PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination : Semester 1   **Academic Year : 2010**
Date : 1 Aug 2010   **Time : 13:30 - 16:30**
Subject : 226-341 Maintenance Engineering   **Room : S817**

คำสั่ง

1. ข้อสอบมีทั้งหมด 9 หน้า (**นับให้ครบก่อนลงมือทำ**)

2. ห้ามการหยิบยืมสิ่งใด ๆ ทั้งสิ้น จากผู้อื่น ๆ เว้นแต่ผู้คุมสอบจะหยิบยืมให้

3. ห้ามนำส่วนใดส่วนหนึ่งของข้อสอบออกจากห้องสอบ

4. ผู้ที่ประสงค์จะออกจากห้องสอบก่อนหมดเวลาสอบ **แต่ต้องไม่น้อยกว่า 30 นาที** ให้ยกมือขออนุญาตจากผู้คุมสอบก่อนจะลุกจากที่นั่ง

5. ผู้ที่ปฏิบัติเข้าข่ายทุจริตในการสอบ ตามประกาศคณะวิศวกรรมศาสตร์ **มีโทษ คือ ปรับตกในรายวิชาที่ ทุจริต และพักการเรียน 1 ภาคการศึกษา**

6. ให้**ทำในกระดาษคำตอบเท่านั้น** ตอบนอกกระดาษ คำตอบไม่มีคะแนน

7. เขียน ชื่อ **หรือรหัส** ในกระดาษคำตอบทุกหน้าก่อนเริ่มทำ เพื่อป้องกันความสับสน ในกรณีกระดาษคำตอบหลุด จากฉบับ

8. ให้นักศึกษาสามารถนำสิ่งต่อไปนี้เข้าห้องสอบได้

     ☐ ตำรา   ☐ หนังสือ

     ☑ กระดาษ A4 **ได้ 2 แผ่น** (เขียนด้วยลายมือตนเอง และ**ให้ส่งมาพร้อมข้อสอบ**)

     ☑ นำ Dictionary และ เครื่องคิดเลข เข้าห้องสอบได้ (ห้ามบันทึกข้อมูลที่เกี่ยวข้องกับวิชานี้)

9. ให้ทำข้อสอบโดยใช้ ☐ ดินสอ   ☑ ปากกา

Question#	1	2	3	4	Total
Full score	10	10	10	40	70
Score					

ผู้ออกข้อสอบ ผศ.ดร.กลางเดือน โพชนา

Question 1 Answer all questions. Please determine whether these following sentences are correct or incorrect. One point (1 point) will be given for the right answer. Minus half point (-0.5 point) will be given for the wrong answer. (Total 10 points)

Q no. 1.	Correct ✓	Incorrect ✗	Question
1			Economic order quantity is not suitable for ordering maintenance material group C for maintenance works.
2			Bolts, nuts and washers should be controlled as non-permanent articles.
3			Fuse is classified in a category of machine tool.
4			Lubrication is one of the activities in preventive maintenance.
5			One of the differences between maintenance stock and raw material stock is purpose of use.
6			Repair application slip should include machine code , date of repair, name of technician, maintenance method, root cause of problem, etc, and this slip must be filled by the technician.
7			The material that is cheap and life-predictable should be kept as a permanent store.
8			In TBM system, a plant must be stopped for maintenance at constant intervals.
9			The letter "M" in the objective of production management, "PQCDSMEE", means "Maintenance".
10			Machine daily inspection is normally performed by the maintenance man who is responsible for that machine.

Question 2. Select optimum answers. (10 points)

Q	Answer			
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d

Questions

1. Which type of maintenance material should be controlled by 2-bins method?
a. Gear box
b. Lubrication oil
c. Nut
d. Screw

2. Which group of maintenance material is included "Wrench"?
a. Mechanical spare part
b. Electrical spare part
c. Machine tools
d. Disposal material

3. Which group of maintenance material is included "Sensor"?
a. Mechanical spare part
b. Electrical spare part
c. Machine tools
d. Disposal material

4. Which group of maintenance material is included "Rubber ring"?
a. Mechanical spare part
b. Electrical spare part
c. Machine tools
d. Disposal material

5. Which type of maintenance organization is suited to be applied for the case where the equipment for plural products series exists in the large-scale plant?
   a. Compromised type
   b. Area type
   c. Centralized type
   d. No correct answer

6. Which type of maintenance organization is suitable for the small organization with a few maintenance men?
   a. Compromised type
   b. Area type
   c. Centralized type
   d. No correct answer

7. Which type of maintenance material should NOT be controlled by 2-bins method?
   a. Motor
   b. Metal washer
   c. Pivot
   d. No correct answer

8. Which answer is NOT an advantage of decentralized maintenance organization?
   a. Fast access of maintenance man
   b. Maintenance man has good relationship with machine operator
   c. Maintenance man has more free time
   d. High skill of maintenance man

9. What are NOT the advantages of coding of maintenance information and data?
   a. the entry time can be shortened
   b. the size of slips becomes small.
   c. make the tantalization and analysis easy
   d. maintenance man can easily ignore maintenance data

10. What is the disadvantage of "departmental type" maintenance organization?

   a) Maintenance men can not become specialists.

   b) Time for maintenance is normally long.

   c) Maintenance men are sometimes free from work.

   d) Maintenance work is more delay than other type.

Name :...code..

Question 3. Answer questions in table "B" by using the words in table "A " only. Some words can be used more than once. Some words may not be used. (1 point each, total 10 points)

<div align="center">Table "A"</div>

ABC	Circuit breaker	CBM
FIFO	TPM	Productive
Permanent store	Money	Hammer
2 bins	Non permanent store	TM
Relay	V-belt	machine
EOQ	APQ	JIPM
IRR	BM	Screw
AM	PLC	CM
Silo	Switch	CMMS

<div align="center">Table "B"</div>

No	Question	Answer
1	The expensive materials with low downtime loss shall belong under this type of stores.	
2	The article prepared against sudden failure shall belong under this type of stores	
3	The system that is designed for maintenance management by using information technology in computer.	
4	The maintenance tools	
5	Type of maintenance that machine diagnosis technology plays an importance role	
6	Mechanical spare part	
7	Disposal material	
8	The life-predictable articles with low annual frequency of use shall belong under this type of stores.	
9	The type of maintenance that is carried out by the operators	
10	Maintenance carried out in response to a signification in a machine as indicated by a change in a monitored parameter of machine condition.	

Question 4: Answer these following questions. (40 points)

4.1 To design maintenance organization, these following items must be considered. Please explain why these items have to be concerned.

(1) Geographic disperse of a plant or equipment's (5 points)

(2) Managing ability of persons (5 points)

4.2 What are the causes of failure during initial stage of machine operation? (5 points)

4.3 What are the disadvantages of condition based maintenance? (5 points)

4.4 According to ABC analysis, what type of material control should be taken for the C items? (5 points)

4.5 The faculty of engineering, Prince of Songkla University, desires to establish maintenance system. You are assigned to be a member of the team. Please answer these following questions. All data can be assumed where necessary.   (15 points)

1. Design the suitable maintenance organization (5 points)
2. Draw flow chart of maintenance procedure. (5 points)
3. Design machine coding system. (5 points)