

**MAHATMA GANDHI UNIVERSITY**  
**M.C.A DEGREE EXAMINATION**  
**MODEL QUESTION PAPER**  
**(2011 Revised Syllabi)**  
**Second Semester**

**MCA 201 PROBABILITY AND STATISTICS**

**Time:3 hours**

**Maximum: 75 Marls**

**Part A**

*Answer any ten questions.*  
*Each question carries 3 marks.*

1. Explain different approaches to probability.
2. If  $P(A) = p_1$ ,  $P(B) = p_2$ ,  $P(A \cap B) = p_3$  find  $P(A \cup B)$ ,  $P(A' \cap B)$  and  $P(A' \cup B)$
3. The odds against a person X settling an issue are 4:3 and odds in favour of another person Y settling the same issue are 7:8. What is the probability that the issue will be settled if they try independently?
4. Differentiate between discrete and continuous random variables.
5. Fit a binomial distribution to the following data:

X:	0	1	2	3	4
f:	7	6	19	35	33

6. If X is a poisson variate such that  $E(X^2) = 6$ , Find  $E(X)$ .
7. Define Skewness and Kurtosis
8. The means of two samples of sizes 50 and 100 respectively are 54.1 and 50.3 and the standard deviations are 8 and 7. Obtain the standard deviation of the sample of size 150 obtained by combining the two samples.
9. Explain different methods of estimation
10. State Central limit theorem.
11. Explain 2 types of errors in testing of hypothesis
12. Define (a) Critical region (b) significance level

**(10 x 3 = 30 marks)**

**Part B**

*All questions carry equal marks.*

13. (a) In a bolt factory, machines A, B, C manufacture respectively 25%, 35% and 40% of the total. Of their output 5,4, 2 percent are known to be defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by (a) machine A (b) machine B or C

OR

(b) State and prove Baye's Theorem

14.(a) In a certain factory turning out optical lenses, there is a small chance  $1/500$  for any one lens to be defective. The lences are supplied in packets of 10. Use Poisson distribution to calculate the approximate number of packets containing no defective , one defective, two defective, three defective lenses respectively in consignment of 20,000 packets.

OR

(b) For a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation.

15(a) Ten participants ina contest are ranked by two judges as

x : 1	6	5	10	3	2	4	9	7	8
y : 6	4	9	8	1	2	3	10	5	7

Calculate the rank correlation co-efficient.

OR

(b) The two regression equations of the variables x and y are  $x=19.13 - 0.87y$  and  $y=11.64-0.5x$ . Find (i) mean of x (ii) mean of y (iii) correlation coefficient between x and y.

16. (a) Explain different types of sampling

OR

- (b) i. Explain the desirable properties of a good estimator. (5 marks)  
ii. For a poisson distribution with parameter  $\theta$  examine the consistency and unbiasedness of the sample mean (4 marks)

17 (a) An IQ test was administered to 5 persons before and after they were trained. The results are given below

Candidate	I	II	III	IV	V
IQ before training	110	120	123	132	125
IQ after training	120	118	125	136	121

Test whether there is any change in IQ after the training programme.

OR

(b) Two random samples drawn from two normal populations are

Sample 1 : 20 16 26 27 23 22 18 24 25 19

Sample 2 : 27 33 42 35 32 34 38 28 41 43 30 37

Obtain estimates of the variances of the population and test whether the populations have same variances.

**(5 X 9 = 45 marks)**