[Total No. of Questions - 9] [Total No. of Printed Pages - 3] (2125)

15284

B. Tech 7th Semester Examination

Maintenance and Reliability (NS)

ME-411(c)

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : The question paper consists of five sections A, B, C, D and E. Attempt any one question from sections A, B, C & D. Section E is compulsory.

SECTION - A

1. (a) Write in brief about (i) Maintenance Evolution (ii) Maintenance Economics. State the relationship of maintenance management with other functional areas. (10)

   (b) What are various preventive maintenance functions associated with maintenance of a thermal power plant? Explain in detail. (10)

2. (a) Define various maintenance strategies. Provide comparison among them on the basis of their advantages and disadvantages. (10)

   (b) State the importance of training and safety aspects in maintenance by taking an example from any process plant. (10)

[P.T.O.]

SECTION - B

3. Define Condition based monitoring (CBM) as maintenance strategy. What are the main stages in Condition based monitoring? Discuss. Explain Functional failure analysis and P-F curve in CBM. (20)

4. Define Reliability centered maintenance. Where it was originated? State its importance over reactive or breakdown maintenance. Provide a sketch for RCM maintenance decision logic diagram and explain its importance. (20)

SECTION - C

5. (a) What are Non destructive testing techniques? Provide a comparison between them and discuss thermography technique by citing an application. (7)

   (b) State importance of lubricant and oil analysis and enlist various methods for analysis of them. (7)

   (c) State the importance of documentation in maintenance planning and control. How it can be used to enhance maintenance productivity? (6)

6. (a) In general what are various ingredients for maintenance planning and control system MPCS? State the need for effective maintenance planning and control system MPCS in machine tool industry. (10)

   (b) State the merits and demerits of NDT techniques. Also provide neat sketches illustrating their working. (10)

SECTION - D

7. How reliability, maintainability and availability are defined? Assume that constant failure rate of tires 1, 2, 3, 4 of car are λ_1 = 0.000015 failures per hour λ_2 = 0.00002 failures per hour sysλ_3 =0.000035 failures per hour λ_4 = 0.000040 failures per

hour, respectively. For practical purposes the car cannot be driven when any one of the tyres is puncture. Calculate the total failure rate for the tyre system and mean time to failure of the car with respect to tyres. (20)

8. Provide a checklist to assess the maintainability improvement program. Also explain how a checklist can help in performing fault diagnosis. (20)

SECTION - E

9. Attempt all questions:

(i) What are the advantages of preventive maintenance over the breakdown maintenance?

(ii) What is Pareto analysis? How it is carried out?.

(iii) What are TPM pillars?

(iv) What is ultrasonic testing? How it is carried out?

(v) State the benefits of condition based maintenance over the reactive maintenance

(vi) What are the maintenance activities which are normally undertaken during service of your vehicle?

(vii) For what purpose endoscopes are used?

(viii) Explain some barriers for implementation of TPM programs in industries

(ix) State the potential benefits of CBM in a plant

(x) Maintenance is a necessary evil. Explain. (2×10=20)