Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2019

FT3CO19 Hazard Identification and Risk Assessment

Programme: B.Tech. Branch/Specialisation: FT

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. The Indian Standard for HIRA is **1**
(a) IS 15656 (b) IS 16565 (c) IS 15565 (d) IS 10460

ii. There are ____ types of Probability levels **1**
(a) Four (b) Five (c) Six (d) Three

iii. What if analysis is a sub division of **1**
(a) HAZOP
(b) QRA
(c) Preliminary hazard analysis
(d) Mond Index

iv. The bathtub is a curve between **1**
(a) Failure mode-Time (b) Failure mode- Process
(c) Failure rate- process (d) Failure rate- Time

v. "Minimal Cut Set" is a part of **1**
(a) Fault Tree Analysis (b) Event Tree Analysis
(c) FMEA (d) None of these

vi. Fault Tree Analysis is _____ approach **1**
(a) Bottom-up (b) Top-down (c) Side-wise (d) None of these

vii. Pool Fires generally occurs in **1**
(a) Storage area (b) Pipe lines
(c) Heat exchangers (d) Processing units

viii. UVCE occurs due to **1**
(a) Boilers blast (b) Pipe lines burst
(c) Physical explosion (d) Presence of accumulated gas

P.T.O.

ix. ALARP is used to **1**
(a) Eliminate hazards (b) Substitute hazards
(c) Provide PPEs (d) Reduce hazards

x. QRA stands for **1**
(a) Quality Rate Assessment
(b) Quantity Rate Assessment
(c) Quantitative Risk Assessment
(d) Quality Risk Assessment

Q.2 i. Define the terms Hazards, Fire and Explosion? **3**
ii. Give the detailed classification of types of Hazards? **7**
OR iii. What do you mean by Fire and Explosion Hazard Ratings? **7**

Q.3 i. What do you mean by Failure Rates? **2**
ii. What is the significance of Set theory and Boolean algebra? **3**
iii. Explain the Bath-tub curve with graph? **5**
OR iv. Explain the terms MTTF and MTBF? **5**

Q.4 i. Define the terms Minimal cut set and Criticality analysis? **4**
ii. Briefly explain the Fault Tree Analysis method? **6**
OR iii. What are the advantages, disadvantages and methodology of ETA? **6**

Q.5 i. Define the terms- Pool fires, Jet fires, Flash fires and Physical explosions? **4**
ii. Explain BLEVE and UVCE? **6**
OR iii. Summarize the Dose-response function? **6**

Q.6 Write short notes on any two:
i. QRA **5**
ii. ALARP **5**
iii. F-N Curve **5**

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Marking Scheme
FT3CO19 Hazard Identification and Risk Assessment

Q.1	i.	The Indian Standard for HIRA is		**1**
		(a) IS 15656		
	ii.	There are ____ types of Probability levels		**1**
		(b) Five		
	iii.	What if analysis is a sub division of		**1**
		(c) Preliminary hazard analysis		
	iv.	The bathtub is a curve between		**1**
		(d) Failure rate- Time		
	v.	"Minimal Cut Set" is a part of		**1**
		(a) Fault Tree Analysis		
	vi.	Fault Tree Analysis is _____ approach		**1**
		(b) Top-down		
	vii.	Pool Fires generally occurs in		**1**
		(a) Storage area		
	viii.	UVCE occurs due to		**1**
		(d) Presence of accumulated gas		
	ix.	ALARP is used to		**1**
		(d) Reduce hazards		
	x.	QRA stands for		**1**
		(c) Quantitative Risk Assessment		
Q.2	i.	Hazards, Fire and Explosion		**3**
		Definition 1 mark for each	(1 mark * 3)	
	ii.	Classification of types of Hazards 3 points		**7**
		1 mark for each (1 mark * 3)	3 marks	
		Subdivision of classes	4 marks	
OR	iii.	Fire Hazard Ratings	3 marks	**7**
		Explosion Hazard Ratings	3 marks	
		Rating table	1 mark	
Q.3	i.	Definition of Failure Rates		**2**
	ii.	Significance of Set theory	1.5 marks	**3**
		Significance of Boolean algebra	1.5 marks	
	iii.	Explanation of Bath-tub curve	3 marks	**5**
		Graph	2 marks	
OR	iv.	Explanation of MTTF	2.5 marks	**5**
		Explanation of MTBF	2.5 marks	
Q.4	i.	Minimal cut set	2 marks	**4**
		Criticality analysis	2 marks	
	ii.	Explanation of Fault Tree Analysis method	3 marks	**6**
		Event symbols notations	1 mark	
		Gate symbol notations	1 mark	
		Transfer symbol notations	1 mark	
OR	iii.	Advantages of ETA	2 marks	**6**
		Disadvantages of ETA	2 marks	
		Methodology of ETA	2 marks	
Q.5	i.	Definition of Pool fires	1 mark	**4**
		Definition of Jet fires	1 mark	
		Definition of Flash fires	1 mark	
		Definition of Physical explosions	1 mark	
	ii.	Explanation of BLEVE	3 marks	**6**
		Explanation of UVCE	3 marks	
OR	iii.	Explanation of Dose-response function	3 marks	**6**
		Graph of Dose-response function	3 marks	
Q.6		Write short notes on any two:		
	i.	QRA		**5**
		Explanation	4 marks	
		Types	1 mark	
	ii.	ALARP		**5**
		Explanation	2.5 marks	
		Steps for ALARP	2.5 marks	
	iii.	F-N Curve		**5**
		Explanation	3.5 marks	
		Graph	1.5 marks	

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