CFSP Process Applications

Section 1: Multiple Choice

EXAMPLE

Candidate Exam Number (No Name):

Please write down your name in the above provided space. Only one answer is correct. Please circle only the best possible answer.

1 : Which of the following does not affect PFDavg?

A. Lambda D.

B. Proof test interval.

C. Proof test coverage.

D. SFF

2 : An cyclic process runs through a complete cycle every week. A hazardous event expected to place a demand on the safety function one time per cycle. A Type A single channel (1oo1) SIF has been designed with external automatic diagnostics (not part of safety function) that also runs every week. The following data is provided for the entire SIF:
Lambda DD = 0.002 failures per year,
Lambda DU = 0.0004 failures per year,
Lambda SD = 0.006 failures per year,
Lambda SU = 0.003 failures per year.
The safety functions is fully proof tested every six months.
To what SIL does this design qualify?

A. Does not meet any SIL

B. SIL1

C. SIL2

D. SIL3

3 : For de-energize-to-trip safety system configurations using identical components in low demand mode, which is the correct ranking of architectures in terms of spurious trip rate:

A. Lowest 1oo2, 2oo2, 2oo3, 1oo1 Highest

B. Lowest 1oo1, 2oo2, 2oo3, 1oo2 Highest

C. Lowest 2oo2, 2oo3, 1oo2, 1oo1 Highest

D. Lowest 2oo2, 2oo3, 1oo1, 1oo2 Highest

4 : What does it mean for a system to have a fault tolerance of 2:

A. Never fail dangerous after 1 random failure

B. Never fail dangerous after 1 systematic failure

C. Never fail dangerous after 2 random failures

D. Never have 2 random failures

5 : What is the best definition of risk?

A. Consequence x Likelihood

B. Likelihood x Frequency

C. Consequence x Vulnerability

D. Occupancy x Vulnerability

6 : How many systematic hardware failures can a 2oo4 system withstand without losing the ability to perform the safety function?

A. 0

B. 1

C. 2

D. 3

7 : If a system with a wear out time of 5 years in normal service is proof tested every 3 years and replaced every 6 years, what is the average probability of failure on demand in normal service assuming a dangerous failure rate of 0.01 failures per year?

A. 0.03

B. 0.015

C. 0.025

D. 0.083

E. It cannot be properly calculated under these conditions.

8 : Which of the following is not typically a mitigation layer of protection?

A. Containment dike or bund

B. Emergency services

C. Fire suppression

D. Alarm with operator intervention

9 : Where is the best place to find information about a safety system component?

A. IEC 61508

B. IEC 61511

C. The Safety Manual from the supplier

D. Plant procedure documents

10 : A “smart” transmitter has a total failure rate of 0.08 failures/year. The percentage of safe failures is 75% and diagnostic coverage of dangerous failures is 20%. Assuming all diagnosed dangerous failures will immediately be converted to a safe process shutdown, what is the average probability of failure on demand if the transmitter is tested four times per year. The Mean Time To Repair is estimated to be 8 hours.

A. 0.0002

correct to: will not

B. 0.0040

C. 0.0020

D. 0.0016