MECHANICAL DEPT. JECRC JAIPUR

ASSIGNMENT -1

MANUFACTURING TECHNOLOGY

UNIT 1

CO1- To characterize various metal removal tool & the forces acting during machining.

Q1. Justify "Machining is a value addition process".

Q2. Why even a battery operated pencil sharpener cannot be accepted as a machine tool?

Q3. Differentiate between Orthogonal & Oblique Cutting.

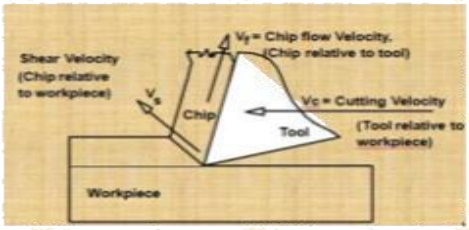
Q4. Derive the Expression for Shear angle with the help of Merchant circle diagram.

Q5. In Orthogonal cutting of steel with 10® rake tool with a depth of cut of 2mm& feed rate 0.20mm/rev. The cutting speed is 200m/min, chip thickness ratio is .31, vertical cutting force is 1200N & horizontal force is 650 N. Calculate from Merchants theory various work done in metal cutting & shear stress.

Problem 6. A seemless tube 32 mm outer diameter is turned on the lathe. The cutting velocity of tool relative to workpiece is 10m/min. Rake angle 35 degrees, depth of cut 0.125 mm, length of chip 60 mm. Horizontal cutting force of the tool on workpiece is 200 N. Vertical cutting force required to hold the tool against work is 80 N. Calculate

1. Coefficient of friction
2. Chip thickness ratio
3. Shear plane angle
4. Velocity of chip relative to tool
5. Velocity of chip relative to workpiece

V_c=10 m/min α =35^0 L2 = 60mm



Q7.Elaborate the types of chips formed during machining.

Q8. With neat diagram show the angles in single point cutting tool.

Q9. What are the thermal aspects of machining.

Q10. Justify the role of different types of cutting tool.

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Assignment Unit-2

CO2-To analyze tool life & its properties

Q1. Define Crater Wear & Flank Wear.

Q2. Discuss various forms of wear found in cutting tools? Show with neat sketch.

Q3. Define Machinability Rating along with the factors affecting machinability.

Q4. Describe the role of cutting fluids in machining & how they are selected.

Q5.Discuss the concept of Tool Life.

Q6.Discuss the factors affecting Tool Life.

Q7.Compare the tool life of two cutting tools (HSS and carbide) at a speed of 30 m/min. The tool life is 130 min. The tool life equation for HSS tool is given by VT1/7 = C1 and for carbide VT1/5 = C2 at a cutting speed of 24 m/min.

Q8. Discuss the "Economics of Machining".

Q9.In Taylor's tool life constants for a given operation are specified as n=0.5 & C = 400, what is the percentage increase in tool life when the cutting speed is reduced by half?

Q10.Determine the percentage change in cutting speed required to give 50% reduction in tool life (i.e., to reduce tool life to 1/5 of its previous value). Take n = 0.2.

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Assignment Unit-3

CO3 To identify various machining tool including special purpose machine tool.

1. A mild steel bar 100 mm long and 38 mm in diameter is turned to 35 mm dia. And was again turned to a diameter of 32 mm over a length of 40 mm as shown in the Fig. 5.23. The bar was machined at both the ends to give a chamfer of 45°× 5 mm after facing. Calculate the machining time. Assume cutting speed of 60 m/min and feed 0.4 mm/rev. The depth of cut is not to exceed 3 mm in any operation.
2. 2.Find the time required to drill 4 holes in a cast iron flange each of 2 cm depth, if the hole diameter is 2 cm. Assume cutting speed as 21.9 m/min. and feed as 0.02 cm/rev.
3. A keyway has to be cut in spindle whose dimensions are 40 cm long 4 cm diameter with a 1 cm width. The cutter diameter is 10 cm. If the cutter is revolving at 120 rpm, what time will be required to cut one cm deep keyway at a feed of 0.05 cm/rev of cutter?
4. A 20 × 5 cm CI surface is to be faced on a milling m/c with a cutter having a diameter of 10 cm and having 16 tooth for the cutting speed and feed are 50 m/min and 5 cm/min respectively, determine the milling time, rpm, and feed/tooth.
5. A T-slot is to be cut in a C.I. slab as shown in Fig. Estimate the machining time. Take cutting speed 25 m/min, feed is 0.25 mm/rev. Dia of cutter for channel milling is 80 mm.
6. Calculate the machining time required to produce one piece of the component shown in Fig. given below starting from f 25 mm bar. The following data is available.
7. Calculate the machining time to drill four 8 mm dia holes and one 40 mm dia central hole in the flange shown in Fig. 20 mm dia hole is drilled first and then enlarged to 40 mm f hole. Take cutting speed 10 m/min, feed for 8 mm drill 0.1 mm/rev, for 20 mm drill feed is 0.2 mm/rev. and for 40 mm f drill feed is 0.4 mm/rev.
8. Find the time required on a shaper to machine a plate 600 mm × 1,200 mm, if the cutting speed is 15 meters/min. The ratio of return stroke time to cutting time is 2 : 3. The clearance at each end is 25 mm along the length and 15 mm on width. Two cuts are required, one roughing cut with cross feed of 2 mm per stroke and one finishing cut with feed of 1 mm per stroke.

9. Differentiate between capstan & turret lathe.
10. With neat sketch explain gear hobbing.

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Assignment Unit-4

CO4- To classify types of Grinding, Finishing & High Velocity Forming processes.

1. Does Polishing improve machining accuracy? Explain.
2. With the help of neat diagram, explain super finishing process.
3. Discuss the types of abrasives used in grinding.
4. How is grinding different from other machining operations? Explain its applications in view of its capabilities.
5. Differentiate between dressing & truing along with their definitions.
6. What is the marking system followed in case of grinding wheels?
7. Mention various types of bonds used in making of grinding wheels.
8. What are the advantages & limitations of using centre less grinding?
9. Specify honing parameters to be considered for good honing practice.
10. What are the various abrasive machining operations you are familiar with? Explain their applications & limitations.

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Assignment Unit-5

CO4- To classify types of Grinding, Finishing & High Velocity Forming processes.

Q1. Discuss the High Velocity Forming with suitable example.

Q2. Illuminate the advantages of HVF.

Q3. Compare the High Velocity Forming with Conventional Forming.

Q4.Explain the Explosive forming (Unconfined type or Stand off technique) in detail.

Q5Explain the Explosive forming (Confined type or Contact technique) in detail.

Q6.Explain the Electro-hydraulic forming in detail.

Q7.Explain the Hydraulic forming in detail.

Q8.Discuss the various methods by which high energy rate forming is done.

Q9. Explain the Electromagnetic forming in detail.

Q10. Discuss the limitations of Electromagnetic forming.