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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, April 2018

Programme: B. Tech -FSE
Course Name: Advanced Safety Engineering & Management
Course Code: FSEG 431
No. of page/s: 2

Semester – VIII
Max. Marks : 100
Duration : 3 Hrs

Section A

Answer all the questions:

4 * 5 = 20 Marks

1. Differentiate Fault Tree Analysis and Event Tree Analysis.
2. What do you understand by PDCA cycle?
3. Describe the elements in 5W1H methodology
4. Illustrate the domino theory of accident causation.

Section B

Answer all the questions:

4 * 10 = 40 Marks

5. What is safety culture? Explain different theories of leadership.
6. List out the major changes made in ISO 45001:2018 compared to OHSAS 18001.
7. Describe the requirements of interview process that would help to obtain best quality information from witness regarding a workplace accident
8. Heinrich's theory have greatest impact on the practice of safety and have done the most harm. Discuss.

Section C

Answer all the questions:

2 * 20 = 40 Marks

9. Number of employees worked in Avnet Industries for the year 2017 is given below. Total working days during the year was 300 and average working hours for any employee was 8 hours. It is also reported that 1500 hours of overtime works were performed during the year.

Time period- 2016	Morning Shift	Night Shift
January to April	1000	1000
May to August	2000	1000
September to December	1000	2000

The following are the injury statistics of the company for the year 2016

- a) Number of fatalities - 3
- b) Number of reportable accidents – 7
- c) Number of lost time accidents - 15
- d) Number of first Aid injuries- 20

Calculate reportable accident and lost time injury frequency rates and incidence rates for the year 2017

10. a. Determine all the minimal cut sets for the following motor problem. (10)
- b. Calculate the probability of occurrence of the top event for the above problem. (10)

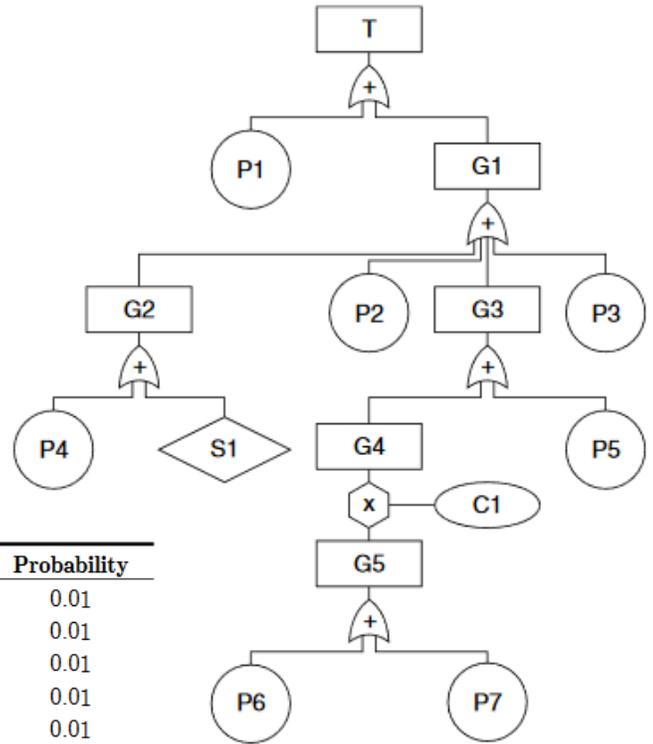
Let T denote the top event

P denote primary events (circles)

G denote intermediate events (rectangles)

S denote undeveloped events (diamonds)

C denote conditioning events (ovals) [similar to and gate]



Event	Description	Probability
P1	Defect in motor	0.01
P2	Wire failure (open)	0.01
P3	Power supply failure	0.01
P4	Switch fails open	0.01
P5	Fuse failure under normal conditions (open)	0.01
P6	Wire failure (shorted)	0.01
P7	Power failure (surge)	0.01
S1	Switch opened erroneously	0.001
C1	Fuse fails open	0.50

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Name of the School (Please tick, symbol is given)	:	SOE	<input checked="" type="checkbox"/>	SOCS		SOP	
Programme	:	B. Tech -FSE					
Semester	:	VIII					
Name of the Course	:	Advanced safety engineering and management					
Course Code	:	FSEG 431					
Name of Question Paper Setter	:	Arun P A					
Employee Code	:	40001673					
Mobile & Extension	:	9072346002					
Note: Please mention additional Stationery to be provided, during examination such as Table/Graph Sheet etc. else mention "NOT APPLICABLE":							
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Section A

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3. Describe the elements in 5W1H methodology.
4. Illustrate the system theory of accident causation.

Section B

Answer all the questions:

4 * 10 = 40 Marks

5. Explain different theories of leadership.
6. List out the major changes made in ISO 45001:2018 compared to OHSAS 18001.
7. Describe the requirements of interview process that would help to obtain best quality information from witness regarding a workplace accident
8. Outline various lagging and leading indicators used in measuring safety performance.

Section C

Answer all the questions:

2 * 20 = 40 Marks

9. A forklift skidded on an oil spill causing serious injury to a visitor
 - a. You immediately reached the accident spot, explain how you are going to respond to this accident (8)
 - b. Explain why this accident should be investigated (4)
 - c. What are the different evidences that you will scrutinize to identify the root cause of this accident? (8)

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b. Calculate the probability of occurrence of the top event for the above problem. (10)

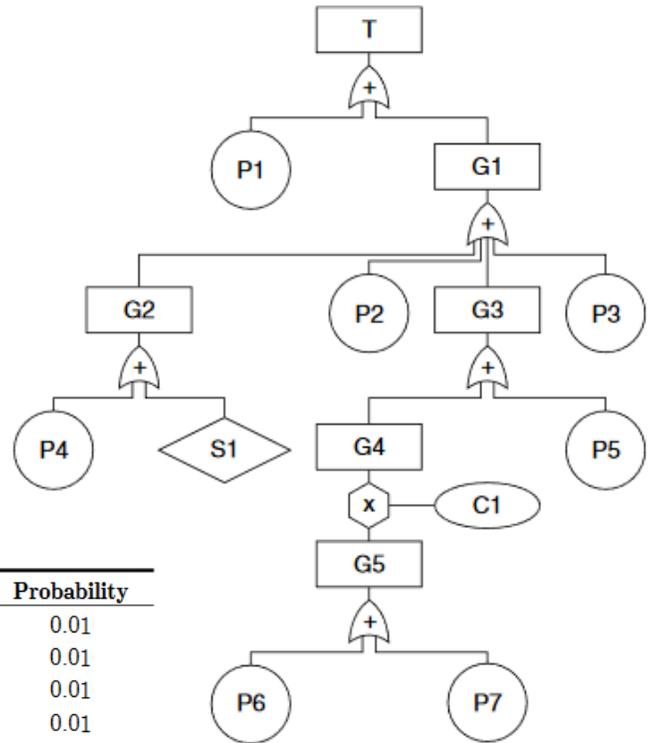
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S1	Switch opened erroneously	0.001
C1	Fuse fails open	0.50