Bangladesh University of Engineering and Technology

Course Number: **IPE 432**

Course Title: Machine Tools Sessional

Experiment Number: **5**

Name of the experiment(s): **Study and Operations of Gear Shaper**

Date of Performance: 22.05.21

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SUBMITTED BY:

Student Name: Akib Abdullah Khan

Student ID: 1610170

Department: ME

Section: C_{24}

Department of Industrial and Production Engineering (IPE), BUET

IPE 432 (Machine Tools Sessional)

Experiment No.:05 (Study and Operation of Gear Shaper)

Student No.: 1610170 Name: Akib Abdullah Khan

Group No.: C24 Date of Submission: 22/05/21

Note: When answering the following questions, consider the Gear Shaper studied in this experiment.

1. Write down the following specifications of the machine studied.
   a) Maximum diameter of gear cut, mm: 350 mm
   b) Maximum face-width, mm: 120 mm
   c) Maximum Module: 3 mm
   d) Nominal diameter of gear shaper cutter, mm: 104 mm
   e) Number of cutter double strokes per min: 125
   f) Feed rate per double stroke, mm:
      (i) Circular: 0.17 mm
      (ii) Radial: 0.048 mm
   g) Main drive motor power, kW: 2.8 KW

2. Perform the following calculations.
   a) Find the value of L for the given value of B for setting the length of the cutter stroke.
   b)

B (mm)	A (mm)	L (mm)
40	20	60

b) For setting up the rotary feed change gears:

Dc (mm)	S (mm/stroke)	a	b
104	0.17	34	55

c) For setting up the in feed change gear:

In feed (mm/stroke)	a	b
0.048	40	40

d) For setting up the index change gears:

z	Ze	A	B	C	D
60	50	96	30	50	80

3. Label the schematic diagram of the gear shaper shown in Figure 1.

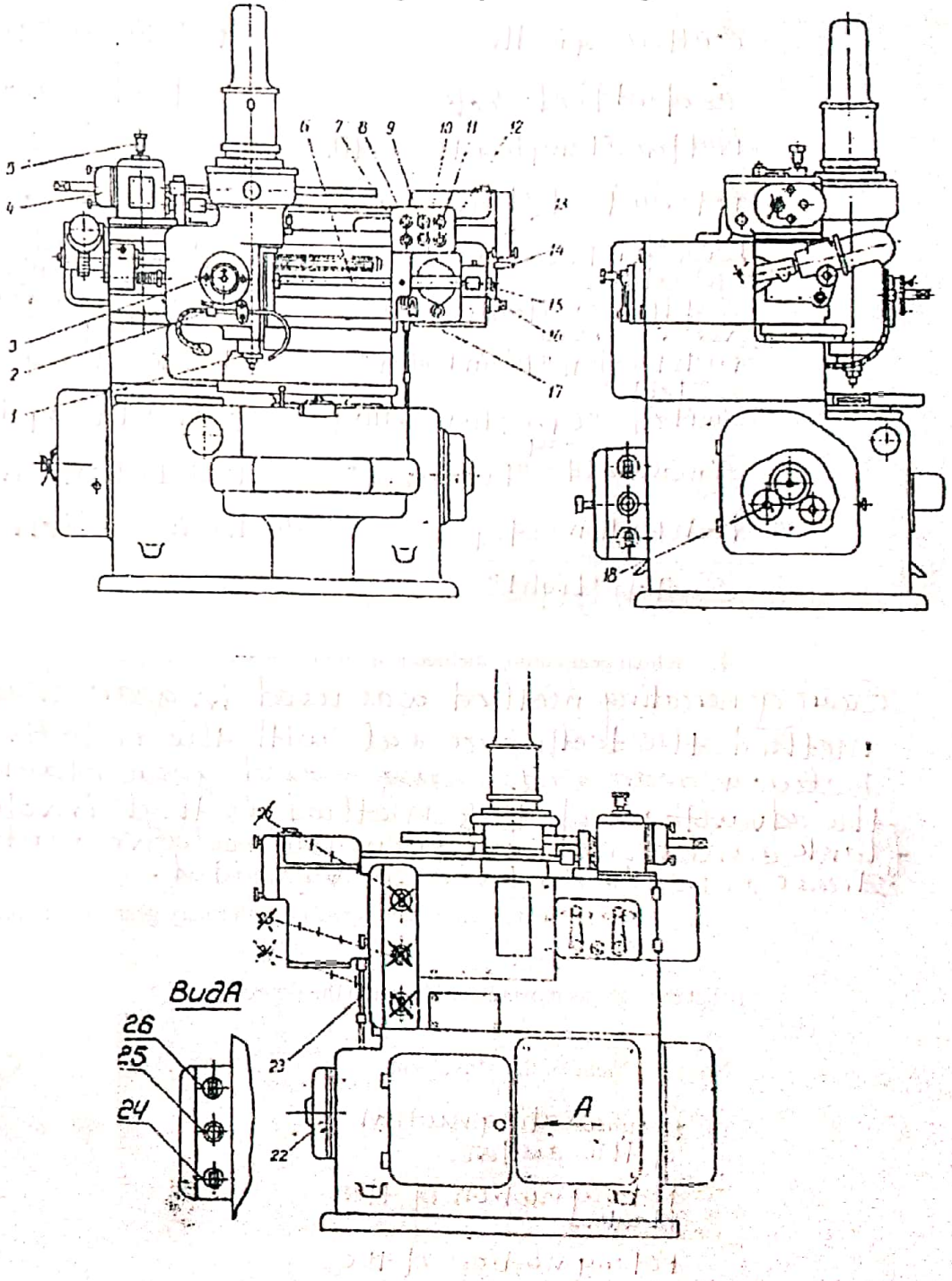

Figure 1

No.	Name ofthe component	No.	Name of the component
1.	Cutter Spindle	12.	Push Button "Inching"
2.	Coolant Feed Cock	13.	In Feed Change Gear
3.	Nut for Clamping the saddle	14.	In feed Clutch Lever
4.	Rotary Feed Change Gear	15.	Limit Switch
5.	Lever for Reversing the Machine	16.	Square Shank for Manual Rotation of infeed Cam
6.	Saddle Longitudinal Transverse Screw	17.	Strap for Engaging Line Counting
7.	Push Button "Main Button" & "Table"	18.	Index Change Gear
8.	Switch - "Operation-Setting -up"	24.	Coolant Pump Rotary Switch
9.	Signal Light - "Energized"	25.	Push Button "inching"
10.	Push Button "Stop"	26.	Main Switch
11.	Switch "Light"		

4. Which gear cutting method is used in gear shaper? Explain.

Gear generating method was used in gear shaper. In this method, the teeth are cut with the relative motion between gear cutter and gear blank. One of the advantages of this method is that involuted gear flank can be produced from the relative motion, thus stress concentrations are avoided.

5. A schematic diagram of cutting gears with rotary gear shaper cutter is shown in Figure 2.

Label the various movements shown in the figure.

No.	Name of the Movement
1.	Reciprocating motion of the cutter
11.	Rotary motion of the blank
111.	Rotary motion of the cutter
IV.	Withdrawal motion of the blank
V.	Radial infeed motion of the cutter

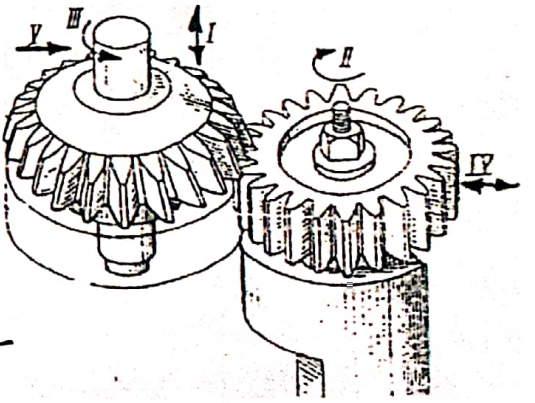

Figure 2

6. Draw the kinematic diagrams of the different movements identified in question no. 5.

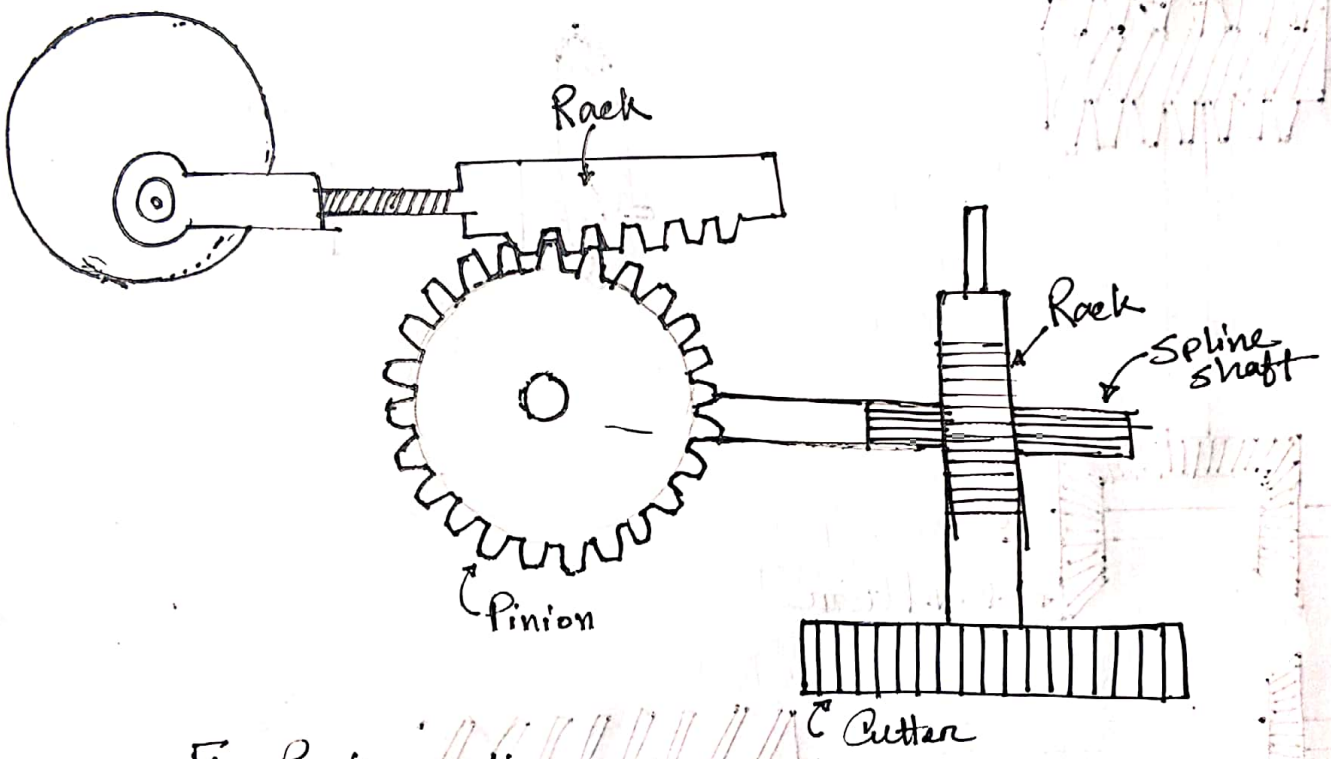

Fig: Reciprocating motion of the cutter.

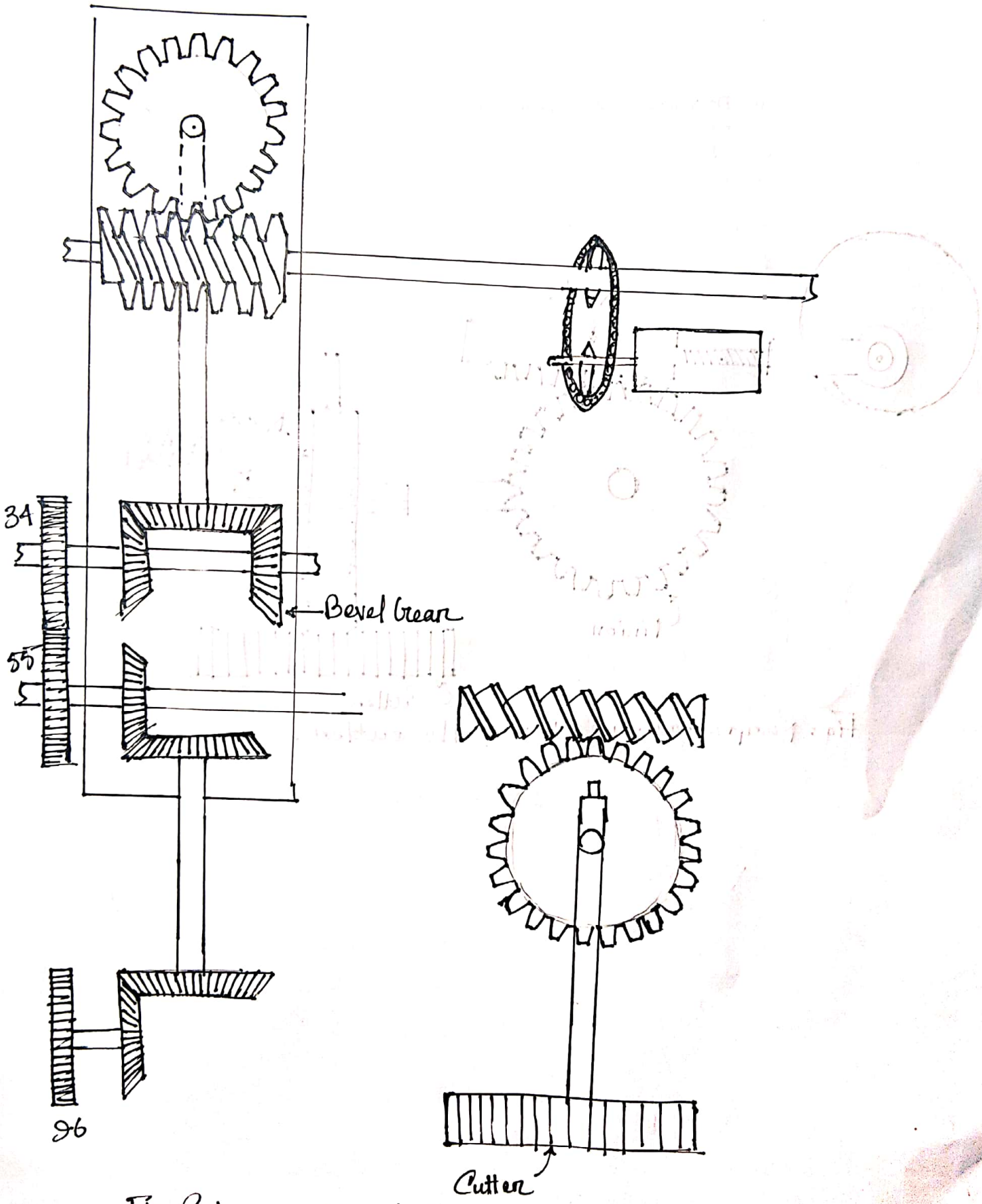

Fig: Rotary motion of the cutter

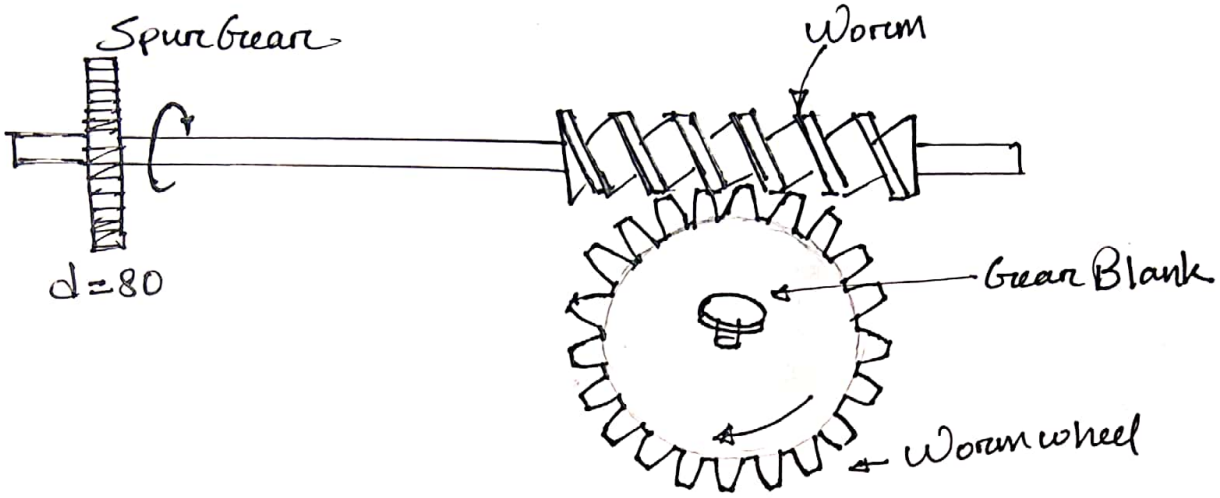

Fig: Rotary motion of the blank.