

B.TECH SEM – VII (2007 COURSE) (PRODUCTION ENGG.) :
WINTER - 2017
SUBJECT : ELECTIVE - I : RELIABILITY ENGINEERING

Day : **Monday**
Date : **22/01/2018**

Time **02.30 PM TO 05.30 PM**
Max. Marks : **80**

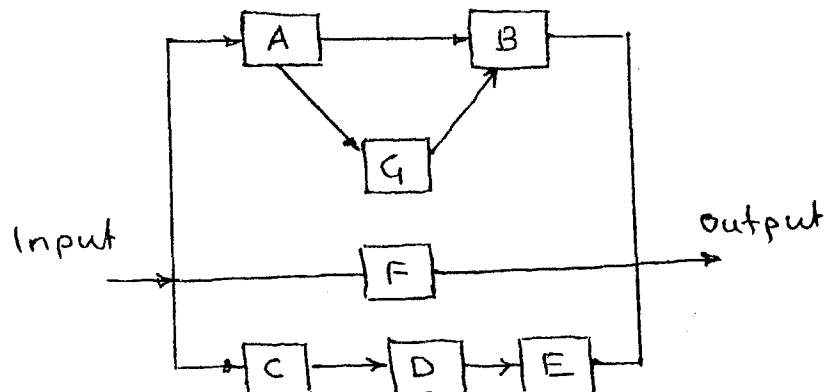
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N. B. :

- 1) **Q. No. 1 and Q. No. 5 are COMPULSORY.** Out of remaining attempt **ANY TWO** questions from each section.
- 2) Answers to both the sections should be written in **SEPARATE** answer books.
- 3) Figures to the right indicate **FULL** marks.
- 4) Draw neat diagram **WHEREVER** necessary.
- 5) Use of non programmable pocket calculator is **ALLOWED**.
- 6) Assume suitable data, if necessary.

SECTION - I

- Q. 1**
- a) Explain the significance of random failure region in a both tube curve. (05)
 - b) Explain the methodology of constructing fault tree diagram? (05)
 - c) Define the term MTBF. (04)
- Q. 2**
- a) Explain how one can determine the following from the experimental or filed failure data of a product: (07)
 - i) Failure density function
 - ii) Failure rate
 - iii) Reliability
 - iv) Mean time to failure
 - b) Discuss in detail the stochastic process. (06)
- Q. 3**
- a) Discuss the method of finding the criticality of a component using 'Risk Priority Number'. (07)
 - b) Discuss the advantages and field of applicability of FEMA and FMECA. (06)
- Q. 4**
- a) Discuss the redundancy in reliability system. (07)
 - b) Find the reliability of the system show in the figure 1. through optimal tie set or optional cut set if each one has got reliability of 0.93. Find out the reliability of the system. (06)



P. T. O.

SECTION - II

- Q. 5** a) Discuss in detail the survival rate? (05)
b) Explain the safety factors related to reliability. (05)
c) Explain reliability with stand by system. (04)

- Q. 6** a) Discuss briefly the 'AGREE' method of allocation of reliability among the component of a system. (05)
b) Following data refers to the allocation of reliability to each component in the system: (08)

Sr. No. (i)	No. of components (Ni)	Operating time (ti)	Probability of system failure due to failure of sub system (Wi)
1	15	10	1.00
2	25	9	0.95
3	100	10	1.00
4	70	8	0.90

Find out the failure rates of components so that the system reliability becomes 0.995 using AGREE method.

- Q. 7** a) Justify with neat sketch the trade off between preventive and corrective maintenance. (07)
b) How are system effectiveness and costs inter related in reliability maintenance? (06)
- Q. 8** a) Explain the Morkov analysis of two independent components? (07)
b) Discuss CTMS model used in reliability testing.. (06)

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