Engineering Design Using CAD - AM311 – Fall 2008

Bethune: x3414, Bethune@bu.edu
Section B1, Thursday 6:00, PHO 205, LAB: RM302 at 110 Cummington St.
Lab: 3-5989
TEXT: Class notes

GRADES: 25% Lab work and Class Assignments
10% Motor Tester Report (see requirements)
25% Cam Project Performance
10% Cam Project Report
10% Quiz 1
10% Quiz 2
10% Large Assembly Drawing

ALL LAB WORK IS DUE 1 WEEK AFTER IT IS ASSIGNED.
NO LATE WORK WILL BE ACCEPTED.

Copies assignments will be given 0 credits, and 5 points will be deducted from the final grades for each offense.

DATE	TOPIC	LAB ASSIGNMENT
9/4	Introduction Design Projects Into to SolidWorks Gears – speed	**Concept sketch for motor tester** **Due 9/18** Counts as 2 homework EX1-7, EX1-12 EX2-18 Due 9/22 Form teams – up to 4 members Everyone must join a team
9/11	3D Models Gears – loads	EX3-7, EX3-11, EX3-32 Due 9/18
9/18	Orthographic views	Start building motor tester EX4-7, EX4-18, EX4-42, EX4-55 Due 9/25
9/25	Assembly drawings	EX5-5, EX5-12 Due 10/2
10/2	Threads and fasteners	EX6-2, EX6-3, EX6-21A – Due 10/9 Class handout

10/9 (Tuesday)	Dimensions	EX7-3 (inches), EX7-10 (millimeters) EX7-22, EX7-29 Class handout Due 10/23
10/16	Quiz 1 Closed book/Closed Notes	

MOTOR TESTER REPORT DUE 10/27 by 5:00 PM

Motor Tester Report Requirements

Title page, see sample page in lab
3D isometric drawing of tester, include assembly numbers
Parts list (BOM), include a materials column and part numbers
Dimensioned drawing of any part you manufactured
Load vs. RPM diagram with supporting data: **specify motor by manufacturer and part number**
Estimated manufacturing time; how long did it take to build the tester?
Signed verification sheet

10/23	Cam Project Designing cams Shafts	EX15-1- Due 10/30 (No animation required)
10/30	Tolerances and fits	EX8-2, EX8-17, EX8-26 (linear tolerances) Class handout Due 11/6 Manufacture the cam ASAP
11/6	Geometric tolerances	EX8-40, EX8-28 EX8-30(geometric tolerances) Class handout Due 11/13
11/13	Bearings and shafts Large Assembly drawing – Due12/4	Class handouts
11/20	No Lecture	Work on large assembly drawing

12/4	No Lecture Cam performance test; up to 4:00PM 12/8
12/11	**Quiz 2**
12/12	**Cam report due by at 5:00PM**

Cam Report Requirements

Title page: see sample title page in lab
3D isometric assembly drawing, include assembly numbers
Parts list (BOM), include a materials column
Displacement diagrams, include dimensions
3D cam drawing
Gear calculations: start with the motor's estimated speed
and show how the final speed was obtained.

Motor Tester Design Project

AM-311

OBJECTIVE:
Design and build a dynamometer that can be used to measure the power generated by a small DC motor.

REQUIREMENTS:
1. A working prototype
2. A complete set of drawings defining the Dynamometer.
3. A RPM vs. Load (weight) curve (specify the motor).

PARAMETERS:
1. Any DC motor may be used.
2. Lego, Etech, Erector, etc. sets may be used for parts.

VERIFICATION SHEET:
Each team must bring their prototype to the CAD Lab for verification.
Any TA can sign the verification sheet.
Power must be applied to the dynamometer and is must lift an amount of weight.

Motor Tester Verification Sheet

Team Members:

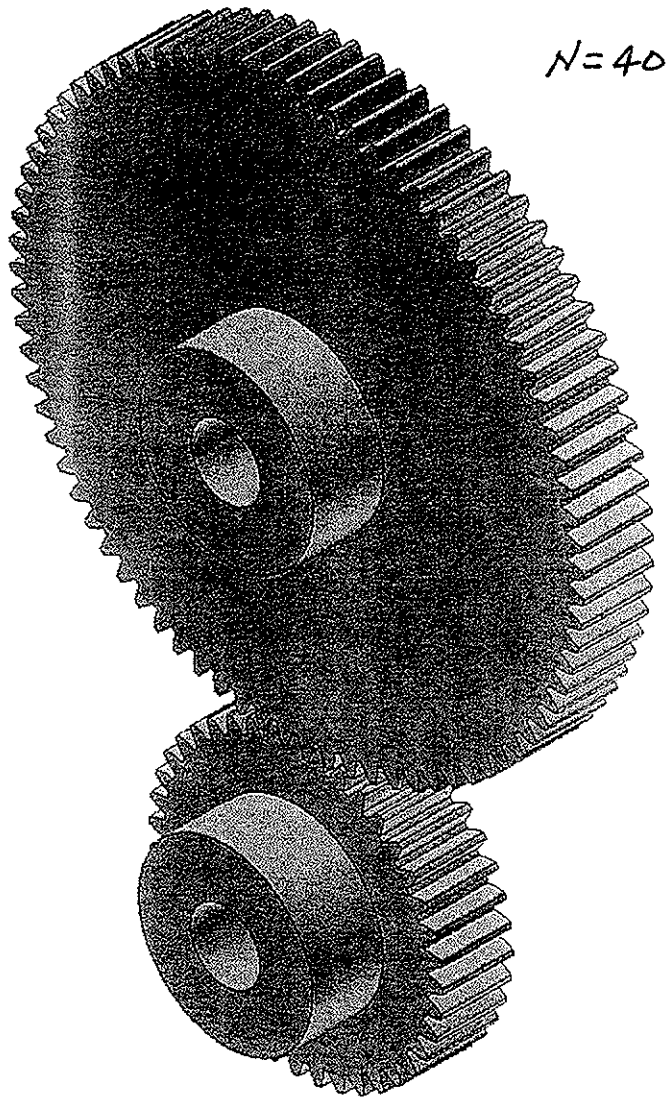
_____

_____

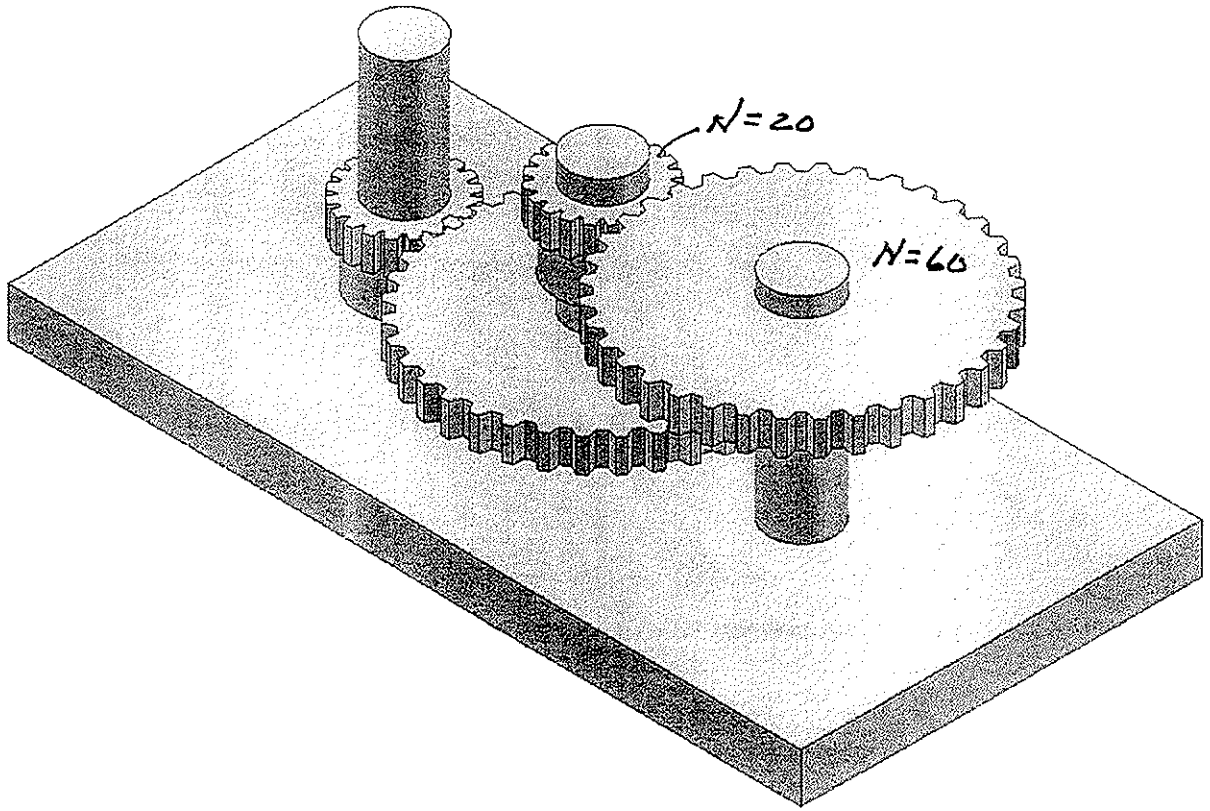
_____

I verify that the above team has presented a motor tester to me. Power was applied and the tester operated.

TA:_____

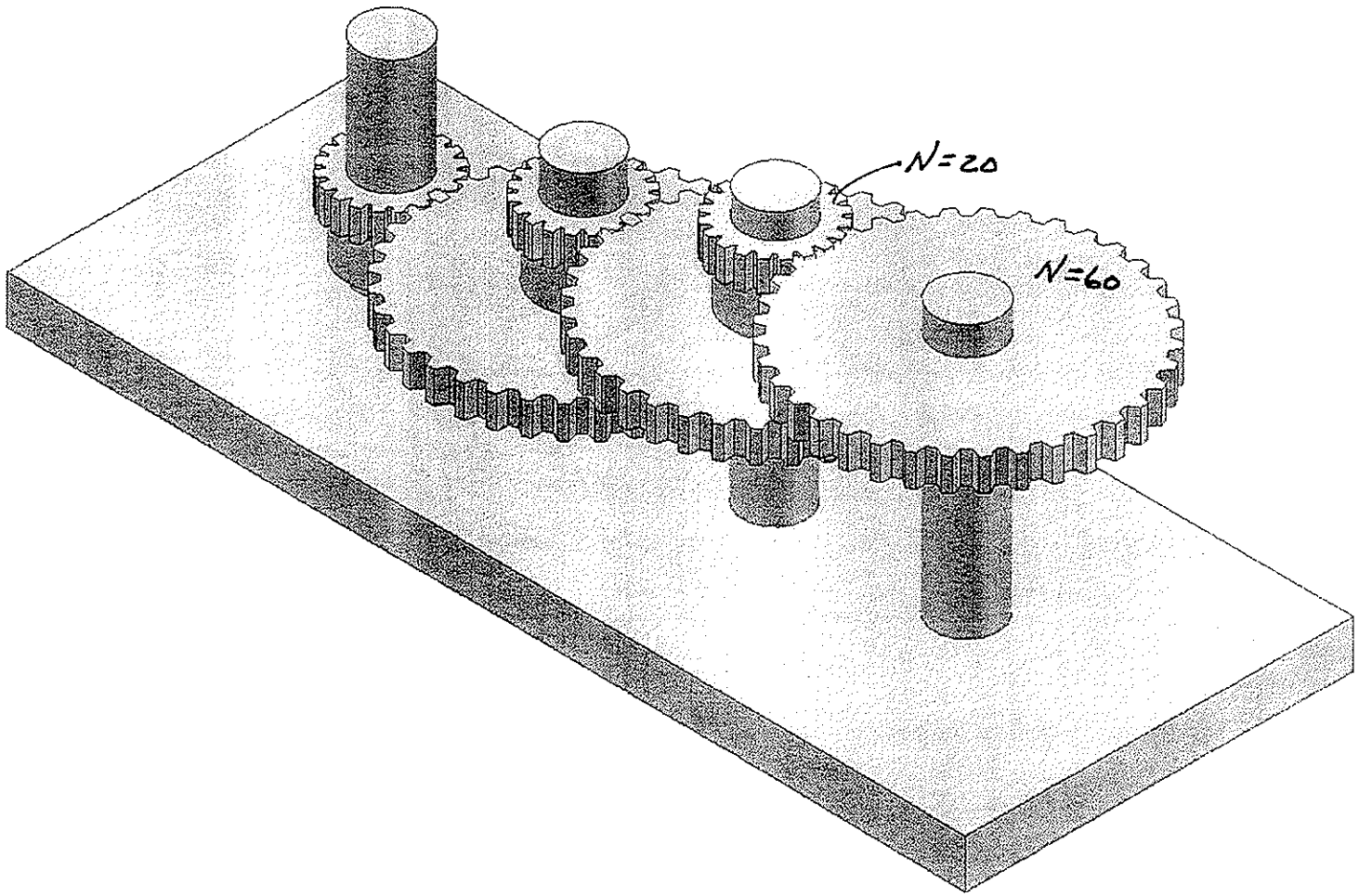

N=40
N=20

INPUT SPEED = 1750 RPM



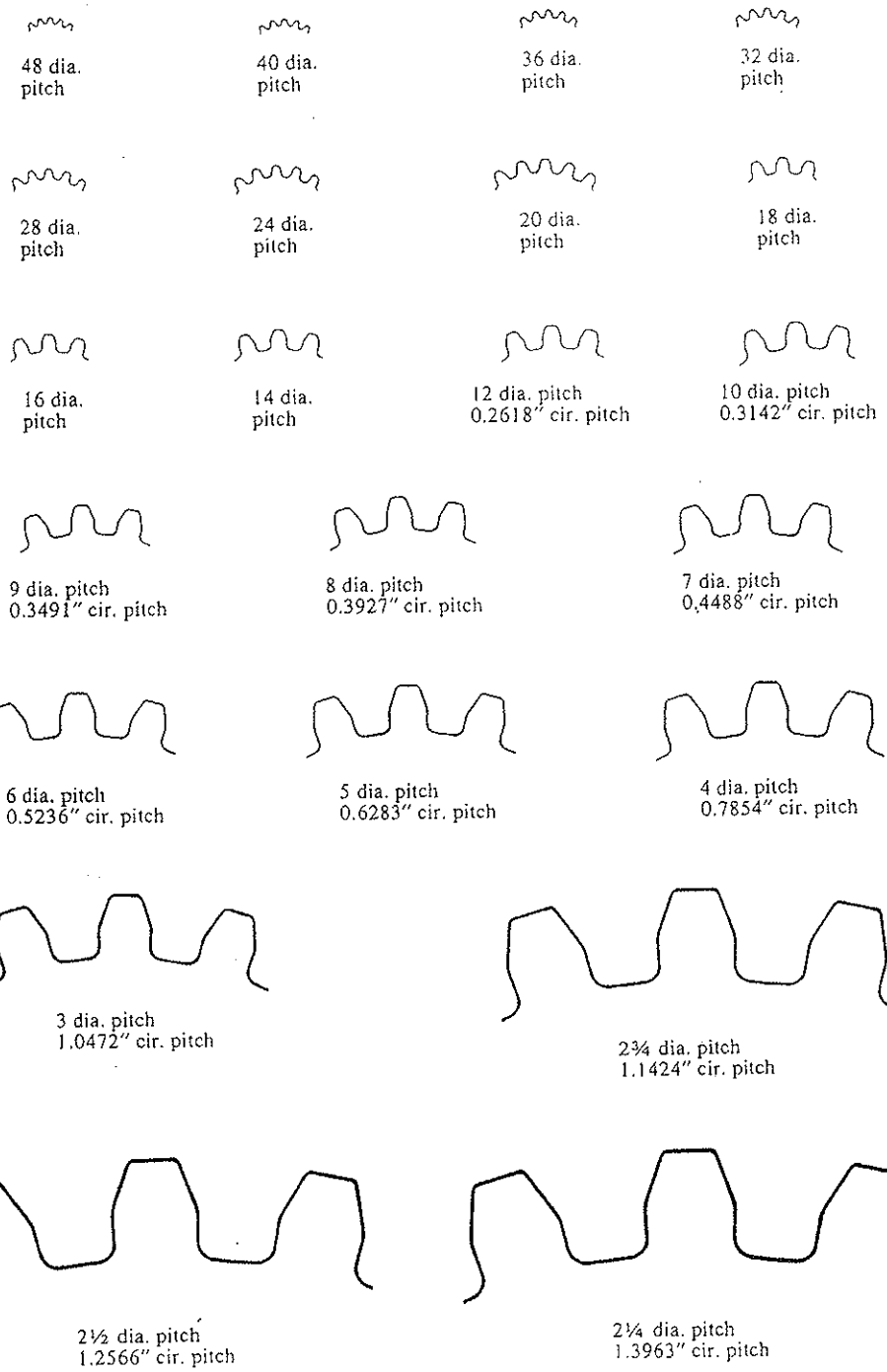
OUTPUT SPEED = _____

INPUT SPEED 800RPM



OUTPUT SPEED ? _____

GEAR PITCH



ENGLISH UNITS

FIGURE 7.4 Size of gear teeth of various diametral pitches *(Courtesy of the Tool Steel Gear and Pinion Company, Cincinnati, Ohio)*

METRIC UNITS

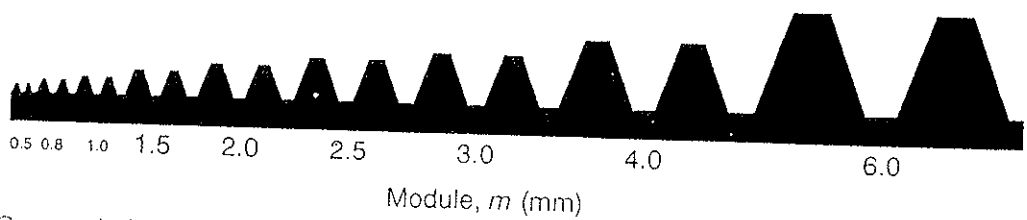


Fig. 4.11 Gear tooth size as a function of the module.