[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 1151 **G** **Your Roll No.....**

Unique Paper Code : 237502

Name of the Paper : Applied Statistics – III (STHT-502)

Name of the Course : **B.Sc. (Hons.) Statistics**

Semester : V

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **Six** questions.
3. Use of simple calculator and normal probability tables is allowed.

1. (a) How to scale individual test items in terms of difficulty ? Give assumptions. Also explain how to obtain σ distances from the level of minimum or zero difficulty.

   (b) Define CBR and CDR. Show that CDR for a stationary population, except for the multiplier 1000, equals $1/e_0^0$. (6½,6)

2. (a) Distinguish between curate and complete expectation of life. Further show that :

$$e_x = \frac{\left(\sum_{n=1}^{\infty} l_{x+n}\right)}{l_x}$$

   (b) What are important factors that affect reliability of a test ? The following values were obtained by administering a 100 item geometrical drawing ability test to a group of 250 students of a local technical school :

   Mean score = 49.95
   Standard deviation = 12.53

   Obtain an estimate of test reliability by the Kuder-Richardson Method. (6½,6)

3. (a) What are percentile scores ? Comment on the statement that "percentile scale should be used with reservations," illustrating with the help of an example.

P.T.O.

(b) What are vital events ? Describe a few sources of data collection on these events. (6½,6)

4. (a) Explain the concept of reliability of a test. Describe the Test-Retest method of assessing the reliability of a test along with its merits and demerits.

(b) In the usual notations, prove that :

(i) $e_x^0 = e_{x+1}^0 p_x + f_x + (1-f_x)p_x$

Where $f_x = \frac{1}{m_x} - \frac{1}{q_x} + 1$

(ii) $q_x = \frac{1-(e_x - e_{x+1})}{1+e_{x+1}}$ (6½,6)

5. (a) Define GRR. Assuming that sex ratio at birth remains constant at all the ages of women in the reproductive period, find an approximate value of GRR.

(b) Distinguish between Standard scores and Mc-Call T scores stating clearly the basic assumptions underlying the two. Under what condition the two sets of scores become equal ? (6½,6)

6. (a) Define the term validity. Mention the different concepts of validity and explain any two of them in detail.

(b) Differentiate between GFR and SFR, stating clearly their merits and demerits. (6½,6)

7. (a) Define a life table explaining clearly its structure and the underlying assumptions that are used in its construction.

(b) Four items A, B, C, and D are passed by 90%, 80%, 70%, and 60% of individuals. Compare the difference in difficulty between A and B with the difference in difficulty between C and D. (6½,6)

8. (a) Discuss the method of fitting a logistic curve by the method of three selected points. How was this method improved by Pearl and Reed ?

(b) Write short notes on the following :

(i) Intelligence Tests

(ii) Effect of lengthening of a test on reliability and validity (6½,6)