


Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: BBS & Human Factor Engineering	Semester: IV
Program: B Tech FSE	Time : 03 hrs.
Course Code: HSFE 2009	Max. Marks: 100

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.	Question	Marks	CO
Q 1	Differentiate with suitable examples a) Basic causes and immediate causes of an incident. b) Accident and Incident	2X2	CO2
Q 2	Differentiate with suitable examples a) Attitude and Behavior. b) Safety audit and Inspection.	2X2	CO2
Q 3	Why the 'percentile' concept is used in ergonomic designs?	4	CO2
Q 4	Identify the possible costs that an organization may incur as a result of inadequate standards of workplace health and safety.	4	CO3
Q 5	List the requirements of work permits as per OISD 105	4	CO1

SECTION B
(4Qx10M= 40 Marks)

Q 6	What is the philosophy of behavior based safety? Prepare a table showing possible antecedents and consequences of safe and at-risk behavior related to the usage of nose masks on our campus.	CO2	3+7																									
Q 7	An organization that manufactures components for the automotive industry is based on a single site and employs 750 people. The table below provides recent accident data recorded at the company.	CO3	10																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Year</th> <th style="width: 15%;">No. of accidents</th> <th style="width: 15%;">No. of near misses</th> <th style="width: 15%;">Average hours worked</th> <th style="width: 15%;">Days lost due to accidents</th> </tr> </thead> <tbody> <tr> <td>2016</td> <td style="text-align: center;">10</td> <td style="text-align: center;">4</td> <td style="text-align: center;">3520</td> <td style="text-align: center;">500</td> </tr> <tr> <td>2017</td> <td style="text-align: center;">12</td> <td style="text-align: center;">8</td> <td style="text-align: center;">3500</td> <td style="text-align: center;">80</td> </tr> <tr> <td>2018</td> <td style="text-align: center;">12</td> <td style="text-align: center;">10</td> <td style="text-align: center;">3500</td> <td style="text-align: center;">600</td> </tr> <tr> <td>2019</td> <td style="text-align: center;">15</td> <td style="text-align: center;">17</td> <td style="text-align: center;">3530</td> <td style="text-align: center;">600</td> </tr> </tbody> </table>	Year	No. of accidents	No. of near misses	Average hours worked	Days lost due to accidents	2016	10	4	3520	500	2017	12	8	3500	80	2018	12	10	3500	600	2019	15	17	3530	600		
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	Calculate the accident frequency, severity and incidence rate for these years. Also, comment on the safety performance of the organization.		
Q 8	Define confined space. State FOUR potential hazards in a confined space and how these hazards can be effectively managed?	CO2	10
Q 9	Heinrich's theories have greatest impact on the practice of safety and have done the most harm. Discuss	CO4	10
SECTION-C (2Qx20M=40 Marks)			
Q 10	<p style="text-align: center;">Description of the Accident</p> <p>Air-India Express Limited B737-800 aircraft VT-AXH was operating a quick return flight on sector Kozhikode-Dubai-Kozhikode under 'Vande Bharat Mission' to repatriate passengers who were stranded overseas due to closure of airspace and flight operations owing to the Covid-19 pandemic. The aircraft departed from Kozhikode for Dubai at 10:19 IST (04:49 UTC) on 07 August 2020 and landed at Dubai at 08:11 UTC. The flight was uneventful. There was no change of crew and no defect was reported on the first sector. The aircraft departed from Dubai for Kozhikode at 10:00 UTC as flight AXB 1344 carrying 184 passengers and six crew members.</p> <p>AXB 1344 made two approaches for landing at Kozhikode. The aircraft carried out a missed approach on the first attempt while coming into land on runway 28. The second approach was on runway 10 and the aircraft landed at 14:10:25 UTC. The aircraft touched down approximately at 4,438 ft on 8,858 ft long runway, in light rain with tailwind component of 15 knots and a ground speed of 165 knots. The aircraft could not be stopped on the runway and this ended in runway overrun. The aircraft exited the runway 10 end at a ground speed of 84 knots and then overshot the RESA (Runway End Safety Area), breaking the ILS (Instrument Landing System) antennae and a fence before plummeting down the tabletop runway. The aircraft fell to a depth of approximately 110 ft below the runway elevation and impacted the perimeter road that runs just below the tabletop runway, at a ground speed of 41 knots and then came to an abrupt halt on the airport perimeter road just short of the perimeter wall. There was fuel leak from both the wing tanks; however, there was no postcrash fire. The aircraft was destroyed and its fuselage broke into three sections. Both engines were completely separated from the wings. The rescue operations were carried out by the ARFF (Airport Rescue and Fire Fighting Services) crew on duty with help of Central Industrial Security Force (CISF) personnel stationed at the airport and several civilians who rushed to the crash site when the accident occurred. Upon receipt of the information about the aircraft crash the district administration immediately despatched fire tenders</p>	CO4	20

	<p>and ambulances to the crash site. Nineteen passengers were fatally injured and Seventy Five passengers suffered serious injuries in the accident while Ninety passengers suffered minor or no injuries. Both Pilots suffered fatal injuries while one cabin crew was seriously injured and three cabin crew received minor injuries. The rescue operation was completed at 16:45 UTC (22:15 IST)</p> <p style="text-align: center;"><i>Source (AAIB Investigation Report August 2021)</i></p> <p>Identify potential root causes of this incident using 4M analysis.</p>		
Q 11	<p>What is the hierarchy of risk control?</p> <p>You are working as a safety advisor in a reputed residential school. The school management has decided to resume operations after the Covid-19 lockdown. Identify five new hazards expected while resuming the operation and suggest measures to control the risk as low as reasonably achievable.</p>	5+15	CO5