PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination : Semester 1   **Academic year : 2003**

Date :   October 1, 2003.   **Time : 13.30-16.30**

Subject : 226-301 Machine Tools Technology   **Room :**

Introduction :

- Answer all questions in the <u>answer</u> book.

- Dictionary and a calculator with programming capability are allowed.

- All notes and books are not allowed.

- Total mark is 100 (30%).

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1.   Write short notes on   (10 marks)

   (a)   High speed milling attachment

   (b)   Machining centers

   (c)   Straddle milling

   (d)   Face milling

   (e)   Indexing chuck

   (f)   Counter sinking

   (g)   Trepanning

   (h)   Gang Drill Press

   (i)   Traverse grinding

   (j)   Drift

2.   What are the distinguishing characteristics of a universal and of a plain
       milling machine ?   (4 marks)

3.   How does a universal dividing head differ from a plain dividing head ?
                                                                            (4 marks)

4.   What is a rotary   table ? How are they indexed ?   (4 marks)

5. What is a staggered tooth cutter ? Why is it preferred to a plain milling cutter ?   (4 marks)

6. What is the difference between conventional and climb milling ? When is it proper to use each ?   (4 marks)

7. Discuss the various methods which may be used to mill a chamfer or an angle on a workpiece.   (4 marks)

8. Given a shaft 4-in. in diameter with a $\frac{1}{2}$ -in. square key, find (a) the height of the incompleted arc; (b) the depth of the keyway in the shaft ; (c) the depth of the keyway in the bore ; (d) the distance from the depth of the keyway in the shaft to the opposite side of the shaft ; (e) the distance from the bottom of the keyway in the bore to the opposite side of the bore ?
                                                                                      (4 marks)

9. Describe three variations of planer type surface grinding.   (4 marks)

10. Explain the difference between direct and simple indexing.   (4 marks)

11. Assume a workpiece is to have 20 divisions about its circumference. Calculate the movement of the index handle for (a) a 90:1 ratio dividing head ; (b) a 120:1 dividing head ; (c) a 40:1 dividing head.   (4 marks)

12. Find the gears and the movement of the index handle needed to differential index 233 divisions.   (4 marks)

13. Using the method of continued fractions, index $39° 29'$. Find the movement of the index handle and the error.   (4 marks)

14. Explain the three motions which make the radial drill press more flexible than the standard drill press.   (4 marks)

15. What is a BTA drill ? When is it advisable to use a BTA drill ? (4 marks)

16. How does the counterbore operation differ from the spot-facing operation ?

(4 marks)

17. Describe how to hold drills in a drill press. (4 marks)

18. Make a drawing of a shaper toolslide head and label all parts. (4 marks)

19. Explain the transmission of power from the bull wheel to the ram in a crank shaper. (4 marks)

20. Explain how to machine an angular surface on a shaper. (4 marks)

21. A spur gear has 52 teeth and measured 3-in. in outside diameter. Find : (a) the diametral pitch ; (b) the full depth of the tooth ; (c) the root diameter, and explain the method for cutting the gear on a milling machine.

(8 marks)

Pichit Pitsuwan

September, 2003.