



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2011/2012**

**COURSE NAME : MAINTENANCE AND SAFETY  
ENGINEERING**

**COURSE CODE : BDE 4073**

**PROGRAMME : 4 BDD**

**EXAMINATION DATE : JANUARI 2012**

**DURATION : 3 HOURS**

**INSTRUCTION : ANSWER FOUR QUESTIONS ONLY**

**THIS PAPER CONTAINS FIVE (5) PRINTED PAGES**

- Q1** (a) Preventive Maintenance is the best practice for the organization.
- (i) What is the meaning of “Preventive Maintenance?”
  - (ii) List the criteria of preventive maintenance
  - (iii) Draft a graph to show the preventive maintenance is the best practice
  - (iv) Briefly explain about the impact of cost, time and the other factor for answer above if compare with the other maintenance types.
- (12 marks)
- (b) Scheduling is one of the important aspects of “preventive maintenance”.
- (i) What are the philosophy to have the scheduling
  - (ii) How about the effect is fail to follow the scheduling
- (6 marks)
- (c) Give an example for preventive maintenance application to the one complete system (mechanical system).
- (7 marks)

**Q2** The safety and health of workers is the key to increase the quality and productivity.

- (i) What is OSHA 1994 (2 marks)
- (ii) Please state the objective of OSHA 1994 and the date of officially gazette for implementation in Malaysia? (3 marks)
- (iii) Name 4 Regulations including year of establishment and give some information of each regulation (8 marks)
- (iv) Please state why the organization must set-up the safety and health committee and what are the composition. (3 marks)
- (v) Chemical has three (3) types to enter the human body. List the types. (3 marks)
- (vi) Please describe the important to comply with USECHH Regulation 2000. (3 marks)
- (vii) NADOOPOD Regulation 2005 is new approach to protect workers from safety and health risk. Please explain what is NADOOPOD Regulation 2005 and their methods to reduce the number or industrials accidents and occupational diseases. (3marks)

**Q3 (a)** Hazard, risk and danger is terms that are related to the safety and health.

- (i) Definition of Hazard
- (ii) Categories of hazard
- (iii) Example of hazard
- (iv) What is risk

(8 marks)

**(b)** For hazard identification, a few methods were applied including *HIRARC*.

- (i) What is the definition of *HIRARC* and explain on *HIRARC* function (4 marks)
- (ii) Describe how the 5 x 5 metrics were develop (2 marks)
- (iii) Explain how the risk level were justify (4 marks)
- (iv) What are the control measures should be prepared to reduce the risk (2marks)
- (v) Please discuss the hierarchy of control and what are the reasons for each control technique. (6 marks)

**Q4** Industrial accident statistics are reference how the safety arrangement in the workplace.

Table 1 below shows the industrial accidents based on the industrial sector from year 2006-2010.

**Table 1: Industrial Accidents Statistics by sector from 2006-2010**

Sector /Year	Year 2006			Year 2007			Year 2008			Year 2009			Year 2010		
	D	PD	NPD	D	PD	NPD	D	PD	NPD	D	PD	NPD	D	PD	NPD
Manufacturing	66	116	2752	63	133	2094	76	134	1564	63	90	1419	59	162	1493
Mining and Quarrying	2	1	22	9	1	5	6	0	4	3	1	2	1	1	2
Construction	81	25	365	95	10	76	72	2	55	71	6	38	66	4	50
Agriculture and Forestry	32	19	1014	30	14	712	42	7	365	44	8	440	30	18	469
Utility	5	6	66	10	4	51	19	12	82	23	3	116	11	3	34
Transport & Communication	10	1	47	2	0	7	8	1	18	18	0	21	14	1	16
Wholesale and retail	0	1	13	3	1	11	0	0	2	0	0	0	0	0	0
Hotel and restaurant	0	0	7	0	2	11	1	1	13	0	0	18	0	0	25
Financial & Real Estate	4	2	18	4	0	25	4	1	2	1	0	0	1	1	30
Public Services	9	3	44	3	3	16	2	1	3	1	0	0	3	2	40

Source: DOSH annual report 2007, 2008, 2009 and 2010

Legend: D -Death  
 PD -Permanent Disability  
 NPD -Non-Permanent Disability

Refer to the table:

- (i) Please calculate the number of D, PD and NPD annually 2006-2010. Please analyze it and comment the increase/ decrease yearly. (10 marks)
- (ii) With the maintenance approach, explain what engineer can contribute to reduce the number of the overall industrial accidents? (5 marks)
- (iii) With a specific task, please give an idea how the maintenance activities will be the effect to the manufacturing sector and construction sector respectively? (5 marks)
- (iv) What is the safety and health officer (SHO) function?. Please state the requirement to have and what condition that SHO will be applied. (5 marks)

**Q5** Occupational Safety and Health Challenges was identified by the Department of Occupational Safety and Health. Table 2 below shows the DOSH Challenges for the year 2005-2010.

**Table 2:** DOSH Challenges for the year 2005-2010

<b>Challenges *</b>	<b>Anticipated Solutions</b>
*Improvement of delivery system	With the improvement of the delivery system, the backlog and waiting time in any work process/ activity can be shortened. This will make industries involved with occupational safety and health more competitive.
*Awareness of OSH remains low	A negative and lack a radical attitude towards OSH by certain industrial sectors contributes to the low implementation of OSH. The department will focus more on these sectors to increase their OSH awareness.
*Domestic and international pressure	The spread of news of the weaknesses in OSH management by the NGOs and the need to improve the standards in all sectors to be paralleled with the development of the country have made the department more sensitive. Proper action needs to be taken on OSH issues locally and internationally.
* Increased occupational health risks at the workplace	Technological and scientific advances have contributed to an increase in health risks at the workplace due to the use of hazardous chemicals, equipment usage as well as the working environment and method. This lead to the requirement of having guidelines and code of practices.
*Emergence of new occupational hazards	Among the challenges faced by the department is the emergence of new occupational hazards such as handling of new chemicals and diseases arising from indoor air quality.