

**SECOND YEAR B.Sc. DEGREE EXAMINATION, APRIL/MAY 2005****Part III—Statistics and Subsidiary to Mathematics (Main)****Paper III—PRACTICAL**

Time : Three Hours

Maximum : 50 Marks

*Each question carries 10 marks.**Half the paper carries full marks.*

1. Calculate a suitable relative measure of dispersion for the following data :—

Class	: Below 10	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	Above 70
Frequency	: 8	18	24	30	28	20	15	7

2. Draw histogram and frequency polygon to represent the following data :—

Marks (out of 100)	: 0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of students	: 4	10	12	15	13	6

3. The contents of 3 boxes are as follows :

Box 1	: 3 orange	3 white and 3 green balls
Box 2	: 6 orange	3 white and 2 green balls
Box 3	: 4 orange	2 white and 3 green balls.

One box is selected at random and 2 balls are taken. They happened to be green and orange. What is the probability that they come from box 3 ?

4. For the following ordered pair of points, draw the scatter diagram and find the regression equations :—

(5, 53) ; (6, 57) ; (7, 59) ; (8, 59) ; (9, 58) ; (10, 59) ; (11, 63) ;

(12, 60) ; (13, 64) ; (14, 67) ; (15, 63) ; (16, 68)

5. Fit a binomial distribution for the following data :—

X	: 0	1	2	3	4	5
Frequency	: 10	20	30	20	15	5

6. Let
- $\bar{X}$
- be the mean based on 80 observations from a Poisson distribution, with parameter
- $\lambda = 10$
- .

Using Chebyshev's inequality, find a lower bound for  $P(9 \leq \bar{X} \leq 11)$ . Also find an approximation to this probability using central limit theorem.

7. Obtain the m.l.e. of
- $\theta$
- based on a random sample of size 10 from the distribution with density function
- $f(x, \theta) = x \cdot \theta^2 e^{-\theta x}$
- ,
- $x < \infty$
- . The observed values are :

2.1, 1.0, 2.3, 1.2, 1.6, 0.9, 1.8, 1.3, 2.0, 2.2.

8. Construct a 95 % confidence interval for the variance  $\sigma^2$  of the normal population with unknown mean given the following sample :—

4.5, 10.2, 10.5, 9.8, 13.0, 19.2, 15.5, 13.3, 10.8 and 16.4.

9. Eleven students are given a course to improve their IQ on a standard test. Their scores before and after the course are given below. Check the effectiveness of the course.

IQ before : 95 110 120 98 99 95 89 93 95 116 95

IQ after : 98 114 124 93 99 106 106 95 103 124 111

10. The following data represent the number of units of production per day turned out by 5 workmen using 4 types of machines :—

- (a) Test to see whether the machines differ in mean productivity.  
 (b) Test to see whether the workmen differ with respect to mean productivity.

	<i>Machine Type</i>			
<i>Workmen</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	44	38	47	36
2	46	40	52	43
3	34	36	44	32
4	43	38	46	33
5	38	42	49	39