

Prince of Songkla University**The Faculty of Engineering****Final Examination Semester 1****Academic Year 2009****Date : 9 October 2009****Time : 13.30-16.30****Subject : 225-349 Safety and Environmental Engineering****Room : R201**

Name : Student Code :

Question	1	2	3	4	5	6	Total
Full score	20	10	10	10	10	20	80
Score							

คำสั่ง

- นำตำราหรือเอกสารใด ๆ เข้าห้องสอบได้ ห้ามยืมเอกสารหรือสิ่งของใดๆในห้องสอบ
- นำ Dictionary และ เครื่องคิดเลขเข้าห้องสอบได้ ทุกชนิด
- ใช้ปากกาในการทำข้อสอบเท่านั้น ห้ามใช้ดินสอ
- ตรวจสอบก่อนเริ่มทำ (ให้ทำในกระดาษคำตอบเท่านั้น ตอบนอกกระดาษคำตอบไม่มีคะแนน)
- ข้อสอบมีทั้งหมด 9 หน้า (รวมหน้าปก) ตรวจสอบจำนวนหน้าให้ครบถ้วน ก่อนทำ
- เขียน รหัส ในหน้าที่เป็นกระดาษคำตอบทุกหน้า ก่อนเริ่มทำ เพื่อป้องกันความสับสน ในกรณีกระดาษคำตอบหลุดจากฉบับ

ทิวติในการสอบ โทษขันต่ำปรับตกในรายวิชานั้น

และพักการเรียน 1 ภาคการศึกษา


ผศ.ดร.กลางเดือน โพนนา



Part 1: Fill in the blanks by using the following words (20 points)

What if	HAZOP	Dust	HSI	150	Potential problems	Solids particles	120
Check list	JSA	Fume	Spray	140	And	Chain reaction	Ultrasonic testing device
ETA	Fire Rating	Smoke	Cyclone	Fire hazard	End	Oxygen	Failure analysis
FTA	External Event	Mist	Wet scrubber	Building structure	Or	Nitrogen	Initiating Event
fuel	Temperature	Planning	Guide Words	Logic gate	Job	Chemical reaction	Metallic oxide
KYT	TPM	TWAN	PM	QC	Pressure	5S	Accident

1. Fault tree analysis is a in which an undesired state of a system is analyzed using boolean logic to combine a series of lower-level events. This analysis method is mainly used in the field of safety engineering to quantitatively determine the probability of a safety hazard.
2. The Fault tree diagram is usually written out using conventional..... symbols.
3. Job Safety Analysis is one of the safety management tools that can be used to define and control the hazards associated with a certain process, or procedure.
4. In HAZOP analysis, the key feature is to select appropriate parameters which apply to the design intention. These are general words such as flow, ,
5. In order to identify deviations, the HAZOP analysis leader applies (systematically, in order) a set of to each parameter for each section of the process.
6. HAZOP studies is a methodology for identifying and dealing with in industrial processes, particularly those which would create a hazardous situation or a severe impairment of the process.

7. To produce a fire, it is necessary to have, and
8. ETA is a technique used to identify hazards and assess their consequences when occurs.
9.  This symbol is used as an “.....” gate for fault tree analysis.
10. The specific letter on fire extinguisher (such as “6A-10B”), indicatesof the fire extinguisher.
11. The wall of boiler is normally measured by using
12. is solid particles consists of relatively large particles, cement dust
13. Fume is solid particle, a formed by the condensation of vapor by distillation, or chemical reaction processes. The particulates in fumes are quite small
14. Smoke is entrained formed as a result of incomplete combustion of carbon materials.
15. Mist is liquid particle formed by the condensation of vapors and perhaps by
16. is liquid particle formed by the atomization of a parent liquid sprays settle out under gravity.
17. is possibly the most popular, economical, and effective means of controlling particulates.
18. The spray tower or scrubber smaller the gas bubbles or water droplets (called), the more effective the scrubbing
19. In the design of an emergency exit of a building, and should be considered.
20. Two popular safety promotion activities in industries are and



Part 2 : 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 #	✓	✗	Questions
1			TWAN is the indicator used to assess level of non toxic chemical in work place.
2			Ear muffs should reduce noise more than 25 dBA.
3			H ₂ S gas has rotten egg odor at low concentrations, and odorless at high concentrations.
4			Sand is normally used to extinguish fire type B.
5			WBGT is an indicator used to indicate heat in human body.
6			FTA is basically composed of logic diagrams that display the state of the system and is constructed using graphical design techniques.
7			Water tube boiler is normally safer than fire tube boiler.
8			Threshold Limit Values (TLV) is the limit of air level that is allowed by laws.
9			Heat exhaustion is normally happened after heat cramp.
10			Fire type C can be extinguished by using water.





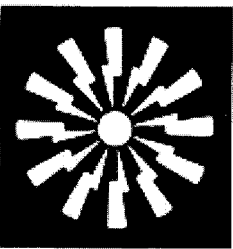
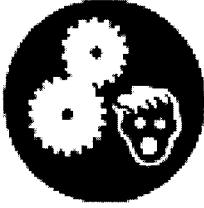



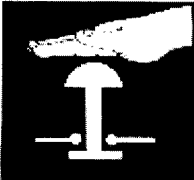
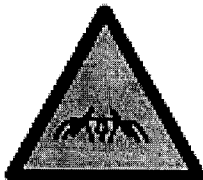

Part 3 : Which type of fire is the following: (Type A, B, C, or D) (10 points)

Example :A.... Cloths

1. NGV
2. Fire involving paper
3. Electric Switch
4. Benzene oil
5. Metallic fire such as magnesium
6. Motor
7. Biodiesel
8. Timber
9.Electric Oven
10. Methane



Part 4: Match the following symbol with the description below. (10 points)

 <p>Example6.....</p>	 <p>Example12.....</p>	 <p>.....</p>
 <p>.....</p>	 <p>.....</p>	 <p>.....</p>
 <p>.....</p>	 <p>.....</p>	 <p>.....</p>
 <p>.....</p>	 <p>.....</p>	 <p>.....</p>

1. Danger laser risk	2. Danger fork lift trucks	3. Danger electric shock risk
4. Danger harmful fumes	5. Danger scaffolding incomplete	6. Danger slippery surface
7. Danger explosive material	8. Wear hairnets	9. Fire alarm
10. Danger radiation risk	11. Danger fragile roof	12. Danger overhead crane
13. Danger scaffolding incomplete	14. Danger noise	15. Emergency stop push-button



Part 5 : Fill in the blanks by using suitable answers. (10 points)

- For vibration and noise, damage occurs at about (1)dBA for a short period of exposure and (2)dBA for continuous noise.
- Safety helmet type B is suitable for work relating to (3)
- The act of the ministry of industry states that the width of a fire exit in a factory should not less than (4) centimeters.
- The act of the ministry of interior states that the noise in a workplace should be less than (5).....dBA.
- The pH of water used for boiler should be (6)..... and the total dissolve value should be less than (7)..... ppm.
- The pressure of a sprinkle used for fire extinguishing should be more than (8) lbs per inch².
- HAZOP is an abbreviation for (9).....
.....
- Human internal heat is mainly caused by (10).....

Part 6: Answer these following questions with detail explanation or calculation. (total 20 points, 5 points each)

6.1 A worker in a feed mill factory works in an environment with noise 90 dBA for 2 hours, 93 dBA for 1 hour and 99 dBA for 1 hour, what is the value of TWAN?

6.2 A small job shop factory has a lathe with SPL 90 dBA and a drill with SPL 95 dBA. What is the total dBA of this factory?

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6.3 A furniture factory has 4 old machines located close together. The SPL of each machine are 85, 95, 70 and 90 dBA. What is the total dBA of this factory?

6.4 What is the difference between heat stroke and heat exhaustion?

Congratulations and Have a Good Semester Break.

See you next semester.

