Menoufia University
Faculty of Engineering
Prod. Engg. & Mech.
Design Dept.

3 rd Year
Metrology& Calib.
Three Hrs.
18 – 6 – 2013

Allowed Table and Charts (None).
This Exam measures ILOS No.:(a1-1, a14-1,a14, a19-1,b13-1, b13- c5-1,d1-1).

Answer all the following questions:

Question (1) (15 marks)

a- Design a method to check the angle of a traversed recess whose angle of taper is very small.
b- Explain a method to determine the internal and external angles of The dovetails accurately.
c- Describe a method to measure the diameter of big holes accurately.
d- Explain one method for measuring internal taper in blind hole.

Question (2) (15 marks)

a– Draw the screw terminology and explain how to select the best wire to measure some of screw elements.
b- Name the various types of pitch errors found in screw? (Draw and explain).
c- Name the various methods used for measuring the major diameter? (Draw and explain one method).
d- Design a simple method to check the unknown dimensions of steel ball.

Question (3) (15 marks)

a- Explain measurement method for workpiece tapered on one side(< 45 °).
b- Explain the measurement method of taper ring gauge.
c- Draw and explain the angle dekkor.
d- Check interior angle of a profile gauge.

See Page (2)

Question (4) **(15 marks)**

a-- Describe the David Brown base tangent comparator and explain how it can be used to measure base tangent length for the gear.

b- Calculate the dimension of the maximum chord five teeth when the gear Under inspection specifications; No. of teeth= 32 , Module= 3 , pressure angle = 14.5°

c- Calculate the setting of the gear tooth vernier caliper of spur gear having 30 teeth and 5mm module. Deduce the relations used.

Question (5) **(15 marks)**

a-Explain how to check the straightness of machine bed by the use of an auto-collimator. Also, show how the angle readings may be converted into errors of flatness

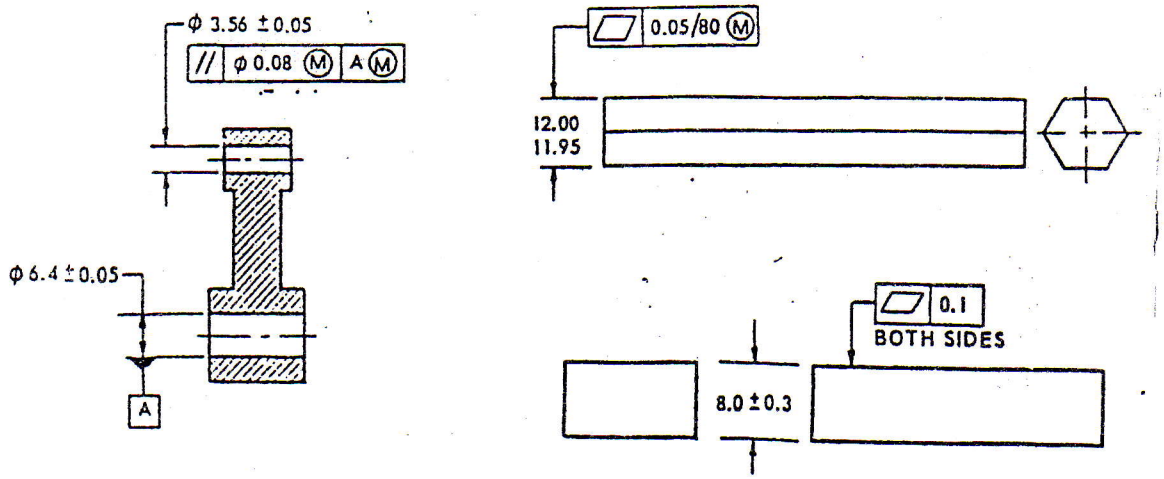
b-Draw and describe the method of testing the parallelism of the axis of centers with the bed center lathe.

c-Discuss with sketch the method of testing a drilling machine spindle of squareness with the table.

Question (6) **(10 Marks)**

a-What is the extreme virtual size for the following parts.

b-show with sketches how to check these parts.



(Exam Marks) :

Question No.	1	2	3	4	5	6
Marks	15	15	15	15	15	10