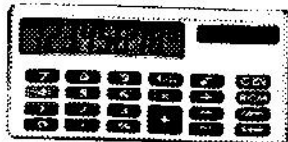


UNIVERSITY EXAMINATIONS



UNIVERSITEITSEKSAMENS

UNISA  university of south africa

**PYC304C**

( 470600) October/November 2009

**PSYCHOLOGICAL RESEARCH (PSYCHOLOGY 304)**

Duration : 2 Hours

70 Marks

EXAMINERS :

FIRST :

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SECOND :

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EXTERNAL :

PROF DJF MAREE (PRETORIA - UP)

Use of a non-programmable pocket calculator is permissible.

This examination paper consists of 20 pages including 2 blank pages for rough work (pp 19 & 20), 1 page (i) of formulae and 4 pages tables (ii-v) plus instructions for the completion of a mark reading sheet.

**This examination paper remains the property of the University of South Africa and may not be removed from the examination room.**

After completing your answers, you must hand in the following:

- The mark reading sheet.
- The question paper. (All the pages must be handed in.)

This exam paper consists of seventy items. Your mark will be converted to a mark out of 90 and 10% of your assignment mark will be added, to produce a mark out of 100. [Note that if your mark is less than 40% the assignment mark will not be added.]

**ENSURE THAT YOU HAVE WRITTEN YOUR STUDENT NUMBER AND COURSE CODE ON THE MARK READING SHEET.**

**Please complete the attendance register on the back page, tear off and hand to the invigilator.**

**NOTE: An adjustment will be made for guessing based on the number of items answered incorrectly.**

[TURN OVER]

ANSWER THE FOLLOWING SEVENTY MULTIPLE CHOICE QUESTIONS ON THE MARK READING SHEET. READ THE ATTACHED INSTRUCTIONS AND FOLLOW THEM CAREFULLY.

### Question 1

"Empirically" means "based on - - - -"

1. theory
2. statistical arguments
3. observations

### Question 2

The (a) - - - - variable can be said to "cause" the (b) - - - - variable.

1. (a) dependent (b) independent
2. (a) operational (b) measured
3. (a) independent (b) dependent

### Question 3

A psychologist is conducting a study about the self-concepts of university students. He makes the assumption that students' concepts of themselves can be used to predict their willingness to participate in class discussions. In order to be able to do a scientific study of this (a) - - - - question, he would have to provide a (an) (b) - - - - definition of the (c) - - - - called "self-concept".

1. (a) scientific (b) experimental (c) concept
2. (a) experimental (b) research (c) operational concept
3. (a) research (b) operational (c) construct

Use the following scenario to answer Questions 4 and 5:

Ross' explanation of size perception in the natural environment indicates how the estimated size of a distant object is affected by its true size, distance from the observer, and transparency of the atmosphere. He decides to investigate whether estimated size increases with haziness.

### Question 4

"Estimated size increases with haziness" is - - - -

1. an observed relation between two variables
2. a research hypothesis
3. an operational definition

**Question 5**

The dependent variable(s) in Ross' research is/are - - - - -

- true size, distance from the observer, and transparency of the atmosphere
- haziness
- estimated size

**Question 6**

A researcher studies the relationship between educational level and salary in a single selected random sample of employees of a computer company. The study is a (a) - - - - - design, because it (b) - - - - -.

- (a) group (b) compares two samples in a population
- (a) correlational (b) correlates two samples with one another
- (a) correlational (b) studies the correlation between two variables

**Question 7**

In a study, the relationship between level of physiological arousal (high and low) and mood (measured on three levels) is considered. A suitable hypothesis for the study can be viewed as a - - - - -.

- rule associating the values of 'physiological arousal' with the values of 'mood'
- correlation between the constants 'physiological arousal' and 'mood'
- rule correlating the values of the variable 'physiological arousal'.

**Question 8**

Which of the following represents the main purpose of psychological research?

- Making predictions
- Building theories empirically based on observations
- Gathering data about human behaviour

**Question 9**

Which of the following are constructs in psychology

- Anxiety
- Hypothesis
- Theory

**Question 10**

A hypothesis can be best described as

- a hunch
- a type of statement made by researchers when they are motivating their research
- a prediction of some sort regarding the possible outcomes of a study

**Question 11**

The process of selecting a subset of a population for a survey is known as

- survey research
- triangulation
- sampling

**Question 12**

Landers (1988) found a positive association between adolescents' preference for heavy metal music and their having favorable attitudes to premarital sex, pornography, satanism, and drug and alcohol use. What type of study was this?

- an experiment
- a correlational study
- a case study

Base your answers to Questions 13 to 15 on the following scenario:

A class of 10 boys and 11 girls, including Mary and her friend Elizabeth, chooses a class representative by writing the names of everybody in the class on slips of paper, putting these into a box and asking their teacher to draw one name blindly.

**Question 13**

What is the probability that Mary will be selected?

- 1/11
- 1/20
- 1/21

**Question 14**

What is the probability that a boy will be selected?

- 1/21
- 10/21
- 1/10

**Question 15**

What is the probability that **EITHER** Mary **OR** Elizabeth will be selected?

- 2/21
- 2/11
- 2/19

**Question 16**

The central limit theorem states that:

- Sampling error will increase as the population increases
- The sampling error will gradually assume a normal distribution for larger samples
- The sampling distribution of certain sampling statistics will approach a normal distribution as increases.

**Question 17**

John received 45 marks for his psychology test. The average mark for this test is 35 and the standard deviation 10. What is John's z-score?

- 1
- 0,34
- 0,16

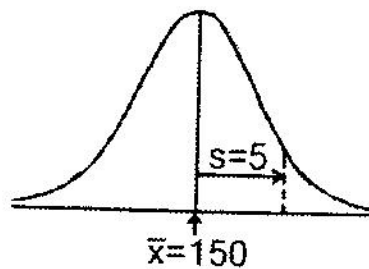
**Question 18**

Transforming variables to z-scores is useful because

- It is used to calculate the test statistic
- It enables one to compare variables with different means and standard deviations from scores with different original units
- It can be used to test whether a score is normally distributed.

## Question 19

By the following figure of the normal curve:



What is the total size of the area under the curve, to the left side of the mean?

- 100%
- 0,50
- 5

## Question 20

Probability of an event occurring depending on something else occurring, such as passing a test when you do not understand your course, can be described as

- conditional probability
- an independent event
- mutually exclusive events

## Question 21

A probability can range between

- 0 and 1
- any numbers
- 1 and 100%

## Question 22

A z-score provides one with:

- The measure of how much the scores vary around the mean
- The sum of scores divided by the number of scores in a sample
- The number of standard deviations that a score lies above or below the mean

## Question 23

What is  $p(z < -1,5)$ ?

- 0.4332
- 0.9332
- 0.0668

## Question 24

What would you calculate using this equation?  $P(E) = \frac{\text{Number of events}}{\text{Number of possible outcomes}}$

- A z-score
- A variance
- Probability

## Question 25

When applying a statistical test, the p-value represents the probability of obtaining the - - - - -

- sample statistic under the alternative hypothesis
- population parameter under the null hypothesis
- sample statistic under the null hypothesis

## Question 26

The hypothesis " $H_1: \mu < 30$ " is a - - - - - hypothesis and requires a - - - - - statistical test.

- non-directional; one-tailed
- directional; two-tailed
- directional; one-tailed

## Question 27

The nature of the research process and of statistical analysis is such that statistically significant results - - - - -

- also psychologically important
- psychologically important if a high level of significance was used
- not necessarily psychologically important

## Question 28

When a statistical test yields a very small p-value, we know that the sample result is very - - - - -.

- likely under the null hypothesis
- unlikely under the alternative hypothesis
- unlikely under the null hypothesis

**Question 29**

A type I error occurs when - - - - -

- the null hypothesis is wrongly rejected
- the null hypothesis is wrongly not rejected
- the alternative hypothesis is wrongly rejected

Base your answers to Questions 30 to 34 on the following scenario:

A researcher hypothesizes that babies born prematurely will be somewhat less intelligent as young adults than their peers. She uses the records of various maternity hospitals to identify a random sample of 25 persons who are now young adults, but who were born more than four weeks prematurely. She measures the IQ of each, using the SAWAIS. (IQ scores on this test are distributed normally in the general population, with a mean of 100 and a standard deviation of 15.) Suppose she finds that the mean IQ score of her sample is 97.9 and the standard deviation of the scores is 17.

**Question 30**

Which of the following best describes the theoretical hypothesis to be tested?

- Intelligence is determined by date of birth
- Premature birth is associated with low intelligence
- Premature birth is not associated with lower intelligence

**Question 31**

How many of the two constructs mentioned in the theoretical hypothesis have been operationally defined?

- none
- one
- both

**Question 32**

Which is the appropriate test statistic to calculate?

- The t-statistic for the difference between the means of two independent groups
- The t-statistic for the mean of a single group
- The z-statistic for the mean of a single group

**Question 33**

What are the requirements with regard to the type of statistical test that may be required to interpret the research results?

- No statistical test is required
- A one-tailed statistical test should be performed
- A two-tailed statistical test should be performed

**Question 34**

What will be the outcome of the analysis of the results?

- The null hypothesis will be rejected in favour of the alternative hypothesis
- The alternative hypothesis will be rejected in favour of the null hypothesis
- The null hypothesis will not be rejected

**Question 35**

A type II error occurs when - - - - -

- the null hypothesis is wrongly rejected.
- the null hypothesis is wrongly not rejected.
- the alternative hypothesis is wrongly accepted.

**Question 36**

The power of a statistical test refers to - - - - -

- the test's ability to give small p-values
- the test's ability to detect significant results
- the sample size

**Question 37**

Suppose a researcher has formulated a research hypothesis and has collected the data which must now be analysed.

- He must specify a level of significance when he formulates the hypothesis and before he analyses the data
- He must specify a level of significance after he analysed the data
- The level of significance is fixed by convention and the researcher has no choice about this

**Question 38**

When two population means are compared, the p-value expresses - - - - -.

- the probability of the difference between the sample means given that  $H_0$  is true
- the probability of the difference between the sample means given that  $H_1$  is true
- the probability of the difference between the sample means given that  $H_0$  is false

**Question 39**

A psychologist analyses data obtained from a sample ( $n=36$ ) and finds that the mean of the sample is 10 and the standard deviation of the sample is 3.3. The sample is drawn from a population with a known variance of 4. What is the standard error?

- 0.55
- 0.67
- 0.33

Questions 40 to 42 depend on the scenario below.

An educational psychologist is doing research on intelligence and has drawn a sample of university students enrolled for research methodology. It is known that the population average IQ is 103, and she hypothesises that the average IQ of these students will be higher than the population average. She sets a level of significance of  $\alpha = 0,05$ .

#### Question 40

Select the correct formulation of the hypothesis in this study ( $H_0$  indicates the null hypothesis and  $H_1$  stands for the alternative hypothesis).

- $H_0: \mu = 103; \quad H_1: 103 \geq \mu$   
 $H_0: \mu = 103; \quad H_1: \mu \leq 103$   
 $H_0: \mu = 103; \quad H_1: \mu > 103$

#### Question 41

The hypothesis is:

- directional  
non-directional  
We need more information to decide

#### Question 42

Suppose a researcher finds after statistical analysis that the average IQ in her sample is 105 and that the p-value associated with this finding is 0,06. What should her decision be?

- She rejects both  $H_0$  and  $H_1$   
She does not reject  $H_0$   
She rejects  $H_0$

**Question 43**

Suppose a random sample of size 25 is selected from a population with mean  $\mu$ , the value of which is unknown. The sample statistics are:

$$\bar{x} = 6,4; s = 10.$$

Test the following hypothesis:

$$H_0: \mu = 10$$

$$H_1: \mu < 10 \text{ using } \alpha = 0,05.$$

The researcher determines that to test this hypothesis with a one-tailed t-test at  $\alpha = 0,05$ , the calculated t-statistic must be smaller than -1,711.

Which of the following statements do you KNOW is correct?

A type 1 error has been committed.

$H_0$  must be rejected

$H_0$  cannot be rejected

**Question 44**

Suppose the level of significance is set at 0,05, and the appropriate p-value is calculated as 0,04. What is the probability that the researcher will be making a Type I error should he decide to reject  $H_0$  ?

0,04

0,05

Normally not possible to estimate

Raise your answers to Questions 45 and 46 on the following scenario:

A researcher hypothesizes that chess-playing students are better at non-verbal reasoning than students in general. He draws a random sample of 25 students from the members of the chess clubs of South African universities and measures their non-verbal reasoning ability by means of a test developed for this purpose. The scores of a large group of students on this test were found in earlier research to be distributed normally with a mean of 20. Suppose the researcher finds that the mean score of his sample is 20, and the standard deviation of the scores 6.

**Question 45**

Which are the appropriate statistical hypotheses for testing the researcher's hypothesis?

$H_0: \mu$  is not equal to 20;  $H_1: \mu$  is larger than 20

$H_0: \mu$  equals 20;  $H_1: \mu$  is larger than 20

$H_0: \mu$  equals 20;  $H_1: \mu$  is not equal to 20

**Question 46**

What value of the standard deviation of the sampling distribution of the mean of 25 non-verbal reasoning scores does the researcher use when calculating the test statistic?

- 0,24
- 1,2
- 6

**Question 47**

Suppose a researcher selects a single sample of students and is interested in the proportion of students who prefers quantitative research over qualitative research. The population parameters of interest is ----- while the sample statistic is -----.

- P ; p
- p ; P
- P ;  $z_p$

**Question 48**

Consider the following statistical hypothesis:

$$H_0 : P = 0,7$$

$$H_1 : P > 0,7$$

If the sample proportion is found to be 0,08, the sample size 21 and the  $z_p$  value is 1,0, what is the p-value?

- 0,16
- 0,34
- 0,08

**Question 49**

Suppose the alternative hypothesis states that the population mean is larger than 60. The researcher should test  $H_0$  against  $H_1$  if -----.

- the sample mean is larger than 60
- the sample mean is larger or smaller than 60
- the p-value is smaller than the level of significance

**Question 50**

Susan stated the following hypothesis:

$$H_0: \mu = 100$$

$$H_1: \mu > 100$$

She drew a random sample of 50 persons. Given that the null hypothesis is false, what can Susan expect the mean of the sample to be?

- Less than 100
- Some value different from 100
- More than 100

Base your answers to Questions 51 to 53 on the following scenario:

To validate a new depression scale a researcher applies it to 50 patients diagnosed with depression and 50 patients diagnosed with stress. She predicts that the depression sample will score higher (more depression) than the stress sample. The mean scores of the two samples are found to be 30 (standard deviation 10) and 25 (standard deviation 10) respectively.

**Question 51**

Which is an appropriate null hypothesis for the analysis of the results?

- $\mu_1 = \mu_2$
- $\mu = 25$
- The population mean of the difference score equals zero

**Question 52**

Which of the following assumptions underlies the calculation of the test statistic?

- The population standard deviation is known
- The two populations have different means
- The two populations have the same variance

**Question 53**

Which is the appropriate test statistic to calculate?

- The t-statistic for the difference between the means of two independent samples
- The t-statistic for the difference between the means of two dependent samples
- The z-statistic for the difference between the means of two independent samples

**Question 54**

The probability under the null hypothesis of obtaining a t-value of 2,0 or higher in the case of a two-tailed test is - - - - - that for a one-tailed test.

- the same as
- twice
- half

**Question 55**

In which of the following cases can the scores on two variables not be regarded as independent ?

- the variables represent scores from persons in a control group and an experimental group, where each member of the two groups was matched on the basis of demographic variables
- the variables represent scores from the same persons measured on two occasions on the same test
- both of the above

**Question 56**

A researcher wants to test the following hypotheses:

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 > \mu_2$$

On the basis of data provided, the output from a computer programme indicates that a t-value of  $t = -1,9$  was found, with the p-value for a nondirectional test (two-tailed) given as  $p=0,07$ . What should the researcher do to evaluate this result?

- divide 0,07 with 2 before comparing it with the pre-selected alpha level
- multiply 0,07 by 2 before comparing it with the pre-selected alpha level
- compare the computed p-value as given with the pre-selected alpha level

**Question 57**

A researcher wants to compare the percentage of persons from urban areas who have been victims of crime with the percentage of crime victims from rural areas in a two-group design. Which of the following is the most appropriate test statistic to use?

- the chi-square test statistic ( $\chi^2$ )
- the t-test statistic for independent samples ( $t_c$ )
- the z-test statistic ( $z_c$ ) for proportions

**Question 58**

A researcher suspects that social phobia is more common among females than among males. She wants to test this by comparing the following hypotheses:

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 > \mu_2$$

where  $\mu_1$  indicates the average level of social phobia among females in the population (group 1), as tested on a 7-point scale, and  $\mu_2$  is the average level of social phobia among males in the population (group 2). She draws random samples of females and males respectively, and gets the following average levels of social phobia scores for each group:

$$\text{Females: } \bar{x}_1 = 4,1; \quad \text{Males: } \bar{x}_2 = 4,8$$

What may she conclude?

- $H_0$  can be rejected
- $H_0$  cannot be rejected
- the relevant t-statistic and p-value must be calculated before making a conclusion

**Question 59**

Which of the following statements about the relationship between the value of the t-test statistic and the probability value p is true, if the sample size n remains constant?

- The larger the value of the t-test statistic, the smaller p will be
- The smaller the value of the t-test statistic, the smaller p will be
- There is no relationship between p and the t-test statistic

**Question 60**

Samples where the results in one group are not influenced by the results in the other group are referred to as \_\_\_\_\_ samples.

- random
- independent
- dependent

**Question 61**

Vusi wants to know if students did significantly better on a test the second time they took it. Which test of statistical significance should he use?

- Pearson r
- Independent sample t
- Dependent sample t

[TURN OVER]

**Question 62**

A scatter plot is a graphical representation of the relation between - - - - -

- two variables measured on a nominal scale within a single group
- two variables measured on a ratio or interval scale within a single group
- two groups of subjects with regard to a single variable measured on an interval or ratio scale

**Question 63**

A researcher hypothesizes that general intelligence underlies students' performance in both history and mathematics. He investigates this idea by tabulating for each of his students whether they (a) passed or failed their last history examination, and (b) passed or failed their last mathematics examination. Which research design is he using?

- A correlational design
- A two-sample groups design
- A one-sample groups design

**Question 64**

What is the correlation coefficient between the following values of X and Y?

X 0 0 0  
Y -1 0 +1

- 1
- 0
- +1

Base your answers to Questions 65 and 66 on the following scenario:

A researcher hypothesizes that the drug treatment of hospitalised schizophrenic patients improves their mental alertness. He studies a random sample of 27 such patients and finds a correlation coefficient of 0,6 between the number of days of drug treatment and patients' scores on the Mental Alertness Test.

\* **Question 65** *Mistake.*

Which is an appropriate null hypothesis for this research?

- $r = 0 \rightarrow \rho = 0$  (the)
- $\mu = 0$
- $P = 0$

Question 66

~~A~~

Mistake-Typo.

Which is an appropriate alternative hypothesis for this research?

$\mu_1 = \mu_2$   
 $r > 0$  - p > 0 (rho)  
P is not equal to zero.

Question 67

As the sample size (n) increases - - - - -

- a smaller value of the Pearson's correlation coefficient r will reach significance
- a larger value of the Pearson's correlation coefficient r is required before the result will be significant
- there are no implications for the significance of the value of the Pearson's correlation coefficient r

Question 68

Pearson's r represents - - - - -

- a comparison between the observed frequencies and the frequencies expected if the null hypothesis is true, for two variables
- the covariance of two variables X and Y compared with the square root of the product (multiplication) of their respective variances
- the distribution of observed data compared with the distribution of data as expected if the null hypothesis is true

Question 69

A contingency table represents - - - - -

- the distribution of the frequencies for a variable
- the cross classification of two nominal-scale variables
- the plot of the relationship between two variables

## Question 70

Which of the following is the appropriate formula for the chi square test?

1.  $\sum \frac{(O_i - E_i)^2}{E_i}$  ✓

2.  $\frac{(\bar{x} - \mu_x)}{s_x}$

3.  $\frac{\text{cov}(x,y)}{\sqrt{\text{var}(x)\text{var}(y)}}$

[TOTAL: 70]

END OF EXAM PAPER

7.00/100