FACULTY OF ENGINEERING

B.E. 4/4 (ECE) II-Semester **(Main)** Examination, May 2011

Subject : **Design of Fault Tolerant Systems**
(Elective-II)

Time : 3 Hours

Max. Marks: 75

Note: Answer **all** questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1.   Define Reliability   (2)
2.   Explain relation between Reliability and Mean time between failures.   (3)
3.   Distinguish between fault detection and fault location.   (3)
4.   What is temporary fault?   (2)
5.   A first generation computer contains 10000 thermionic valves each with
     $\lambda=0.5\%/(1000$ hours). What is the period of 99% reliability.   (3)
6.   Find the overall reliability of a series of a series system having
     N' subsystems of reliability 'R'.   (2)
7.   What is the need of self checking circuits ?   (2)
8.   What is fail-soft operation?   (2)
9.   Give the block diagram of signature analyzer circuit.   (3)
10. Give the block diagram of a simple built in test for VLSI clips.   (3)

PART – B (5x10=50 Marks)

11. Explain the different modeling schemes of faults that generally come
     across in digital circuits.

12. What is meant by active repair time and passive repair time referred in
     maintainability of a system? Derive the expression for MTTR.   (10)

13. With an example, explain the basic principle of transition count testing.
     Also give its merits and demerits.   (10)

14.(a) Explain the two major techniques employed in static Redundancy.   (6)
   (b) Explain techniques used for detection of fault in individual modules of a
       dynamic redundancy.   (4)

15. Obtain the output equations for a fail safe machine for the given state table:

Present State	Input			
	I_1	I_2	I_3	I_4
A	C, O	C, O	A, O	A, O
B	B, O	C, O	D, 1	A, O
C	C, O	B, O	A, O	A, O
D	B, 1	A, O	D, 1	A, O
E	E, O	E, O	A, O	A, O

16.   A circuit realizes the function
         $Z = X_1 X_4 + X_2 X_3 + X_1 X_4$

         Using Boolean Difference method find the test vectors for SAO, SA1
         faults on all input lines of the circuit.

17. Discuss about scan path technique in detail.