

**PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING**

Midterm Examination : Semester 1

Academic year : 2006

Date : August 3, 2006.

Time : 13.30-16.30

Subject : 226-314 Machine Tools Technology

Room : A 201

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 (40%).

Questions:

1. Trace the distribution of power from the motor to the work and to the tool for turning. (6 marks)
2. What is the carriage? What are the components which make up the carriage? What is the purpose of each of the components? (6 marks)
3. What is the purpose of the feed shaft? The lead screw? What is the essential difference between the two in the manner in which they drive the tool? Explain. (5 marks)
4. Describe the use of a split collet. (5 marks)
5. What are the precautions which should be taken when grinding a tool bit? (4 marks)
6. Describe the preparation of both ends of a piece of work for centering. (4 marks)

7. Describe the procedure for testing a lathe to ensure that it will turn a true cylinder. (4 marks)
8. Describe a universal chuck and an independent chuck. How are they used? How do they differ? (5 marks)
9. A work piece consists of a tapered cylinder and a constant diameter cylinder. (a) How is the taper per ft. calculated? (b) What effect does the constant diameter have on the offset calculation? (5 marks)
10. Define: major diameter, minor diameter, pitch diameter, pitch, and lead of an external thread. (4 marks)
11. What is the basic purpose of a self-opening die head? (3 marks)
12. How does thread milling differ from thread turning? (4 marks)
13. Why has thread rolling become the most commonly used method for making threads? (3 marks)
14. Explain fully the process of setting a lathe for cutting threads. (5 marks)
15. Given a No.18 Jarno taper, find : (a) the large diameters ; (b) the small diameters ; (c) the length of the taper. (3 marks)
16. A tapered 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 0.775 in. and a large diameter of 0.985 in. Find: (a) the taper per in.; (b) the taper per ft.; (c) the set-over; (d) the imaginary large diameter. (6 marks)
17. Given a work diameter of 5.5 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. Given a $\frac{1}{2}$ -22 NF thread, calculate: (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. ($d = 0.6495p, f = p/8$)
(8 marks)
19. Find the gears necessary to cut 32 thread per in. The lathe constant is 8, the gear progression is 5, and the gears available are 25, 30, 35,...,80.
(5 marks)
20. Find the rpm of lathe spindle to turn a 60 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 one 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.
(5 marks)
21. 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.
(6 marks)

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