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THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF PSYCHOLOGY & COUNSELLING
ACADEMIC YEAR 2024/2025– SEMESTER II

The Open University of Sri Lanka
09 JUL 2012
Department of Psychology

BSC HONS IN PSYCHOLOGY
PLU4303 – INTRODUCTION TO STATISTICS IN PSYCHOLOGY - LEVEL 4
CONTINOUS ASSESSMENT TEST – NBT I
DURATION: 1 ½ HOURS

DATE:09/07/2025 TIME: 9.00 AM – 10.30 AM

INDEX NO: .....

IMPORTANT INSTRUCTIONS/ INFORMATION TO CANDIDATES

- This question paper consists of **08 pages** with **04 Short Answer Questions (100 marks)**
- Write your INDEX number in the space provided.
- **Problem-Based Questions:** Write the answer within the space provided.
- Do **NOT** remove any page/part of this question paper from the examination hall.
- Do **NOT** keep unauthorized materials, including mobile phones and other electronic equipment, with you during the examination.
- **Non-programable calculators are allowed**

INDEX NO: .....

SHORT ANSWER QUESTIONS

1) A psychologist is interested in understanding the relationship between sleep duration and cognitive performance. She collects data from 20 participants, recording their average nightly sleep duration (in hours) and their scores on a standardized cognitive performance test. The collected data is shown below:

   Hours of nightly sleep: 5.3, 5.7, 6.1, 6.5, 6.9, 7.2, 7.5, 7.9, 8.3, 8.7, 8.9, 9.1, 9.5, 9.7, 10.2, 10.5, 10.9, 11.3, 11.7, 12.1

   Cognitive performance score: 65, 68, 70, 72, 75, 77, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106

   i. Calculate the mean and median for the cognitive performance. **(6 Marks)**

   ii. Compute the first quartile (Q1), third quartile (Q3), and the interquartile range (IQR) for the cognitive performance. **(9 Marks)**

iii. Using the provided data on cognitive performance scores, create a box plot for sleep duration. **(6 Marks)**

iv. Determine if there are any outliers in the data using the 1.5 IQR rule. **(4 Marks)**

2) A psychologist conducted a study to explore factors influencing academic motivation among university students. Data were collected from a sample of 120 students enrolled in various undergraduate programs. The variables investigated were:

a. Academic motivation level (measured on a Likert scale from 1 to 5)
b. Age
c. Gender
d. Field of study (recorded as: science, arts, business, engineering, etc.)
e. Average study hours per week
f. GPA from the previous semester
g. Employment status (recorded as: employed, unemployed)
h. Participation in peer study groups (recorded as: yes, no)

i. Identify the scale of measurement (nominal, ordinal, interval, or ratio) for each of the study variables. **(8 Marks)**

ii. Define these variables as Quantitative and Qualitative **(8 Marks)**

iii. Give 2 examples for discrete variables. **(4 Marks)**

iv. Explain the concepts of control variable using a relevant example. **(5 Marks)**

3) Considering the basic concepts in hypothesis testing and parametric tests, write the answers for the following questions.

i. Define the term 'Hypothesis Testing'. **(3 Marks)**

ii. Write the steps in Hypothesis testing. **(6 Marks)**

iii. Briefly explain the 2 types of Decision errors happen in hypothesis testing. **(4 Marks)**

iv. Identify the parametric test for each research problem. (Hint: One sample t-test, One sample -test, Two sample independent t-test, Two sample independent z-test, Paired sample t-test, and ANOVA) **(12 Marks)**

Research problem	Appropriate parametric test
A university counselor wants to determine whether students sleep significantly less than the recommended 8 hours per night. She surveys a random sample of 40 students and records their average sleep duration.	
A psychologist studies the impact of caffeine on memory performance. Two groups of participants are tested: one group drinks coffee before taking a memory test, while the other drinks a placebo. Their test scores are then compared.	
An HR researcher wants to assess whether employee satisfaction levels differ across departments in a company (e.g., Finance, Marketing, HR, and IT). A satisfaction score is collected from employees in each department.	

4) A study is conducted to examine the relationship between seatbelt use and the likelihood of injury in car accidents. The data collected from accident reports is summarized below:

Seatbelt Use	Injury	
	Yes	No
Yes	25	15
No	20	30

i. State the hypothesis. **(4 Marks)**

ii. Calculate the test statistic using the formula $\chi^2 = \sum [(O-E)^2/E]$, where O represents observed frequency and E represents expected frequency. **(15 Marks)**

iii. Determine the critical value for the chi-squared test at a significance level of 5%.

(3 Marks)

iv. What is the conclusion of this study? **(3 Marks)**

----------END OF QUESTION PAPER----------