# PRINCE OF SONGKLA UNIVERSITY
# FACULTY OF ENGINEERING

**Final Examination : Semester 1**     **Academic year : 2005**
**Date : October 8, 2005.**     **Time : 9.00-12.00**
**Subject : 226-314 Machine Tools Technology**  **Room : A401**

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> ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น
>
> และพักการเรียน 1 ภาคการศึกษา

## Instruction :
- Answer all questions in the <u>answer</u> book.
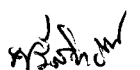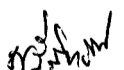- All notes, books and calculators are not allowed.
- Total score is 100 (40%).

## Questions:

1.  What are the fundamental differences in structure between a bed type milling machine and a column and knee type of milling machine?

    ( 4 marks )

2.  What is the saddle on a milling machine? What is its purpose?

    ( 4 marks )

3.  How does a universal dividing head differ from a plain dividing head?

    ( 3 marks )

4.  What is a stagger-tooth cutter? Why is it preferred to a plain milling cutter?

    ( 3 marks )

5.  What is the difference between up and down milling? When is it proper to use each?

    ( 4 marks )

6. Explain the squaring of a block of steel on a milling machine.

( 4 marks )

7. Describe the entire operation when a hexagon is to be milled on a round piece of material using a dividing head and two cutters.

( 4 marks )

8. Given a shaft 4-in. in diameter with a 5/8-in. square key, find: (a) the depth of the keyway in the shaft ; (b) the depth of the keyway in the bore ; (c) the distance from the depth of the keyway in the shaft to the opposite side of the shaft ; (d) the distance from the bottom of the keyway in the bore to the opposite side of the bore.( the height of the incompleted arc is 0.025 in.)　　　　　　　　　　　　　( 8 marks )

9. One turn of the index handle is how many degrees on the work for a 40 : 1 dividing head? Suppose the index head has a ratio of 90 : 1 ; how many degrees of the work does one turn of the index handle represent?

( 4 marks )

10. Assume a workpiece is to have 15 divisions about its circumference. Calculate the movement of the index handle for (a) a 90 : 1 ratio dividing head ; (b) a 60 : 1 dividing head ; (c) a 40 : 1 dividing head.

( 6 marks )

11. Find the gears and the movement of the index handle needed to differential-index 113 divisions.

( 4 marks )

12. Using the method of continued fractions, index $25°23´$ find the movement of the index handle and the error.

( 4 marks )

13. Explain the three motions which make the radial drill press more flexible than the standard drill press.　　　　　　　　　( 3 marks )

14. What is trepanning?　　　　　　　　　　　　　　　　( 2 marks )

15. What is ultrasonic drilling? Explain. ( 3 marks )

16. How do serial taps differ from a set of starting -plug-bottoming taps?
( 3 marks )

17. How does a gang-drilling machine differ from a multiple-spindle drilling machine?
( 3 marks )

18. What is back spot facing? ( 2 marks )

19. When are left-hand helixes used on reamers? Why is their use important? ( 2 marks )

20. The tool slide of a shaper may be used to make angle cuts. Explain.
( 3 marks )

21. Explain and illustrate the method by which the return stroke of a shaper is caused to move faster than the cutting stroke. ( 3 marks )

22. There are two types of magnetic chucks used on a surface grinder. Make a sketch of the essential parts of these chucks, and illustrate how they are capable of holding a piece of steel. ( 4 marks)

23. Explain the principle of through feed on a centerless grinder.
( 2 marks )

24. What are the five factors used to describe a grinding wheel? What function does each of the five factors during the grinding operation?
( 4 marks )

25. Define : diametral pitch , pitch diameter , clearance , addendum ,dedendum , and working depth of a spur gear.
( 6 marks )

26. A spur gear has 20 teeth and an outside diameter of 2 in. find : (a) the diametral pitch ; (b) the full depth of the tooth ; (c) the root diameter ; (d) the pitch diameter.(a = 1/P, c = 0.157/P)

(8 marks )

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Pichit   Pitsuwan
September,2005.