

**PRINCE OF SONGKLA UNIVERSITY  
FACULTY OF ENGINEERING**

**Final Examination : Semester II**

**Academic year : 2006**

**Date : February 19, 2007**

**Time : 13.30-16.30**

**Subject : 226-306 Tools Engineering**

**Room : R 300**

ทฤษฎีในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น  
และพักการเรียน 1 ภาคการศึกษา

**Instruction :**

- Answer all questions in the answer book.
- All notes, books and calculators are not allowed.
- Total score is 100 (45%).

**Questions:**

1. What is necessary to establish complete location of a workpiece whose configuration is formed by flat planes? ( 3 marks )
2. What is one of the shortcomings of V location? ( 3 marks )
3. How is unevenness compensated for when locating against an irregular surface with more than three locating points? ( 3 marks )
4. What are diamond pins, and how are they used? ( 3 marks )
5. What are the four essential requirements of clamps and clamping devices? ( 3 marks )
6. What is a spherical washer, and when is it used? ( 3 marks )
7. Explain the principle of a simple toggle clamp. ( 3 marks )

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8. What is the difference between template jig and plate jig? ( 3 marks )
9. How should jig feet be placed in relation to the drill bushings?  
( 3 marks )
10. What methods are used when two or more holes are so close together that it is impossible to have an individual standard bushing for each hole in the workpiece? ( 3 marks )
11. Why are keys mounted to the base of mill fixtures? ( 3 marks )
12. How can the accuracy of contact between bearing surfaces of the mill fixture and the workpiece resting upon it be checked? ( 3 marks )
13. Why is it necessary for the rear pilot of a double-piloted boring bar to be larger than the sweep of the cutter? ( 3 marks )
14. What precautions should be taken when designing external broaching fixtures? ( 3 marks )
15. What is the advantage of using a rocking jaw on a three-saw chuck? ( 3 marks )
16. Explain the principle of an expanding mandrel. ( 3 marks )
17. What is meant by a single-, two-, or four-point suspension of a press? ( 3 marks )
18. What effect does the bolster plate have on the shut height of a press? ( 3 marks )
19. Describe the characteristic appearance of edges of parts produced by piercing and blanking. ( 3 marks )
20. What is the result of insufficient die clearance? ( 3 marks )

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21. Is the die clearance placed on the punch or die opening for a piercing operation? Why? ( 3 marks )
22. What is the major advantage of the inverted die? ( 3 marks )
23. Why should dowels be located diagonally across from each other and as far apart as possible? ( 3 marks )
24. What is meant by slug pulling? ( 3 marks )
25. What is meant by foolproofing a die block? ( 2 marks )
26. What is a misfeed detector? ( 2 marks )
27. What is the purpose of the primary stop (sometimes called starting stop)? ( 2 marks )
28. What are the major considerations when positioning blanks on the stock strip? ( 2 marks )

(Design problems next page.)

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29. Design a jig to drill all the holes in the workpiece shown in fig. I. Assume that all surfaces have been previously machined. ( 10 marks )
30. Design a milling fixture to mill the 1.625 -in.slot of the workpiece shown in fig. I. Assume that the holes and all surfaces have been previously machined. ( 10 marks )

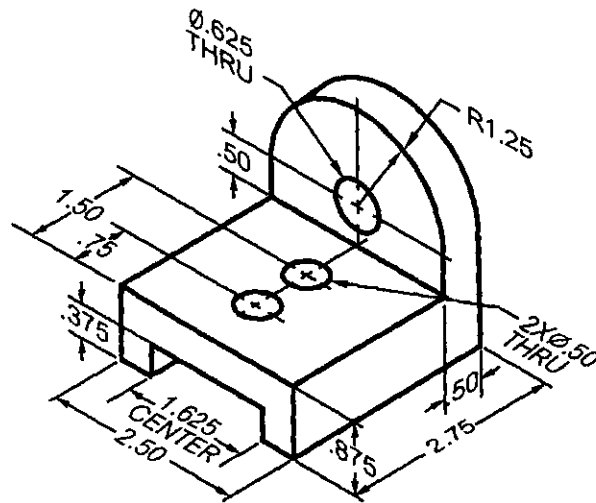


Fig. I.

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Pichit Pitsuwan  
February, 2007.