

**8E4052**

Roll No. : \_\_\_\_\_

Total Printed Pages : **4****8E4052**

B. Tech. (Sem. VIII) (Main/Back) Examination, February/March - 2011  
Mechanical Engg.  
8ME4.1 Reliability and Maintenance Engg. (Elective - II)

Time : 3 Hours]

[Total Marks : 80

[Min. Passing Marks : 24

Attempt any **five** questions, selecting one question from each unit. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.  
(Mentioned in form No. 205)

1. \_\_\_\_\_ Nil \_\_\_\_\_

2. \_\_\_\_\_ Nil \_\_\_\_\_

### UNIT - I

- 1 (a) Discuss the basic maintenance concept. Also discuss the objectives of maintenance.
- (b) Draw a typical organizational chart for a maintenance department intended for an automobile ancillary industry.
- (c) How does corrective maintenance differ from preventive maintenance? What is the relationship between the two?
- 6+6+4

OR

- 2 (a) Suppose you are the chief of a maintenance department of a cement plant. Discuss your plan for implementing maintenance by objectives.
- (b) What is the impact of maintenance cost on production cost? Discuss.
- (c) Explain the role of planning techniques in the efficient performance of maintenance functions.
- 8+4+4

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[Contd...

## UNIT - II

- 3 (a) What is predictive maintenance? Explain the equipments used in predictive maintenance.
- (b) Explain various condition monitoring techniques used in practice.
- (c) Write short note on total productive maintenance.

6+6+4

OR

- 4 (a) State the advantages and disadvantages of ultrasonic techniques over radiography in testing turbine blades and weldments in pressure vessels.
- (b) Discuss various computerized maintenance models used in practice.
- (c) Explain liquid penetrate testing technique in brief with neat sketch.

6+6+4

## UNIT - III

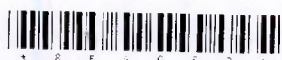
- 5 (a) What is reliability? How it can be applied to existing system?
- (b) What is difference between reliability and quality?
- (c) The time-to-failure density function (PDF) for a system is  $f(t) = 0.01$   $0 \leq t \leq 100$  days  
find :
- (i)  $R(t)$
- (ii) The hazard rate function
- (iii) The MTTF
- (iv) The standard deviation

4+4+8

OR

- 6 (a) Explain why weibull distribution is more appropriate in case of reliability evaluation?
- (b) Explain both tub curve.
- (c) Explain the terms MTTR and MTBF.

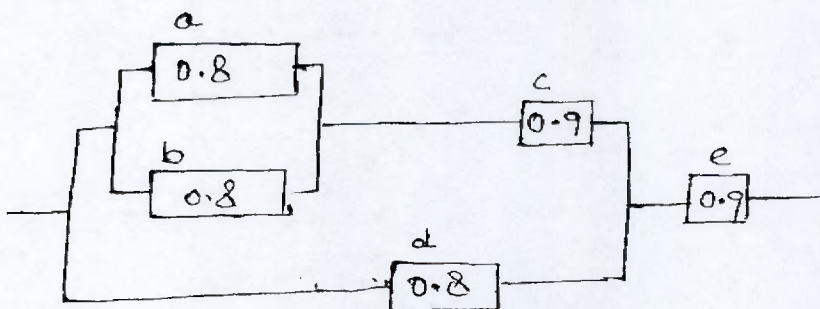
6+4+6





## UNIT - IV

- 7 (a) Five elements (a,b,c,d and e) of a system are connected as shown in figure which also indicates reliability of each element. Determine the reliability of system.

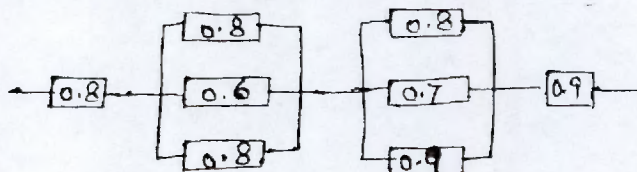


- (b) Explain the methods for improving reliability during design.  
 (c) Discuss different types of redundancy being used in practice.

8+4+4

OR

- 8 (a) Consider a system with series and parallel connection as shown in fig. which also shows the probabilities of functioning of each element. Find the reliability of whole system.



- (b) What is pareto curve? How will you use it in reliability improvement?

10+6

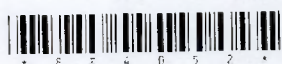
## UNIT - V

- 9 (a) Discuss the factors which need to be considered for implementation of an efficient spare parts control system.  
 (b) What is meant by ABC analysis? How might an organization can use it in spare parts control?

8+8

OR

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[Contd...

- 10 (a) What are XYZ and VED approaches? How they can be used in spare parts control?
- (b) Explain how spare parts cost can be optimized?
- (c) What are features and categorization of spares?

8+4+4

