

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS

II-B.TECH-I-Semester End Examinations (Supply) - December- 2025
NUMBER THEORY & STATISTICAL METHODS
(CSC)

[Time: 3 Hours]

[Max. Marks: 70]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A**(20 Marks)**

1. a) Define Point estimator. [2M]
- b) Write the difference between the sampling distribution of the sample mean and the sample mean. [2M]
- c) Explain briefly the student t-test. [2M]
- d) Write test of significance for small samples. [2M]
- e) State prime number theorem. [2M]
- f) Find GCD of 36 and 54. [2M]
- g) Write Linear Diophantine equation. [2M]
- h) What is the divisibility rule for 7 [2M]
- i) State Wilson's theorem. [2M]
- j) Compute $\sigma(2000)$. [2M]

PART-B**(50 Marks)**

2. A random sample of size 2 is drawn from without replacement the population 3, 4, 5. Find (i) population mean (ii) population Standard deviation (iii) mean of the sampling distribution of means. [10M]

OR

3. A company claims that the mean life time of tube lights is 500 hours. Is the claim of the company tenable if a random sample of 25 tube lights produced by the company has mean 518 hours and standard deviation 40 hours? [10M]
4. In a sample of 1000 people in karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 5% level of significance? [10M]

OR

5. A sample of 26 bulbs gives a mean life of 990 hours with a standard deviation of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not upto the standard? [10M]

6. Find the gcd of (252, 192) using Euclidean algorithm. [10M]

OR

7. The canonical decomposition of (i) 999 (ii) 1024. [10M]

8. Find the remainder when 3^{181} is divisible by 17. [10M]

OR

9. Find the solutions of the following system of linear congruence $4x+y=2(\text{mod } 5)$, $2x+3y=1(\text{mod } 5)$. [10M]

10. State and prove Fermat's little theorem. [10M]

OR

11. Find $\phi(n)$ for the integer n with $13 \leq n \leq 20$. [10M]
