SECTION A

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 building blocks of psychological theories are most accurately described as - - - - -

1. concepts
2. constructs
3. variables

Question 3

A construct may be a - - - - -

1. hypothetical relation between two or more variables
2. hypothetical aspect of humans that we wish to investigate
3. testable prediction derived from a theory of human behaviour

Question 4

Constructs are sometimes called - - - - -

1. hypothetical variables
2. observable consequences
3. manifest variables

Question 5

Which of the following best describes "manifest"?

1. hidden
2. observable
3. hypothetical

Question 6

An operationally defined variable is - - - - -

1. abstract
2. latent
3. observable

Question 7

"Arithmetic ability is measured by the number of simple sums a person can do correctly in two minutes". In this scenario "arithmetic ability" is - - - - -, and "the number of sums done correctly" is - - - - -

1. a manifest variable; an observable consequence
2. a factor; a hidden variable
3. a latent variable; an empirical consequence

Question 8

A theoretical definition defines a - - - - - in terms of - - - - -

1. manifest variable; theoretical constructs
2. theoretical construct; observable behaviour
3. construct; other constructs

Question 9

"The mental age of child number one is eight years". In this statement "mental age" is a(n) - - - - -, whereas "eight years" is a(n) - - - - -

1. variable; value of that variable
2. construct; latent instance of that construct
3. indicator; numerical value of that indicator

Use the following scenario to answer **Questions 10 to 12**:

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 transparancy of the atmosphere. She decides to investigate whether estimated size increases with haziness.

Question 10

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

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

Question 11

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

1. true size, distance from the observer, and transparancy of the atmosphere
2. haziness
3. estimated size

Question 12

The independent variable in Ross' research is - - - -

1. haziness
2. estimated size
3. size perception in the natural environment

Question 13

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

What is the probability that a boy will be selected?

1. 1/21
2. 10/21
3. 1/10

Question 14

Suppose that over the years 10 000 students wrote the examinations in PYC 304-C and that 6000 of them passed, of which 300 obtained exactly 50%. This means that for randomly selected students the probability of obtaining exactly 50% is - - - - - while the probability of obtaining 50% or more is - - - - -

1. 0,60; 0,03
2. 0,05; 0,60
3. 0,03; 0,60

Question 15

The probability value "p is larger than or equal to 0,2" is - - - - - the probability value "p is smaller than or equal to 10%".

1. larger than
2. larger than or equal to
3. smaller than or equal to

Question 16

If 10 000 students wrote a university admission test, 7000 passed (obtained 50% or more) and 300 obtained exactly 50%, what is the probability that a randomly selected student will fail the test?

1. p smaller than or equal to 0,50
2. p = 0,67
3. p = 0,30

Question 17

A frequency distribution of the ages in months of a class of Grade 1 children indicates for each - - - - - what the corresponding - - - - - is.

1. frequency; age in months
2. age in months; number of children of that age
3. age in months; relative frequency at that age

Question 18

A probability distribution of the ages in months of South African Grade 1 children indicates for each - - - - - what the corresponding - - - - - is.

1. child; age of that child
2. age in months; number of children of that age
3. age in months; relative frequency at that age

Question 19

The normal distribution is useful for interpreting psychological measurements because - - - - -

1. many psychological variables are approximately normally distributed
2. it has a mean of zero and a standard deviation of 1
3. it represents an arbitrarily large population of scores

Question 20

All normal distributions are - - - - - and - - - - -

1. asymptotic; continuous
2. symmetrical; have a mean of zero
3. bell-shaped; have the same standard deviation

Question 21

The standard deviation of the standard normal distribution equals - - - - -

1. its mean
2. zero
3. one

Question 22

John scored 15 in English (class mean 12, standard deviation 3) and 18 in Geography (class mean 13, standard deviation 5). Use z-scores to decide which statement is true: Relative to the rest of his class John does
- - - - -

1. better in English than in Geography
2. equally well in English and Geography
3. better in Geography than in English

Question 23

If examination scores are approximately normally distributed with a mean of 60% and a standard deviation of 8% and Pete's score is 66%, he did better than about - - - - - of the candidates.

1. 27%
2. 23%
3. 77%

Question 24

Suppose the height of military recruits is distributed normally with a mean of 1750 mm and a standard deviation of 50 mm. Drawing repeated samples of 25 recruits each we expect the standard deviation of the sample means to be about - - - - - mm

1. 2
2. 10
3. 50

Question 25

The standard error of the mean is - - - - -

1. the standard deviation of the population mean
2. the standard deviation of the sampling distribution of the mean for samples of a specific size
3. the mean of the standard deviations of repeated samples of a specific size

Question 26

Which of the following assumptions do we make when applying a statistical test?

1. That the null hypothesis is true
2. That the alternative hypothesis is true
3. That the null hypothesis is false

Question 27

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

1. likely under the null hypothesis
2. unlikely under the alternative hypothesis
3. unlikely under the null hypothesis

Question 28

Which best describes one's aim when applying a statistical test?

1. To accept the alternative hypothesis over the null hypothesis
2. To reject the null hypothesis in favour of the alternative hypothesis
3. To reject the statistical hypothesis in favour of the research hypothesis

Question 29

Suppose we have stated H_0: $\mu = 10$, and H_1: $\mu < 10$, and find that the sample mean corresponds to a z-score of 2.5. This means that the corresponding p-value - - - - -

1. is 0,0062
2. need not be found to reach a decision
3. cannot be found from the available information

Question 30

The hypothesis "H_1: μ is not equal to 50" is a - - - - - hypothesis and requires a - - - - - statistical test.

1. non-directional; one-tailed
2. non-directional; two-tailed
3. directional; two-tailed

Question 31

When applying a statistical test, if the p-value is smaller than the level of significance we - - - - - the null hypothesis.

1. accept
2. do not reject
3. reject

Question 32

When applying a statistical test, if the p-value is smaller than the level of significance we - - - - - the alternative hypothesis.

1. accept
2. reject
3. fail to reject

Question 33

The alternative hypothesis is often a re-statement of the - - - - - hypothesis.

1. statistical
2. research
3. null

Question 34

A type I error occurs when - - - - -

1. the null hypothesis is wrongly rejected
2. the null hypothesis is wrongly not rejected
3. the alternative hypothesis is wrongly rejected

Base your answers to **Questions 35 to 43** 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 35

How would you describe the population investigated in this research?

1. Adults that were born more than four weeks prematurely
2. All adults
3. Adults that completed the SAWAIS

Question 36

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

1. Low intelligence is caused by premature birth
2. Premature birth is associated with low intelligence
3. Premature birth is not associated with lower intelligence

Question 37

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

1. none
2. one
3. both

Question 38

Which research design did the researcher use?

1. Correlational design
2. Single-sample groups design
3. Two-sample groups design

Question 39

Which of the following are appropriate null and alternative hypotheses?

1. H_0: μ equals 100; H_1: μ is smaller than 100
2. H_0: μ equals 100; H_1: μ does not equal 100
3. H_0: μ does not equal 100; H_1: μ is smaller than 100

Question 40

Which is the appropriate test statistic to calculate?

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

Question 41

Which is the correct value of the standard deviation of the sampling distribution of the mean of 25 IQ scores?

1. 3,0
2. 3,4
3. 15

Question 42

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

1. No statistical test is required
2. A one-tailed statistical test should be performed
3. A two-tailed statistical test should be performed

Question 43

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

1. The null hypothesis will be rejected in favour of the alternative hypothesis
2. The alternative hypothesis will be rejected in favour of the null hypothesis
3. The null hypothesis will not be rejected

Base your answers to **Questions 44 to 47** 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 44

Which research design did the researcher use?

1. Single-sample groups design
2. Two-groups design
3. Two-groups design with a known population mean

Question 45

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

1. H_0: μ is not equal to 20; H_1: μ is larger than 20
2. H_0: μ equals 20; H_1: μ is larger than 20
3. H_0: μ equals 20; H_1: μ is not equal to 20

Question 46

Which is the appropriate test statistic to calcultate?

1. The z-statistic for the mean of a single sample
2. The t-statistic for the difference between the means of two independent samples
3. The t-statistic for the mean of a single sample

Question 47

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?

1. 0,24
2. 1,2
3. 6

Base your answers to **Questions 48 to 50** 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 48

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

1. $\mu > 25$
2. The population mean of the difference scores is larger than 25
3. $\mu_1 > \mu_2$

Question 49

Which is the appropriate test statistic to calculate?

1. The t-statistic for the difference between the means of two independent samples
2. The t-statistic for the difference between the means of two dependent samples
3. The z-statistic for the difference between the means of two independent samples

Question 50

What type of statistical test is required?

1. A one-tailed test
2. A two-tailed test
3. A two-directional test

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

To test the efficacy of psychotherapy aimed at relieving depression, a researcher applies a depression scale to 50 depressed patients at the start and again at the end of their treatment, predicting that the latter scores will be lower (reflecting less depression). Scores on his depression scale among the general population have a mean of 30 and a standard deviation of 10.

Question 51

Which constructs are related to one another by the research hypothesis?

1. Psychotherapy; depression
2. Depression before psychotherapy; depression after psychotherapy
3. Depression in the experimental group; depression in the general population; the presence/absence of psychotherapy

Question 52

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

1. $\mu = 30$
2. $\mu_1 = \mu_2$
3. The population mean of the difference scores equals zero

Question 53

Which is the appropriate test statistic to calculate?

1. The z-statistic for the mean of a single sample
2. The t-statistic for the difference between the means of two dependent samples
3. The t-statistic for the mean of a single sample

Question 54

A teacher investigates the effect of extra classes on the performance of pupils in mathematics. A group of 20 pupils receives the extra classes while a control group of 20 pupils receives singing lessons. For each of the 40 pupils the teacher calculates the increase or decrease in his or her mathematics performance from an examination before the extra classes to an examination after the extra classes.

Which research design should the teacher use?

1. A single-sample groups design
2. A two-sample groups design
3. A four-sample groups design

Question 55

When applying a t-test for the difference between the means of two independent samples, the probability of the t-statistic under the null hypothesis is compared to the - - - - - to reach a decision.

1. level of significance
2. degrees of freedom
3. two-tailed probability

Question 56

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.

1. the same as
2. twice
3. half

Base your answers to **Questions 57 to 58** on the following scenario:

A marriage counsellor expects that second marriages more often end in divorce than first marriages. She tests this hypothesis by following up 200 marriages that were all registered five years ago, 50 in which at least one partner had been married before and 150 in which neither partner had been married before. Of the 150 first marriages 30 ended in divorce; of the 50 second marriages 10 ended in divorce.

Question 57

What is the researcher's operational definition of "divorced"?

1.The marriage ended in divorce
2. The marriage either ended in divorce or not
3. The marriage ended in divorce within five years

Question 58

What is the outcome of the analysis of the results?

1. The null hypothesis is rejected in favour of the alternative hypothesis
2. The null hypothesis is not rejected
3. The alternative hypothesis is not rejected

Question 59

A politician asks his audience of 100 whether they will vote for him. Of the 60 men present 33 say yes; o the 40 women present 18 say yes. When analysing these results the two sets of answers should be regarded as - - - - -

1. coming from the same population
2. independent
3. having been randomly assigned to the two groups

Question 60

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?

1. A correlational design
2. A two-sample groups design
3. A one-sample groups design

Question 61

Which of the following is suitable for representing the ages versus the heights of a group of children?

1. A scatter plot
2. A contingency table
3. A histogram

Question 62

A negative correlation between variables X and Y implies that persons scoring low on X will generally score - - - - - on Y.

1. low
2. either low or high
3. high

Question 63

Which of the following can never be exactly zero?

1. a probability
2. a level of significance
3. a correlation coefficient

Question 64

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

X	0	1	2
Y	2	1	0

1. -1
2. 0
3. +1

Question 65

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.

Which is an appropriate alternative hypothesis for this research?

1. $\mu_1 = \mu_2$
2. The correlation coefficient in the population exceeds zero
3. P is not equal to zero

Question 66

A researcher finds that the correlation coefficient between the ages and heights of a sample of 10 children is positive, but not significantly different from zero at the 0,05 level of significance. To improve her chances of obtaining a significant correlation between these variables the researcher could repeat the research using - - - - -

1. more variables
2. more children
3. a lower level of significance

Question 67

Representing the gender (male/female) of members of parliament versus the political party to which they belong is best done in the form of a - - - - -

1. scatter plot
2. contingency table
3. two-sample groups design

Base your answers on **Question 68 to Question 69** on the following:

A researcher studying possible sex-linked inheritance of three psychiatric disorders (denoted by A, B, and C) tabulated the gender (male/female) of 100 psychiatric patients against their diagnosis:

	A	B	C
Male	20	20	10
Female	30	10	10
Total	50	30	20

Question 68

Which research design did the researcher use?

1. A correlational design
2. A two-sample groups design
3. A three-sample groups design

Question 69

What are the requirements with regard to the statistical test to be performed?

1. A directional statistical test is required
2. A non-directional statistical test is required
3. No statistical test is required

Question 70

Which of the following can never have a value of -0,5?

1. The chi-square statistic
2. The z-statistic
3. The Pearson correlation coefficient

[TOTAL: 70]