



**ANSWER THE FOLLOWING QUESTIONS**

**QUESTION # 1 (20 degrees)**

Failures have a great impact on the society and its economy. The lessons learned from failure analysis have resulted in improvements in the overall housekeeping and discipline. Discuss briefly the main lessons learned from the failure analysis. (20)

**QUESTION # 2 (20 degrees)**

- A) Improper design, operation and service abnormalities represent some of the common causes of failure of structures. Discuss the main items in these defects with some examples. (10)
- B) Explain briefly the conventional nondestructive techniques which are used in failure analysis of structures. (10)

**QUESTION # 3 (20 degrees)**

- A) Explain briefly the steps of failure in structures due to fatigue. (10)
- B) What is the aim of the macroscopic examination, state the main features revealed from the macroscopic examination. (10)

**QUESTION # 4 (20 degrees)**

What is meant by fault tree analysis (FTA)? Explain this technique and apply it to analyze the probability of failure of a practical application. (20)

**QUESTION # 5 (20 degrees)**

- A) What is meant by forensic failure analysis? Discuss the case of collapse of domestic ladders. (10)
- B) What is the relevant background information to be collected for any failed part before failure analysis? (10)

*With best wishes*

This exam measures the following ILOs															
Question number	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
skills	A1	A1	A3	A1	A4	B2	B2	B5	B5	B2	C1	C3	C1	C3	C3
	Knowledge & Understanding					Intellectual					Professional				