 70 Time: 3 Hours	Fourth Year Production
Faculty of Engineering		24/6/2010
Prod. & Mech. Design Dept.		Fine Measurements

Answer all questions, with neat sketches whenever it is possible

Question (1): (12 Marks) Define the following Surface Texture parameters:

1-	Roughness	5-	Assessment Length	9-	High Spot Count (HSC)
2-	Waviness	6-	Transverse Length	10-	Kurtosis (R_{ku})
3-	Lay	7-	Cut-off Length	11-	Arithmetic Average Roughness (R_a)
4-	Flow	8-	Sampling Length	12-	Bearing Ratio (t_p)

Question (2): (15 Marks) Discuss in brief the following:

1. Basic properties that made controlling the Surface Texture important.
2. Factors which affect the Surface Finish.
3. Causes of Surface Irregularities.
4. Main types of Roughness Parameters.
5. Causes of Out-of-Roundness.

Question (3): (15 Marks) Illustrate the advantages and limitations of the following:

1. Contact methods of surface roughness measurements.
2. Non-contact methods of surface roughness measurements.
3. Three Point Measuring in Roundness Testing.
4. Rotating Pick-up in Roundness Testing Instruments.
5. Turn Table in Roundness Testing Instruments.

Question (4): (15 Marks)

A- Define the following Gear Measurements:

1-	Involute Function	4-	Blank Diameter	7-	Dimetral Pitch and Module
2-	Pressure Angle	5-	Circular Pitch	8-	Addendum and Dedendum
3-	Line of Action	6-	Clearance	9-	Tooth thickness

B- Show how to measure/calculate Tooth Thickness (W), and Tooth Depth (h) of an Involute Spur Gear at the pitch line.

C- Illustrate the principles of testing the Involute Form of a Spur Gear.

Question (5): (13 Marks)

A- Discuss in general the purpose, function, and applications of the following Instruments:

1. Interference Microscope.
2. Coordinate Measuring Machine.

B- What are the advantages specifications, and configurations of CMM.

C- Choose one type of the CMM and write what you know about it in details.



Best wishes
Dr. Ahmed Galal