

機械與機電博士班資格考試題庫

科目：機械製造

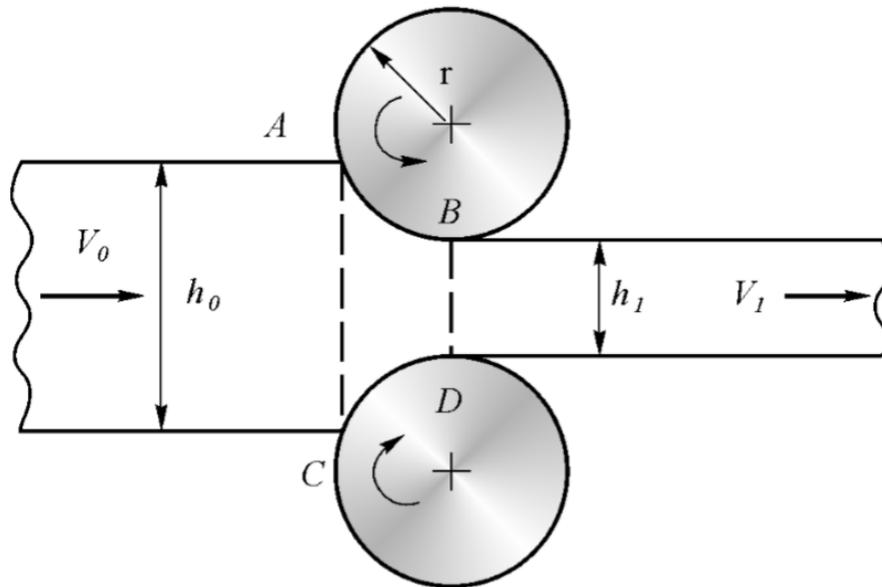
參考書籍：Introduction to MANUFACTURING PROCESSES by Mikell P. Groover

命題範圍：

1. 材料與屬性
 2. 固化製程
 3. 金屬與陶瓷
 4. 金屬成形與板金
 5. 材料移除程序
 6. 材料屬性強化與表面處理
 7. …等
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1. Explain the processing steps and uses of metal injection molding will be described?
 2. Explain the principle, advantages and disadvantages of electrical discharge machining?
 3. Explain the effects of hot forging, cold forging and warm forging on the shape and material properties of the product?
 4. Describe the meaning of Intelligent Manufacturing Systems?
 5. What is the Virtual Manufacturing Technology (VMT)?
 6. What are the factors affecting the product size of injection molding?
 7. Explain the main construction and transmission steps of the indexing head?
 8. What is the principle of punching shear processing? What kinds are there?
 9. What is the Electrochemical machining (ECM)? What are the processing steps of ECM? What are the advantages and disadvantages of ECM?
 10. What is the purpose of case hardening? Explain the processing steps of case hardening?

11. Explain the processes and applications of plastic injection molding?

12. Please draw and explain the principles of flat rolling processing?



13. A tensile test uses a test specimen that has a gage length of 50 mm and an area = 200 mm². During the test the specimen yields under a load of 98,000 N. The corresponding gage length = 50.23 mm. This is the 0.2 percent yield point. The maximum load of 168,000 N is reached at a gage length = 64.2 mm. Determine (a) yield strength, (b) modulus of elasticity, and (c) tensile strength. (d) If fracture occurs at a gage length of 67.3 mm, determine the percent elongation. (e) If the specimen necked to an area = 92 mm², determine the percent reduction in area.

14. A steel tensile specimen with starting gage length = 2.0 in and cross-sectional area = 0.5 in² reaches a maximum load of 37,000 lb. Its elongation at this point is 24%. Determine the true stress and true strain at this maximum load.

15. What properties determine the quality of a sand mold for sand casting?

16. Describe how a piece of glass is heat treated to produce tempered glass?

17. Discuss some of the defects that can occur in plastic injection molding?

18. What are the principal methods used to produce metallic powders?

19. What is the technical difference between blending and mixing in powder metallurgy?

20. In a tensile test, two pairs of values of stress and strain were measured for the specimen metal after it had yielded: (1) true stress = 217 MPa and true strain = 0.35, and (2) true stress = 259 MPa and true strain = 0.68. Based on these data points, determine the strength coefficient and strain-hardening exponent.
21. Distinguish between direct and indirect extrusion?
22. Identify the three basic types of sheet metalworking operations?
23. Name and briefly describe the four types of chips that occur in metal cutting?
24. What are the three mechanisms of grinding wheel wear?