

**DHARMSINH DESAI UNIVERSITY, NADIAD.**  
**M. C. A. SEM. III**

**COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS**

DATE: 4/12/07  
DAY: Tuesday

TIME: 10:00 to 1:00  
MAX. MARKS: 60

**SECTION I**

- 1 Do as directed. [10]
- A. Indicate whether the following statements are True or False :
- Statistics cannot be misused.
  - There is difference between survey and an experiment.
  - In a symmetrical distribution, the coefficient of skewness is 1.
  - The standard deviation of binomial distribution is  $npq$ .
- B. Tick the correct answer.
- Classification is the process of arranging data in
    - different columns
    - different rows
    - different rows and columns
    - grouping of related facts in different classes.
  - Diagrams and graphs are tool of
    - collection of data
    - presentation
    - analysis
    - summarization
- C. What do you mean by Secondary data? Discuss methods of collecting primary data.
- D. What is measure of central tendency? Define various measures of central tendency.
- E. What is Chi-Square test? Describe the uses of it.
2. Attempt any TWO. [10]
- (a) A survey was conducted to know about the average number of the first information reports lodged per day in a district. For this purpose 60 districts were selected. The following gives the number of FIR lodged in the police stations of each district on a day.
- |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|
| 46 | 38 | 39 | 45 | 48 | 50 | 28 | 29 | 31 | 55 | 6  | 10 |
| 58 | 56 | 0  | 25 | 32 | 35 | 35 | 9  | 35 | 36 | 38 | 35 |
| 33 | 46 | 28 | 31 | 35 | 52 | 78 | 17 | 60 | 50 | 35 | 38 |
| 30 | 10 | 48 | 5  | 19 | 25 | 35 | 40 | 46 | 42 | 45 | 25 |
| 60 | 41 | 68 | 48 | 35 | 30 | 31 | 21 | 23 | 23 | 50 | 72 |
- Generate frequency distribution taking the first mid value is 5.  
Calculate an average FIR per day using (i) Direct Method & (ii) Short-cut method  
Draw (i) Histogram and (ii) Cumulative Frequency Curve
- (b) Define Binomial distribution. Obtain mean, variance and moment generating function of it.
- (c) For the following data find Mean, Median, Mode and Coefficients of Quartile Deviation and variation.
- |             |         |         |         |         |         |         |         |         |         |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Class :     | 54 - 56 | 56 - 58 | 58 - 60 | 60 - 62 | 62 - 64 | 64 - 66 | 66 - 68 | 68 - 70 | 70 - 72 |
| Frequency : | 37      | 76      | 132     | 115     | 72      | 50      | 15      | 2       | 1       |
3. Attempt any TWO. [10]
- (a) Calculate Karlpearson's coefficient of skewness for the following data.
- | Classes   | Frequency |
|-----------|-----------|
| 300 - 400 | 5         |
| 400 - 500 | 10        |
| 500 - 600 | 10        |
| 600 - 700 | 3         |
| 700 - 800 | 2         |
- (b) Taking an appropriate example, define the following terms.
- An event as subset
  - Equally likely events
  - Mutually exclusive events
  - Exhaustive events
  - Dependent & Independent events
- (c) A group of seven week-old chickens reared on a high protein diet weigh 12, 15, 11, 16, 14, 14 and 16 ounces, a second group of five chickens similarly treated except that they receive a low protein diet weighted 8, 10, 14, 10 and 13 ounces. Test whether there is sufficient evidence that additional protein has increased the weight of the chickens.

**SECTION II**

4. Answer the following questions: [10]
- a. Explain any two methods of determining trend in a time series.
  - b. Explain Forward difference & backward difference in brief.
  - c. Which method is better to find a root of an algebraic equation? Why?
  - d. Derive the formula of Simpson's 1/3 rule.
  - e. Discuss utilities of time series analysis.
5. Attempt any TWO. [10]
- (a) Find a root for the given function using Newton - Raphson method.  

$$f(x) = x^2 - 2x - 5$$
  - (b) Solve the given differential equation  $y' = x^2 + y^2$ , with initial condition  $y(0) = 1$ . Find  $y(0.2)$  and  $y(0.4)$  using Runge Kutta fourth order formula.
  - (c) Given the table values
 

$x$	150	152	154	156
$y=f(x)$	12.247	12.329	12.410	12.490

 Find  $y(155)$  using Lagrange's interpolation formula.
6. Attempt any TWO. [10]
- (a) Two random samples were drawn from two normal populations and their values are
 

A :	66	67	75	76	82	84	88	90	92		
B :	64	66	74	78	82	85	87	92	93	95	97

 Test whether the two populations have the same variance at the 5% level of significance.
  - (b) From the following table, find the area bounded by the curve and the x-axis from  $x = 7.47$  to  $x = 7.52$ , using Trapezoidal rule and Simpson's 1/3 rule.
 

$x$	7.47	7.48	7.49	7.50	7.51	7.52
$f(x)$	1.93	1.95	1.98	2.01	2.03	2.06
  - (c) What is an interpolation & extrapolation? Obtain Newton's Backward Interpolation Formula.