

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination : Semester 2

Academic year : 2003

Date : December 24, 2003.

Time : 13.30-16.30

Subject : 226-306 Tools Engineering

Room : A 400

Instruction :

- Answer all questions in the answer book.
- Dictionary and a calculator with programming capability are allowed.
- All notes and books are not allowed.
- Total mark is 100 (40%).

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1. Explain the progressive formation of a metal chip during a machining operation.
(4 marks)
 2. Why do positive rake angles have greater cutting efficiency from the standpoint of power requirements and cutting forces?
(3 marks)
 3. How does the process of chip formation contribute to vibration, or chatter, of the cutting tool?
(3 marks)
 4. What causes the BUE chip?
(3 marks)
 5. Sketch a high speed steel single-point cutting tool with the following tool signature 7-20-7-7-10-15-1/8.
(6 marks)
 6. Why does the pressed-in chip breaker produce acceptable chips over a wide range of materials, feeds, speeds, and depths of cut?
(3 marks)
 7. When is it advantageous to set the boring bar above the centerline of the work piece? Why?
(3 marks)

8. What is the major advantage of a form-relief cutter? (3 marks)
9. When selecting a milling cutter, why is it important to keep the cutter diameter as small as possible? (3 marks)
10. What is the advantage of eccentric relief on small milling cutters? (3 marks)
11. Why is it preferable to use face-milling cutters with a chamfer sufficiently wide for cutting to be confined to the cutting edge along the chamfer when face-milling a plane surface? (3 marks)
12. When is it necessary to grind a radial taper on a milling cutter? (3 marks)
13. How is it possible for a drill to unwind during a drilling operation? How is this tendency reduced? (3 marks)
14. What is the advantage of high-helix drills? Low-helix drills? (3 marks)
15. How is the effective rake angle changed on a standard drill when the drill geometry is fixed by the manufacturer? (3 marks)
16. What causes chipped cutting lips (along the entire length) during drilling? (3 marks)
17. Why is reaming speed slower than drilling speed? (3 marks)
18. What is the major difference between a hand and machine reamer? (3 marks)
19. When should reamers with a left-hand spiral be used? (3 marks)
20. What is probable the major problem encountered in reaming operations?(3 marks)
21. Why does tap breakage sometimes occur when tap is reversed? (3 marks)

- 22. What determines the thread height of the thread in a tapped hole? (3 marks)
- 23. What is the difference between ring gages and receiving gages? (3 marks)
- 24. What is pin gages, and how are they used? (3 marks)
- 25. What are optical flats, and how are they used? (3 marks)
- 26. How is the dimensional stability of carbon steels and alloy steels used in gage manufacture increased? (3 marks)
- 27. Explain the principle of the reed movement. (3 marks)
- 28. Why does gaging-head wear not affect the accuracy of pneumatic gaging? (3 marks)
- 29. A taper is being checked with a 10-in. sine bar. The perpendicular distance is 4.132 in. what is the angle? (4 marks)
- 30. Select the necessary gage blocks to check dimension of 2.5136 in. (4 marks)
- 31. A ring gage is designed to check a hole dimension of 1.5 ± 0.001 in. Using the rule 10 to 1, and unilateral tolerance. What should be the dimension of the go and not go gages? (4 marks)

Pichit Pitsuwan
December , 2003.