

**PRINCE OF SONGKLA UNIVERSITY  
FACULTY OF ENGINEERING**

**Midterm Examination : Semester 1**

**Academic year : 2010**

**Date : August 2, 2010.**

**Time : 13:30-16:30**

**Subject : 226-312 Machine Tools Engineering**

**Room : A 201**

ทูลริตในการสอบ โทษขันตำปรับตกในรายวิชานัน  
และพัคการเรียน 1 ภาคการศึกษา

**Instruction :**

- Answer all questions in the answer book.
- All notes, books and calculators are not allowed.
- Total score is 100 (45%).

**Questions:**

1. Describe the basic principle of broaching, contour turning and slab milling operation. (6 marks)
2. What is a turret lathe? Differentiate between saddle-type and ram-type turret lathe. (3 marks)
3. Describe the two common types of single-spindle automatic screw machines. (3 marks)
4. Describe the two distinctive features of multi-spindle automatic lathe. (4 marks)
5. What is the carriage? What are the components which make up the carriage? What is the purpose of each of the components? (6 marks)
6. Describe the use of a drive plate for turning a long taper piece. (3 marks)

7. Describe a universal chuck and an independent chuck. How are they used? How do they differ? (4 marks)
8. Sketch a single point cutting tool and indicate all the angles. (3 marks)
9. What are the precautions which should be taken when grinding a tool bit? (3 marks)
10. What are the advantages and disadvantages of increasing the SCEA ? (4 marks)
11. What is the purpose of the nose radius? Why does too large a nose radius tend to induce chatter? (3 marks)
12. What are the advantages and disadvantages of brazed carbide tools? (3 marks)
13. What are the advantages of the screw-, bridge-, and pin-type clamping mechanisms of tool holders? (3 marks)
14. What is the purpose of the carbide seat provided to support the throwaway insert? (3 marks)
15. Describe the procedure for testing a lathe to ensure that it will turn a true cylinder. (3 marks)
16. A tapered piece is to be turned. It has an overall length of 20 in. and a tapered section 12 in. long. The tapered section has a small diameter of 2.04 in. and a large diameter of 2.40 in. Find: (a) the taper per in.; (b) the taper per ft.; (c) the set-over; (d) the imaginary large diameter. (4 marks)
17. What are the advantages and disadvantages of the taper attachment? (3 marks)
18. The offset of the tailstock may be accomplished in several ways, describe all of them. (3 marks)

19. Given a 1-8 NC thread, calculate: (a) the pitch ; (b) the depth of the thread ; (c) the minor diameter of the screw ; (d) the tap drill size ; (e) the pitch diameter. ( $d = 0.6495p$ ) (5 marks)
20. Explain fully the process of setting a lathe for cutting threads. (4 marks)
21. Find the rpm of lathe spindle to turn a 3.5 in. diameter piece of work with a cutting speed of 140 fpm. Also determine the time required to take one cut over the stock if the length is 14 in. and the feed used is 0.010 in. per revolution. (4 marks)
22. Explain the fundamental structure of a universal column-and-knee milling machine. (3 marks)
23. How does a turret milling machine differ from a vertical milling machine? (3 marks)
24. What is a slotting attachment? What is its use? (2 marks)
25. What is a milling fixture? What are the components which make up the milling fixture? What is the purpose of each of the components? (6 marks)
26. What is the purpose of a staggered-tooth milling cutter? (3 marks)
27. Describe the difference between a two-flute center-cutting end mill and a four-flute center-relieved end mill. (3 marks)
28. How does a woodruff key seat cutter differ from a T-slot cutter? (3 marks)

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Pichit Pitsuwan  
July, 2010