

5. Please select a material for a cutting die! The die is subjected to pressure and bending, Required surface hardness 60 HRc. The tool cuts washer rings from a 10 mm thick sheet. The tool is subjected to quasi-static mechanical stress and is produced in small series. 5.1 What is the purpose of a cutting die? (2 points) 5.2 What are the main loads? (2 points) 5.3 Which material group do you select and why? (2 points) 5.4 Which specific material grade(s) do you recommend? (2 points) 5.5 Please sketch the temperature (T) - time (t) diagram of the proposed heat treatment. (5 points) 5.6 Please outline the manufacturing process of the part. (2 points) Choice of materials: C45U, C70U, C80U, C90U, C105U, C120U, 105V, 50WCrV8, 60WCrV8, 102Cr6, 21MnCr5, 70MnMoCr8, 90MnCrV8, 95MnWCr5, X100CrMoV5, X153CrMoV12, X210CM2, X210CrW12, 35CrMo7, 40CrMnNiMo8-6-4, 45NiCrMo16, X40Cr14, X38CrMo16-9; 55NiCrMoV7, 32CrMoV12-28, X37CrMoV5-1, X38CrMoV5-3, X40CrMoV5-1, 50CrMoV13-15, X30WCrV9-3, X35CWMoV5, 38CrCoWV18-17-17;HS10-4-1, HS18-0-1, HS3-3-2, HS6-5-3-8, HS10-4-3-10.		Name:	Neptun code:
		1. General questions. Answer the following questions in a couple of sentences each.	
		1.1 Please write down the reaction equation for the direct reaction in a blast furnace. (4 points)	
		1.2 What is the through hardening diameter? (4 points)	
		1.3 Please interpret the material designation S 355 K2 ! (4 points)	
		1.4 Please list the tool steel groups you know (4 points)	
		1.5 Please describe the case hardening steels (main alloys, expected properties, applications) (4 points)	
		1.6 Please describe the austenitic stainless steels (main alloys, expected properties, applications) (4 points)	
		1.7 Please interpret the cast iron designation Grade 60-40-18 . (4 points)	
		1.8 Please interpret the material designation Al6061 ! (4 points)	
		1.9 Please briefly describe what is the function of the runner during sand moulding (4 points)	
		1. 10 Please list the main steps of investment (precision) casting . (4 points)	
Σ			Σ

