**(3 Hours)** **Total Marks: 80**

**Note:**

1. **Question No. 1 is compulsory.**
2. **Attempt any THREE out of the remaining FIVE questions.**
3. **Assume suitable data if necessary.**

**Q. 1.** Answer **any FOUR** of the following: **(20)**

(a) Explain the term MTTF. Also derive it with respect to reliability and CDF.

(b) Write short note on FMECA with an example.

(c) Define system effectiveness?

(d) What is inspection and repair availability model? Explain a case for it.

(e) Explain Skewness and Kurtosis.

**Q. 2.** (a) The time to wear for a cutting tool is distributed normally with a mean of 2.8hour and standard deviation of 0.6 hour. Find **(10)**

I. The probability that the tool will wear out in 1.5 hours

II. Find out the reliability for 1.5 hours

III. How often the cutting edge of the tool must be replaced in order to keep the failure less than 10 percentage?

(b) Explain reliability of Series and Parallel systems with example. **(10)**

**Q. 3.** (a) Define the term reliability? Explain the reliability function **(10)**

(b) What is mixed redundancy? **(10)**

**Q. 4.** (a) Compare unit vs Component Redundancy with sketches **(10)**

(b) With a block diagram explain the reliability design process. **(10)**

**Q. 5.** (a) Find out the system reliability for a serial and parallel configuration with 2 components **(10)**

(b) Explain Weibull Model and how it is useful in reliability engineering? **(10)**

**Q. 6.** **Attempt the following:-** **(20)**

(a) What is MTBF?

(b) Differentiate between Repair Vs Replacement

(c) Draw and explain Bath tub Curve

(d) State the difference between reliability and quality

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