UPES
End Semester Examination, December 2024

Program: B.Tech.-Fire and Safety Engineering   Semester: VII
Course: Hazard Identification and computer aided risk analysis   Time   : 03 hrs.
Course Code: HSFS 4002   Max. Marks: 100
No of pages: 1
Instructions: Read the question properly and give the most relevant answer.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain the term runaway	4	CO2
Q 2	Define the term Risk and Risk assessment	4	CO1
Q 3	Discuss the importance of ALARP	4	CO2
Q 4	Explain Hopkinson scaling law.	4	CO3
Q 5	List the hazards in operation of pumps in process industry.	4	CO2

SECTION B
(4Qx10M= 40 Marks)

Q 6	With the proper sketch discuss the heat exchanger, its hazards and its safe operating procedure in detail.	10	CO3
Q 7	Discuss the methods for the developing probit equation of hazardous toxic chemical	10	CO1
Q 8	Explain the importance of Human reliability analysis and its relevance to process industry.	10	CO2
Q 9	Explain the principle of operation of Accelerating rate calorimetry (ARC) with suitable sketch highlighting its applications. (OR) Explain the importance of ergonomics for an industry. Justify your stand	10	CO2

SECTION-C
(2Qx20M=40 Marks)

Q 10	You are a safety engineer and given the task of operating the chemical reactor. Elaborately prepare a document that covers what could go wrong with the chemical reactor operation and the methods to prevent it.	20	CO3
Q 11	You have been assigned a job to assess the damage due to explosion caused by an explosive of 2000 kg stored at port, whose specific heat is 3000 J/g C^o, Initial onset of exothermicity is 200 C^O and end exothermic temperature is 350 C^O for 1 g for explosive and Heat of reaction of TNT is 4200J/g. Find the explosion damages caused in human beings at 20 m and 100 m respectively. Consider air blast explosion condition for assessment. (OR) Analyze the ergonomic hazards in students and provide a effective control measures that could improve the focus of the students. Do you think personal habits influence the ergonomics of a person. Justify your stand.	20	CO4

Probit table

%	0	1	2	3	4	5	6	7	8	9
0		2.67	2.95	3.12	3.25	3.36	3.45	3.52	3.59	3.66
10	3.72	3.77	3.82	3.87	3.92	3.96	4.01	4.05	4.08	4.12
20	4.16	4.19	4.23	4.26	4.29	4.33	4.36	4.39	4.42	4.45
30	4.48	4.50	4.53	4.56	4.59	4.61	4.64	4.67	4.69	4.72
40	4.75	4.77	4.80	4.82	4.85	4.87	4.90	4.92	4.95	4.97
50	5.00	5.03	5.05	5.08	5.10	5.13	5.15	5.18	5.20	5.23
60	5.25	5.28	5.31	5.33	5.36	5.39	5.41	5.44	5.47	5.50
70	5.52	5.55	5.58	5.61	5.64	5.67	5.71	5.74	5.77	5.81
80	5.84	5.88	5.92	5.95	5.99	6.04	6.08	6.13	6.18	6.23
90	6.28	6.34	6.41	6.48	6.55	6.64	6.75	6.88	7.05	7.33
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
99	7.33	7.37	7.41	7.46	7.51	7.58	7.65	7.75	7.88	8.09

Probit regression according to EP17-A2