

[This question paper contains 3 printed pages.]

Your Roll No.

3223

J

MEE

Paper—EE.663

Fault Tolerant—Digital Systems

Time : 3 Hours

Maximum Marks : 100

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt any five questions.

All questions carry equal marks.

1. (a) Taking the exponential failure law to be valid, derive the expressions for the reliability of series and parallel system. Is it $R_{PS} > R_{SP}$? 10
- (b) Discuss the functioning of a tandem non-stop system;

Or,

A sperry univac 1100/60;

in connection with fault-tolerant specialized architecture. 10

2. (a) Explain the principle of 'transition counting' introduced by Prof. J. P. Hayes. 6
- (b) Explain what do you mean by 'totally self-checking'

[P. T. O.]

circuits. Can you illustrate the working of a totally self-checking two-rail circuits with six input pairs.

14

3. (a) For state identification experiments explain the formation of characterizing sequences. . 10

(b) Can you identify the synchronous deterministic FSM, if the said machine produces the output sequence Z in response to the input sequence X as shown below :

X : 0 0 0 0 0 1 0 0 1 0 1 0

Z : 1 0 0 1 0 0 0 0 0 1 1 1

Assume that the said machine gives input/output pair at time t_k as $I(t_k)/O(t_k)$. 10

4. (a) For software fault tolerance in digital system explain in brief the terms : (i) Robustness, (ii) Temporal Redundancy, (iii) Software diversity.

6

(b) Explain the functioning of the Recovery block introducing the concept of dynamic redundancy for real-time application. 14

5. (a) Explain the term modular sensorialization and algorithmic pattern generation in connection with the test methods development for microprocessors.

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- (b) Explain the meaning of the term 'dead-lock' in RTOS. 6
6. (a) Explain how does internetwork interface carry out the task for internetwork communication. 10
- (b) What do you mean by Commitment, Concurrency and Recovery relationship and CCR services, explain in brief. 10
7. Write short notes on any *two* of the following : 10 × 2
- (a) Designing easily testable combinational circuits with syndrome testing principle.
- (b) Check sum code, Berger code, Residue/Inverse residue code.
- (c) Bridging faults and Stuck-open faults in digital hardware.