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

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–I–Semester End Examinations (Supply) -February- 2024
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 Sample Space and event.   [2M]
   b) Define conditional probability.   [2M]
   c) What is the effect on standard error, if sample is taken from an infinite population size is increased from 400 to 900.   [2M]
   d) Explain the chi square test.   [2M]
   e) Find the canonical decomposition of 1919.   [2M]
   f) Find GCD of 5295,4321   [2M]
   g) State the Chinese Remainder theorem.   [2M]
   h) Define Congruence?   [2M]
   i) State Wilsons theorem?   [2M]
   j) Compute $\Phi(6120)$.   [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 60 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 i) The mean of the population, ii)The standard deviation of the population, iii)The mean of the sampling distribution of means and iv)The standard deviation of the sampling distribution of means.   [10M]

4. A random sample of size 64 is taken from an infinite population having the mean 45 and the standard deviation 8. What is the probability that sample mean will be between 46 and 47.5   [10M]

OR

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

6. State and Prove fundamental theorem of Arithmetic.   [10M]

OR

7. If p is a prime and p/ab then show that p/a or p/b.   [10M]

8. Using modular Exponentiation, find the remainder when 2^{35} is divided by 7   [10M]

OR

9. Find the solution to the linear Diophantine equation 47x+30y=1   [10M]

10. Solve the linear congruence $4x \equiv 7(\mod 15)$ Using Euler's theorem.   [10M]

OR

11. State and Prove Format 's little theorem   [10M]

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