

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**M.Tech., Winter 2017 - 18 Examination**

**Semester: 1**  
**Subject Code: 03218131**  
**Subject Name: Reliability Engineering and Maintenance**

**Date: 04/01/2018**  
**Time: 02:00 pm to 04:30 pm**  
**Total Marks: 60**

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**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1** A) What is Bathtub Curve? Draw and explain. (05)
- B) Explain Memorylessness problem. (05)
- C) An engine tune-up kit consists of 3 parts each having CFRs (in failures per mile) of .000034, .000017, and .0000086. Find the MTTF, median time to failure, standard deviation, and reliability of the tune-up kit at 10,000 miles. (05)
- Q.2 Answer the following questions.** (Attempt any three) (Each five mark) (15)
- A) Write down ways to improve reliability and brief them.
- B) Explain and derive the exponential reliability function.
- C) What is component reliability and maintainability? Explain.
- D) Derive the equation of hazard rate function.
- Q.3** A) Explain analysis of down time with figure. (07)
- B) Explain Availability in terms of Inherent availability, achieved availability and Operational availability. (08)
- OR**
- B) Explain binomial acceptance testing in detail. (08)
- Q.4** A) Write difference between individual replacement and group replacement and when they are applied? (07)
- OR**
- A) Write a short note on vibration monitoring. (07)
- B) Make FMEA for Bearing. (08)