

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination : Semester 1

Academic Year : 2004

Date : October 2, 2004

Time : 13.30-16.30

Subject : 226-301 Machine Tools Technology

Room : R 200

ทฤษฎีในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น
และพักการเรียน 1 ภาคการศึกษา โทษสูงสุดให้ออก

Instruction:

1. Answer all question in the answer book.
2. A calculator with programming capability are allowed.
3. All notes and books are not allowed
4. Total mark is 100 (30%)

ผศ.พิจิตร พิศสุวรรณ
ผู้ออกข้อสอบ

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1. Write short notes on (10 marks)
- (A) Rack milling attachment
 - (B) Machining centers
 - (C) Straddle milling
 - (D) Slab milling
 - (E) Indexing chuck
 - (F) Sensitive drill press
 - (G) Trepanning
 - (H) Gang drill press
 - (I) Plunge grinding
 - (J) Drift
2. What is the knee on a milling machine? What is its purpose? (3 marks)
3. How does a universal dividing head differ from a plain dividing head? (3 marks)
4. What is the purpose of the sector arms on a universal dividing head? (3 marks)
5. How does a plain milling cutter differ from a side milling cutter? (3 marks)
6. What is a stagger-tooth cutter? Why is it preferred to a plain milling cutter? (3 marks)
7. Describe the difference between a two-flute center-cutting end mill and a four-flute center-relieved (gashed) end mill? (4 marks)
8. Explain the procedure for aligning a vise on a plain milling machine. (4 marks)
9. What is the difference between conventional and climb milling? When is it proper to use each? (4 marks)

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10. Explain the squaring of a block of steel on a milling machine. (4 marks)
11. What is an incompleated arc with reference to keys? (3 marks)
12. Given a shaft 3 in. in diameter with a $\frac{3}{8}$ - in square key. find : (a) the height of the incompleated 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. (6 marks)
13. Explain the difference between direct and simple indexing. (3 marks)
14. 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 5 : 1 ; how many degrees of the work does one turn of the index handle represent? (4 marks)
15. Explain the principle of differential indexing if the gearing is 1 : 1 and (a) the plate rotates in the same direction as the index handle; (b) the plate rotates in the opposite direction from the index handle. (4 marks)
16. Find the gears and the movement of the index handle needed to differential-index 121 divisions. (6 marks)
17. Using the method of continued fractions, index $39^{\circ} 59'$. Find the movement of the index handle and the error. (4 marks)
18. Describe three variations of centerless grinding. (4 marks)
19. Explain the three motions which make the radial drill press more flexible than the standard drill press. (3 marks)

20. What is a BTA drill? When is it advisable to use a BTA drill? (3 marks)
21. How does the purpose of counter boring differ from that of spot-facing? (3 marks)
22. What are the primary purposes of reaming? (3 marks)
23. Explain the transmission of power from the bull wheel to the ram in a crank shaper. (4 marks)
24. Explain how to machine a vertical surface on a shaper. (3 marks)
25. A spur gear has 32 teeth and measured 2- in. in outside diameter. Find : (a) the diametral pitch; (b) the full depth of the tooth ; (c) the root diameter; (d) the pitch diameter. (6 marks)

Pichit Pitsuwan
September, 2004

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