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PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination : Semester 1

Academic year : 2004

Date : August 6, 2004.

Time : 09.00-12.00

Subject : 226-301 Machine Tools Technology Room : A401

ทฤษฎีในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น
และพักการเรียน 1 ภาคการศึกษา โทษสูงสุดให้ออก

Instruction :

- Answer all questions in the answer book.
 - A calculator with programming capability are allowed.
 - All notes and books are not allowed.
 - Total mark is 100 (30%).
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1. White short notes on
 - a) Morse taper
 - b) Saddle
 - c) Steady rest
 - d) Follower rest
 - e) Drill holder
 - f) M 14×2
 - g) Knurling tool
 - h) Running center
 - i) Drive plate
 - j) Face plate(10 marks)
2. How does the lathe remove material? (2 marks)
3. What is the function of a lead screw? (2 marks)
4. To remove 1.2 mm from the diameter of a piece being turned on the lathe, find the depth of cut? (2 marks)

5. What types of surfaces can be machined on an engine lathe?
(2 marks)
6. What is the swing of a lathe?
(2 marks)
7. Differentiate between live center and dead center?
(2 marks)
8. What are standard machine tools?
(2 marks)
9. What is the function of a half nut?
(2 marks)
10. What is the quick-change gear box?
(2 marks)
11. Describe the use of a faceplate for machining castings. (2 marks)
12. Describe the precision methods of checking center alignment
on a lathe (3 marks)
13. Given a No.12 Jarno taper, find : (a) the large diameters ; (b) the
small diameters ; (c) the length of the taper. (3 marks)
14. Given a $\frac{5}{8}$ -11 NC thread, find : (a) the best wire size and (b) the
measurement over wires. (3 marks)
15. You are asked to cut 13 thread/in. You set the compound at 29° .
How much is to be cut at 29° ? (3 marks)
16. What is the effect on the rake and relief angles of setting a turning
tool too high above the center line of the work? Too low?
(4 marks)
17. Given a work diameter of 3.5 in., a negative back rake of 13° , an end
relief angle of 7° , and an offset of 0.062 in. above center. Calculate
the effects of this offset on the various angles of the tool bit.
(4 marks)

18. Describe four methods of locating the center of the stock before drilling a center hole. (4 marks)
19. What could be wrong with a lathe that turns a slightly tapered surface instead of a cylinder? Assume the small diameter to be on the headstock end. (4 marks)
20. What is the carriage? What are the components which make up the carriage? What is the purpose of each of the components? (5 marks)
21. A tapered work piece is to be turned. It has an overall length of 10 in. and a tapered section 6 in. long. The tapered section has a small diameter of 0.625 in. and a large diameter of 0.750 in. Find : (a) the taper per in. ; (b) the taper per ft. ; (c) the set over. (5 marks)
22. Describe the universal chuck and an independent chuck. How are they used? How do they differ? (5 marks)
23. Find the gears necessary to cut 2-mm metric thread. The lathe constant is 8, the gear progression is 5, and the gears available are 25, 30, 35, ..., 100 and 127. (5 marks)
24. Find the rpm of lathe spindle to turn a 200 mm diameter piece of mild steel with a (a) high speed tool, (b) carbide tool. Assume a cutting speed of 30 mpm for HSS tool and 80 mpm for carbide. Also determine the time required to take on cut over the stock in both the cases, if the length of the work is 300 mm and the feed used is 0.12 mm per revolution. (6 marks)
25. Given a $\frac{1}{2}$ -12 NC thread, find : (a) the pitch ; (b) the width of the flat ; (c) the depth of the thread ; (d) the minor diameter of the screw ; (e) the tap drill size ; (f) the pitch diameter ; (g) the helix angle. (8 marks)

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26. A 6 teeth 20 mm diameter end milling cutter is to be used to cut a 20 mm slot into a cast-iron block with a feed of 0.12 mm/tooth. If the cutting speed is to be 20 mpm, the depth of the slot to be cut is 5 mm and the length of the work is 200 mm, find : (a) the rpm ; (b) the time for rough machining ; (c) the time for finish machining. (8 marks)

Pichit Pitsuwan
July,2004.