College of Technological Studies **Dept. of Mech. Prod. Tech.**

Production Technology (MEP232) **Exercise Sheet for Milling Operations**

Milling Sheet: Model (1)

Student Name:

Problem

Cutter	Workpiece	Operation & Cutting Conditions
• Coated Carbide Inserts. • Cutter Diameter (Dc)=100 mm. • Teeth (inserts) Number (Z) = 20. • Cutter width (b) = 50 mm.	• Hard Alloy Steel with Dimension (600×500×200) mm. • Removed thickness (h) = 13 mm. • Specific Energy (Ks):2000 kp/cm2	• Type: Four Slots using single cutter. • Cutting Speed (Vc): 50 m/min. • Feed (fr) = 1.5 mm/rev.

Milling Sheet: Model (2)

Student Name:

Problem

• **Cutter**	•	• **Conditions**
• Coated Carbide Inserts • Cutter Diameter (Dc)=150 mm. • Teeth (inserts) Number (Z) = 30. • Cutter width (b) = 10 mm.	• Hard Alloy Steel • Removed thickness (h) = 13 mm. • Specific Energy (Ks):2000 kp/cm2	• 20 slots on a cylindrical rod. • Cutting Speed (Vc): 50 m/min. • Feed = 0.2 mm/tooth

Milling Sheet: Model (3)

Student Name:

Problem

• **Cutter**	•	• **Conditions**
• Coated Carbide Inserts (lovejoy) • Cutter Diameter (Dc)=150 mm. • Teeth (inserts) Number (Z) = 30. • Cutter width (b) = 30 mm.	• Hard Alloy Steel • Removed thickness (h) = 13 mm. • Specific Energy (Ks):2000 kp/cm2	• 3 slots using gang milling. • Cutting Speed (Vc): 50 m/min. • Feed = 25 mm/min.

Milling Sheet: Model (4)

Student Name:

Problem

• **Cutter**	•	• **Conditions**
• Coated Carbide Inserts (lovejoy) • Cutter Diameter (Dc)=100 mm. • Teeth (inserts) Number (Z) = 20. • Cutter width (b) = 40 mm.	• Hard Alloy Steel with dimension (600×300×200) mm. • Removed thickness (h) = 13 mm. • Specific Energy (Ks):2000 kp/cm2	• Type: Slab milling • Cutting Speed (Vc): 50 m/min. • Feed = 0.12 mm/tooth.

Part (A) Operation Sketch

Part (B) Machining Time

Rough Machining Time (Tr) =

Finish machining Time (Tf)=

Machining Time (T) =

Total Machining Time (Ttot) =

Part (C) Cutting Forces and Power

Main Cutting Fo rce Ft =

Ac =

ϕs =

Total Main Cutting Fo rce = Ft × Zs =

Zs =

Radial Force Component (Fr) =

Axial Force Component (Fa)=

Consumed Motor Power (P) = Total Ft × *Cutting Speed (Vc)*

= × = *kw*

Arbor Torque (Mt) = *Total Ft* × *Dc/2*

= × = *kp.m*

Part (D) Load Curve

Surface signature			
Recommendation	**Z=**	**Dc=**	**Dr=**