PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination : Semester 1 **Academic year : 2005**
Date : August 4, 2005. **Time : 13.30-16.30**
Subject : 226-314 Machine Tools Technology **Room : A 201**

ทุจริตในการสอบ 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. What are the basic requirements of a machine tool bed?(5 marks)

2. Determine suitable highest and lowest spindle speeds for the lathe which will accommodate work from 0.5 in. up to 16 in. diameter, assuming a cutting speed of 100 ft. per min.. (6 marks)

3. What is meant by " the swing of a lathe " ? (2 marks)

4. Trace the distribution of power from the motor to the work and to the tool for threading. (6 marks)

5. 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)

6. Differentiate between live center and dead center? (2 marks)

7. What is the purpose of the saddle ? What components are mounted on the saddle? Describe the purpose of each component.(8 marks)

8. What is the quick-change gear box? (2 marks)

9. Describe a universal chuck and an independent chuck. How are they use? How do they differ? (5 marks)

10. Describe the use of a faceplate for machining castings. (3 marks)

11. Describe the procedure for testing a lathe to ensure that it will turn a true cylinder. (4 marks)

12. Given a No.14 Jarno taper, find : (a) the large diameters ; (b) the small diameters ; (c) the length of the taper. (3 marks)

13. 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)

14. A tapered piece is to be turned. It has an overall length of 8 in. and a tapered section 5 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. (8 marks)

15. 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)

16. Given a $\frac{1}{2}$-20 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)

17. Find the gears necessary to cut 36 thread per in. The lathe constant is 9, the gear progression is 5, and the gears available are 25, 30, 35,...,80. (5 marks)

18. Explain fully the process of setting a lathe for cutting threads (5 marks)

19. What is the basic purpose of a self-opening die head? (3 marks)

20. How does thread milling differ from thread turning? (3 marks)

21. Why has thread rolling become the most commonly used method for making threads? (3 marks)

22. Find the rpm of lathe spindle to turn a 50 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. (6 marks)

Pichit Pitsuwan
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