Code No.: MA305BS | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–I–Semester End Examinations (Supply) – August - 2023
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) What is the value of correction factor if n= 10 and N = 100? [2M]
   b) Explain point Estimation? [2M]
   c) Define Level of significance? [2M]
   d) Define Type-I and Type-II errors? [2M]
   e) Define GCD? [2M]
   f) Write prime and composite numbers? [2M]
   g) Solve the Congruence $21x \equiv 9 \pmod 5$ [2M]
   h) Define Congruence? [2M]
   i) State Wilson's theorem. [2M]
   j) State Euler 's theorem. [2M]

PART-B **(50 Marks)**

2. The heights of 10 males of a given locality are found to be 70,67,62,68,61,68,70,64,64,66 inches. Is it reasonable to believe that the average height is greater than 64 inches? Test at 5% level and 9 is degrees of freedom. (t=1.833 at 0.05) [10M]

OR

3. A population consists of five numbers 3, 6, 9, 15 and 27. Consider all possible samples of size 3 that can be drawn without replacement from this population Find [10M]
   i. The mean of the population.
   ii. The standard deviation of the population.
   iii. The mean of the sampling distribution of means.
   iv. The standard deviation of the sampling distribution of means.

4. An oceanographer wants to check whether the mean depth of the ocean in a certain region is 57.4 fathoms, as had previously been recorded. What can he conclude at the level of significance α =0.05, if Surroundings taken at 40 random locations in the given region yielded a mean of 59.1 fathoms with a standard deviation of 5.2 fathoms? Also calculate 95 % confidence interval. [10M]

OR

5. Find the maximum difference that we can expect with probability 0.95 between the means of samples of sizes 10 and 12 from a normal population if their standard deviations are found to be 2 and 3. [10M]

6. If p is a prime and p/ab then show that p/a or p/b. Using the canonical decompositions of 720 and 8800, find their GCD and LCM. [10M]

OR

7. Write about GCD and LCD If (a,b) = 1 then a/bc prove that a/c. [10M]

8. State and prove Chinese remainder theorem. [10M]

OR

9. Write about Linear Dlophantine equations? Check whether the LDE 2019x+2022y =2021 has a solution or not? [10M]

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

OR

11. Prove that $(16+21)^{23} = 16^{23}+21^{23} \pmod{23}$. [10M]

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