

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination : Semester II
Date : December 17, 2005.
Subject : 226-306 Tools Engineering

Academic year : 2005
Time : 9.00-12.00
Room : ห้องหัวหุ่น


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 (35%).

Questions:

1. Explain the progressive formation of a metal chip during a machining operation. (5marks)
2. Name and describe the three basic types of chips? (5 marks)
3. Why does a BUE chip produce a poor surface finish? (3 marks)
4. Name the design and machining practices that help to reduce the built-up edge on the BUE chip? (3 marks)
5. Define the following elements of a single-point tool: (a) side cutting-edge angle, (b) end cutting-edge angle, (c) side relief angle, (d) end relief angle, (e) side rake angle, and (f) back rake angle. (8 marks)
6. Why are negative rake angles necessary when taking interrupted cuts with carbide tools? (3 marks)

7. What problems are encountered when carbide is brazed to steel?
(3 marks)
8. What is the major advantage of negative-rake inserts used in throwaway insert-type tools?
(3 marks)
9. What is the purpose of the carbide seat provided to support the throwaway insert?
(3 marks)
10. What provisions are made for adjustment of mechanical chip breakers to meet the demands of different cutting conditions?
(3 marks)
11. What are stub boring bars? How are they used?
(3 marks)
12. Sketch a boring bar showing the methods of fastening and adjusting the cutter.
(3 marks)
13. What are the functions of the lead angle of a boring tool?
(3 marks)
14. What is an interlocking side milling cutter?
(3 marks)
15. What is a staggered-tooth milling cutter?
(3 marks)
16. When selecting a milling cutter, why is it important to keep the cutter diameter as small as possible?
(3 marks)
17. When is a right-hand cut and left-hand helix milling cutter used? Why?
(3 marks)
18. Why may the relief on side cutting edge be less than that on peripheral cutting edge of a milling cutter?
(3 marks)
19. Which teeth on milling cutters are often sharpened with radial taper?
(3 marks)
20. What is the advantage of eccentric relief on small milling cutters?
(3 marks)
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- (3 marks)
28. Why is reaming speed slower than drilling speed?
(3 marks)
29. When should reamers with a left-hand spiral be used?
(3 marks)
30. What are the major advantages of a spiral-fluted hand tap?
(3 marks)
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21. Why is it preferable to use face-milling cutter with a chamfer sufficiently wide for cutting to be confined to the cutting edge along the chamfer when face-milling a plain surface? (3 marks)
22. Why is chip formation produced in a drilling operation extremely complex? (3 marks)
23. What is the major purpose of the helical flute of a twist drill? (3 marks)
24. How is it possible for a drill to unwind during a drilling operation? How is this tendency reduced? (3 marks)
25. What is the advantage of high-helix drills? Low-helix drills? (4 marks)
26. How is the effective rake angle changed on a standard drill when the drill geometry is fixed by the manufacturer? (3 marks)
27. What should be done to correct for drill failure when the outer corners of the drill have been wiped off during the drilling operation? (3 marks)
28. Why is reaming speed slower than drilling speed? (3 marks)
29. When should reamers with a left-hand spiral be used? (3 marks)
30. What are the major advantages of a spiral-fluted hand tap? (3 marks)

Pichit Pitsuwan
November, 2005.

