Code No.: MA302HS	R20	H.T.No.			8	R						

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–I–Semester End Examinations (Supply) - June- 2025
PROBABILITY AND STATISTICS
(AI&DS)

[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) State Baye's theorem. [2M]
   b) Define Chebeyshev's inequality. [2M]
   c) Define the properties of binomial distribution. [2M]
   d) If a random variable has a poisson distribution such that P(X=1) = P(X=2) find mean. [2M]
   e) Define the properties of normal distribution. [2M]
   f) Define the properties of gamma distribution. [2M]
   g) Write the normal equations of second degree parabola. [2M]
   h) Prove that correlation coefficient is the geometric mean of two regression coefficients. [2M]
   i) Define one tailed and two tailed test. [2M]
   j) Define properties of t distribution. [2M]

PART-B **(50 Marks)**

2.a) A bag A contains 2 white and 3 red balls and a bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball drawn is from bag B. [5M]

b) A random variable X has the following probability distribution : [5M]

x	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Find i) K ii) Mean iii) Varaince

OR

3. A continuous random variable has the p.d.f $f(x) = \{ke^{-|x|} \quad -\infty \leq x \leq \infty$ [10M]
Determine i)k ii) mean iii) variance

4. Derive mean and variance of binomial distribution. [10M]

OR

5.a) Assume that 50% of all engineering students are good in Mathematics .Determine the probability that among 18 engineering students i) exactly 10 ii) at least 10 iii) at most 8 are good in mathematics. [5M]

b) Average number of accidents on any day on a national highway is 1.8 .Determine the probability that the number of accidents are i) atleast one ii) atmost one iii) exactly one. [5M]

6. In a normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution. [10M]

OR

7. Derive mean and variance of normal distribution. [10M]

8. Show that the maximum value of rank correlation coefficient is 1. [10M]

OR

9. From a sample of 200 pairs of observation the following quantities were calculated [10M]
$\sum X = 11.34, \sum Y = 20.78, \sum X^2 = 12.16, \sum Y^2 = 84.96, \sum XY = 22.13$
From the above data show how to compute the coefficients of the equation Y= a+bX.

10.a) A lady stenographer claims that she can take the dictation at the rate of 120 words per minute. Can we reject the claim on the basis of 100 trials in which she demonstrates a mean of 116 words with a SD of 15 words. [5M]

b) A die is tossed 256 times and it turn up with an even digit 150 times. Is the die biased? [5M]

OR

11. Prices of shares of a company on the different day in a month were found to be 66,65,69,70,69,71,70,63,63,64 and 68. Determine whether the mean price of the share in the month is 65. [10M]

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