

**PYC3704**

(493518) October/November 2016

PSYCHOLOGICAL RESEARCH

Duration 2 Hours

70 Marks

EXAMINATION PANEL AS APPOINTED BY THE DEPARTMENT**Use of a non-programmable pocket calculator is permissible****Closed book examination.****This examination question paper remains the property of the University of South Africa and may not be removed from the examination venue****EXAMINERS:****FIRST****PROF P KRUGER****PROF HC JANEKE****SECOND****PROF SH VAN DEVENTER****EXTERNAL:****PROF DJF MAREE (PRETORIA – UP)**

This paper consists of 16 pages plus 2 blank pages for rough work (pp 17 & 18) plus 1 page (i) of formulae and 4 pages of tables (ii-v) as well as 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

- (i) The mark reading sheet
- (ii) 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 80 and 20% of your year mark (from the assignments) will be added, to produce a mark out of 100. [Note however, that if your exam mark is less than 40% the year 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

[TURN OVER]

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

Question 1

To refer to a variable as a "manifest" variable implies that it is - - - - -

- 1 hidden
- 2 observable
- 3 hypothetical

Question 2

The (a) - - - - - variable can be said to influence the (b) - - - - - variable

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

Question 3

A - - - - - is a guess about certain relationships which may exist among constructs, while a(n) - - - - - is an explanation of why those relationships exist

- 1 theory, hypothesis
- 2 hypothesis, operationalisation
- 3 hypothesis, theory

Question 4

An operational definition defines a - - - - - in terms of - - - - -

- 1 manifest variable, observable behaviour
- 2 theoretical construct, observable consequences
- 3 observable construct, other constructs

Question 5

A researcher would make - - - - - based on a - - - - - of data so that she can make - - - - - about the relationships among variables in the - - - - - which she is studying

- 1 observations, sample, inferences, population
- 2 inferences, sample, observations, population
- 3 observations, population, inferences, sample

[TURN OVER]

Question 6

Psychological measurements are always imperfect. The way in which a measurement varies around its 'true' value is referred to as - - - - -

- 1 measurement error
- 2 variance
- 3 the standard deviation

Question 7

- - - - - are operationalised to make it possible to - - - - - them, and the resultant quantities are referred to as - - - - -

- 1 Hypotheses, observe, measurements
- 2 Variables, measure, statistics
- 3 Constructs, measure, variables

Question 8

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

- 1 Making predictions of human behaviour
- 2 Building theories empirically based on observations
- 3 Gathering data about human behaviour

Question 9

Which of the following can be said to be 'constructs' in psychology?

- 1 Anxiety
- 2 Hypothesis
- 3 Theory

Question 10

A hypothesis can be best described as a(n) - - - - -

- 1 insight regarding the relationship among variables based on a theory
- 2 type of statement made by researchers when they are motivating their research
- 3 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 - - - - -

- 1 operationalisation
- 2 inference
- 3 sampling

[TURN OVER]

Question 12

The variable manipulated by the researcher in an experiment is called the - - - - -

- 1 manifest variable
- 2 independent variable
- 3 dependent variable

Question 13

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

- 1 A z-score
- 2 The variance
- 3 A probability

Question 14

If you select one marble randomly from a bag containing 18 red, 17 blue, and 12 green marbles, what is the probability of the marble being green?

- 1 0.26
- 2 0.38
- 3 0.36

Base your answers to Questions 15 to 17 on the following scenario

Mary, a female second year Bachelor of Arts student, joins an introductory psychology class. She finds that the class has 9 first year males, 15 first year females, 8 second year males and 12 second year females (including herself)

Question 15

If one student is randomly selected from this class, what is the probability that it will be Mary?

- 1 1/17
- 2 1/44
- 3 1/20

Question 16

If one student is randomly selected from this class, what is the probability that it will be a second year student?

- 1 1/20
- 2 1/44
- 3 20/44

[TURN OVER]

Question 17

If one student is randomly selected from this class, what is the probability that it will be either Mary OR a male student?

- 1 2/44
- 2 $1/44 + 17/44$
- 3 $1/27 + 1/17$

Question 18

What is $p(z < -2.4)$?

- 1 0.9918
- 2 0.4918
- 3 0.0082

Question 19

A sample of $n=100$ exam scores representing exam results of psychology students has a mean of 60 with a standard deviation of 10. John has a mark of 80. Which of the following is John's score if this was transformed into a z-score?

- 1 2
- 2 1
- 3 4.04

Question 20

Based on data from a random sample of employees in a specific city, a researcher finds that the employees spend on average 23 minutes each day commuting to work, with a standard deviation of 8 minutes. Assuming that commuting time is normally distributed, what is the probability that a randomly chosen employee in this city will spend more than 35 minutes commuting to work each day?

- 1 0.1587
- 2 0.0668
- 3 0.9332

Question 21

A z-score provides one with the -----

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

[TURN OVER]

Question 22

The standard error associated with a specific sample drawn from a population can be estimated from the sample standard deviation in terms of the - - - - -

- 1 sample size
- 2 population size
- 3 population mean

Question 23

A 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 - - - - -

- 1 a conditional probability
- 2 an independent event
- 3 mutually exclusive events

Question 24

If 5000 students wrote an exam, 3000 passed with 50% or more and 250 obtained exactly 50%, what is the value of $p(50\%|\text{pass})$ for randomly selected students?

- 1 0.06
- 2 0.083
- 3 0.05

Question 25

Why is the central limit theorem of importance in inferential statistics?

- 1 Because it informs us how sampling error will increase as the population increases
- 2 Because it tells us that sampling error will begin to approximate a normal distribution as samples grow larger
- 3 Because it shows that the sampling distribution of the means of repeated samples will approach a normal distribution as sample size increases

Question 26

A very bright student is described as having an IQ that is three standard deviations above the population mean. If this student's IQ is transformed to a z-score, this z-score would be equal to - - - - -

- 1 $\mu + 3$
- 2 $\mu + 3\sigma$
- 3 3

[TURN OVER]

Question 27

If a research result looks psychologically important but is found to be not statistically significant, what might the researcher consider doing when repeating the research?

- 1 Use a larger sample
- 2 Set a lower level of significance
- 3 Use a more powerful statistical test

Question 28

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

- 1 also always psychologically important
- 2 psychologically important if a high level of significance was used
- 3 not necessarily psychologically important

Question 29

The lower we set the level of significance, the greater the probability of - - - - -

- 1 rejecting the null hypothesis
- 2 a type I error
- 3 a type II error

Question 30

A null hypothesis - - - - -

- 1 states that a treatment or intervention has no effect
- 2 is indicated by the symbol H_1
- 3 is formulated in terms of sample statistics

Question 31

When a z-score is used to test a hypothesis the calculated value is referred to as a - - - - -

- 1 level of significance
- 2 parameter
- 3 test statistic

Question 32

A lecturer in educational psychology suspects that the average IQ of her students will be higher than the population average of $\mu = 100$. To test this, the hypothesis she has to set up will have to be - - - - -

- 1 directional
- 2 non-directional
- 3 dependent on IQs calculated from a sample of data

[TURN OVER]

Base your answers to Questions 33 to 37 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. She knows that 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 17.0. She decides to set the significance level to $\alpha = 0.05$.

Question 33

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

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

Question 34

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

- 1 none
- 2 one
- 3 both

Question 35

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 36

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 37

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

[TURN OVER]

Question 38

When a statistical test yields a very small p-value, which of the following statements is most likely to be correct?

- 1 The alternative hypothesis is probably false
- 2 The null hypothesis is probably true
- 3 The null hypothesis is probably false

Question 39

A psychologically unimportant result may turn out to be statistically significant if the researcher - - - -

- 1 sets a low level of significance
- 2 uses a large sample
- 3 reduces the probability of a type I error

Question 40

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

- 1 The researcher must specify a level of significance when formulating the hypothesis and before analysing the data
- 2 The researcher must specify a level of significance after analysing the data
- 3 The level of significance is fixed by convention and the researcher has no choice about this

Question 41

A researcher finds that the mean calculated from a sample of $n = 1000$ research participants is $\bar{x} = 52$, with a standard deviation of $s = 5.8$. A subsequent one-sample t-test shows this differs significantly from the population mean which is known to be $\mu = 50$. The researcher is concerned that this significant result is a consequence of the large sample size, but should not be regarded as very important in practical terms. What should the researcher do to check this suspicion?

- 1 Determine the power of test
- 2 Calculate the effect size
- 3 Calculate the standard error

Question 42

As the sample size increases, the sample becomes a better representation of the population while the standard error - - - -

- 1 decreases
- 2 remains the same
- 3 increases

[TURN OVER]

Question 43

Cohen's *d* refers to the - - - - -

- 1 difference score when two means from dependent samples are compared
- 2 effect size
- 3 power of a test

Question 44

A type II error is always made when - - - - -

- 1 The null hypothesis is not rejected when it is false
- 2 The alternative hypothesis is rejected when it is false
- 3 The null hypothesis is rejected when it is true

Question 45

A researcher draws a single random sample from a population to test his hypothesis about the mean population score on a psychological test. Scores on this test are distributed normally in the general population with a known mean but an unknown standard deviation. Which test statistic is the most appropriate to test his hypothesis?

- 1 The t-statistic for the mean of a single sample
- 2 The z-statistic for the mean of a single sample
- 3 The standard deviation of the sampling distribution of the mean of a single sample

Question 46

The probability under the null hypothesis of obtaining a t-value of 2.5 or higher in the case of a one-tailed test is - - - - - that for a two-tailed test.

- 1 the same as
- 2 twice
- 3 half

[TURN OVER]

Question 47

Consider the following statistical hypothesis

$$H_0 \quad \mu = 120$$

$$H_1 \quad \mu > 120$$

If a sample of $n=64$ is drawn from the relevant population and it is found that $\bar{x}=124.2$ and $s = 25$, what would be the value of the standard error ($s_{\bar{x}}$)?

- 1 25
- 2 $\frac{25}{\sqrt{64}}$
- 3 $\frac{25}{64}$

Question 48

Suppose you find that the value of a t-test statistic calculated for your research results is 3.0 and the appropriate p-value 0.02. Assume that the level of significance was set at 0.05. Which conclusion is appropriate?

- 1 Reject the null hypothesis
- 2 Do not reject the null hypothesis
- 3 Reject the alternative hypothesis

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 - - - - -

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

Question 50

Susan stated the following hypothesis

$$H_0 \quad \mu = 100$$

$$H_1 \quad \mu > 100$$

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?

- 1 Less than 100
- 2 Some value different from 100
- 3 More than 100

[TURN OVER]

Base your answers to Questions 51 and 52 on the following scenario

A researcher suspects there is a difference between the creative ability of boys and girls in a school for gifted children. She uses a test for creativity that has been standardised in such a way that the mean creative ability score for the general population is 50.

Question 51

Which of the following is a plausible way to state the null hypothesis?

- 1 $H_0: \mu_B = \mu_G$
- 2 $H_0: \mu = 50$
- 3 $H_0: \bar{x}_B = \bar{x}_G$

Question 52

Which of the following would be an appropriate way of stating the alternative hypothesis?

- 1 $H_1: \mu > 50$
- 2 $H_1: \bar{x}_B \neq \bar{x}_G$
- 3 $H_1: \mu_B \neq \mu_G$

Question 53

A researcher plans to use the t-test to compare two independent samples. What minimum assumption needs to be met before she may proceed, especially when the samples are relatively small?

- (a) the sample variances (or standard deviations) have to be equal
- (b) the data from both samples has to come from populations that are normally distributed

- 1 Only (a)
- 2 Only (b)
- 3 Both (a) and (b)

Question 54

Which of the following sample characteristics is most likely to produce a significant result when a t-test for independent measures is used?

- 1 A small difference between the means and small sample variances
- 2 A large difference between the means and small sample variances
- 3 A small difference between the means and large sample variances

Question 55

For an experiment comparing two treatment conditions, an independent measures design would require ----- score(s) for each subject and a repeated measures design would require ----- score(s) for each subject

- 1 one , one
- 2 one , two
- 3 two, , one

[TURN OVER]

Question 56

Consider a situation where two means are being compared with a t-test. If the null hypothesis happens to be true, one would expect the t-value to have a value close to - - - - -

- 1 0
- 2 1
- 3 1.96

Question 57

The alternative hypothesis in the case of a t-test for independent samples would state that - - - - -

- 1 the two populations being compared have a mean difference of zero
- 2 there is no mean difference between the two samples being compared
- 3 the mean difference between the two populations being compared is not equal to zero

Question 58

In which of the following research situations is it most likely that a test for comparing independent groups will be used?

- 1 Evaluate the effectiveness of a new medicine used for pain relief by measuring how much the pain is reduced after taking the medication
- 2 Evaluate the difference in self-esteem between persons who actively participate in sport and those who do not participate in sport
- 3 Evaluate the development of verbal skills between the ages of 2 and 3 years for a sample of girls

Question 59

For which of the following research projects would a test for dependent samples NOT be appropriate?

- 1 Comparing the verbal skills of boys with those of girls for three year old children
- 2 Comparing pain tolerance before and after taking a new pain medication
- 3 Assigning participants to one of two groups, so that each participant in one group has the same IQ as a participant in the other group, when evaluating a workshop for improving problem-solving skills

Question 60

If a null hypothesis is true, which of the following is the closest to the average value of the t_c statistic for comparing two means that you would expect to find?

- 1 0
- 2 1
- 3 1.96

[TURN OVER]

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?

- 1 The test based on Pearson's r
- 2 An independent sample t-test
- 3 A dependent sample t-test

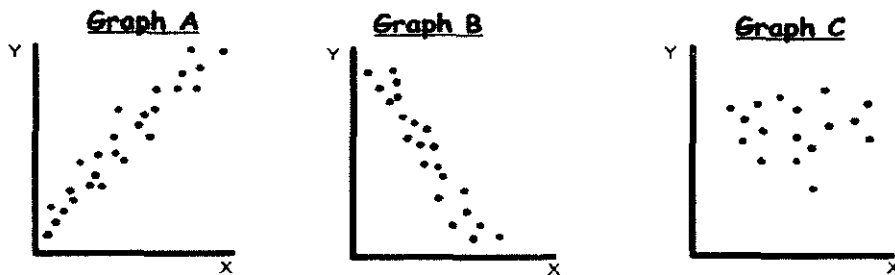
Question 62

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

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

Question 63

Which of the graphs below is most likely to represent a Pearson correlation of $r = +0.85$ between variables X and Y if the measurements are plotted on a scatter plot?



- 1 Graph A
- 2 Graph B
- 3 Graph C

Question 64

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

X	0	0	0
Y	-1	0	+1

- 1 -1
- 2 0
- 3 +1

[TURN OVER]

Question 65

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

Question 66

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 67

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 68

Pearson's r represents -----

- 1 a comparison between the observed frequencies and the expected frequencies if the null hypothesis is true, for the distribution of data across two variables
- 2 the relationship between two variables, when the way in which they vary together is compared to their individual variances
- 3 the difference score between two variables relative to their pooled standard deviation

Question 69

A contingency table indicates -----

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

[TURN OVER]

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
$$\frac{(x - \mu_x)}{s_x}$$

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

[TOTAL: 70]

END OF EXAM PAPER

[TURN OVER]

[TURN OVER]

List of formulae:

$$\frac{\bar{x} - \mu_{\bar{x}}}{\sigma_{\bar{x}}} = \frac{(\bar{x} - \mu)}{\frac{\sigma}{\sqrt{n}}}$$

$$\frac{(\bar{x} - \mu)}{s_{\bar{x}}} = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$$

$$\frac{(\bar{x}_1 - \bar{x}_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$\frac{\bar{d} - \bar{D}}{s_{\bar{d}}/\sqrt{n}} = \frac{\bar{d}}{s_{\bar{d}}/\sqrt{n}} \quad (\text{if } \bar{D} = 0)$$

$$\frac{\text{cov}(x, y)}{\sqrt{\text{var}(x)\text{var}(y)}} = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}}$$

$$\sum_{ij} \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

$$\frac{x - \bar{x}}{s} \quad \text{or} \quad \frac{x - \mu}{\sigma}$$

$$\sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$$

$$\frac{\bar{x}_1 - \bar{x}_2}{s_p}$$

Appendix: Probabilities associated with the standard normal distribution (z)

z	Mean to z	Larger portion	Smaller portion	z	Mean to z	Larger portion	Smaller portion
0 00	0 0000	0.5000	0.5000	0 51	0.1950	0.6950	0.3050
0 01	0.0040	0 5040	0.4960	0 52	0 1985	0 6985	0.3015
0.02	0.0080	0.5080	0 4920	0 53	0.2019	0 7019	0.2981
0.03	0.0120	0 5120	0 4880	0 54	0 2054	0.7054	0.2946
0.04	0.0160	0.5160	0 4840	0 55	0 2088	0.7088	0.2912
0.05	0 0199	0.5199	0 4801	0 56	0 2123	0 7123	0.2877
0 06	0 0239	0 5239	0.4761	0 57	0 2157	0.7157	0.2843
0 07	0.0279	0 5279	0 4721	0 58	0 2190	0.7190	0.2810
0 08	0 0319	0 5319	0 4681	0 59	0 2224	0.7224	0.2776
0 09	0 0359	0.5359	0 4641	0.60	0 2257	0.7257	0 2743
0 10	0 0398	0 5398	0 4602	0 61	0 2291	0 7291	0 2709
0 11	0.0438	0.5438	0 4562	0 62	0 2324	0.7324	0.2676
0.12	0 0478	0.5478	0 4522	0.63	0.2357	0 7357	0 2643
0 13	0.0517	0 5517	0 4483	0 64	0 2389	0 7389	0 2611
0 14	0.0557	0 5557	0 4443	0 65	0 2422	0 7422	0.2578
0 15	0 0596	0 5596	0 4404	0 66	0 2454	0.7454	0.2546
0.16	0.0636	0 5636	0.4364	0.67	0 2486	0 7486	0 2514
0 17	0 0675	0 5675	0 4325	0.68	0.2517	0 7517	0.2483
0 18	0.0714	0.5714	0 4286	0 69	0 2549	0 7549	0.2451
0.19	0.0753	0.5753	0.4247	0.70	0 2580	0 7580	0 2420
0.20	0.0793	0 5793	0 4207	0 71	0.2611	0 7611	0.2389
0.21	0 0832	0.5832	0.4168	0.72	0 2642	0 7642	0.2358
0.22	0.0871	0 5871	0 4129	0.73	0 2673	0.7673	0.2327
0 23	0.0910	0.5910	0 4090	0 74	0 2704	0 7704	0.2296
0.24	0.0948	0.5948	0 4052	0 75	0 2734	0 7734	0.2266
0.25	0.0987	0 5987	0 4013	0.76	0 2764	0 7764	0.2236
0.26	0 1026	0 6026	0 3974	0.77	0 2794	0 7794	0.2206
0 27	0.1064	0.6064	0 3936	0 78	0 2823	0 7823	0 2177
0 28	0.1103	0.6103	0.3897	0 79	0 2852	0.7852	0.2148
0 29	0.1141	0 6141	0 3859	0 80	0 2881	0 7881	0.2119
0 30	0.1179	0.6179	0.3821	0.81	0 2910	0.7910	0.2090
0.31	0.1217	0.6217	0.3783	0 82	0 2939	0 7939	0.2061
0 32	0.1255	0 6255	0.3745	0 83	0 2967	0 7967	0 2033
0.33	0 1293	0.6293	0.3707	0 84	0 2995	0 7995	0.2005
0 34	0.1331	0.6331	0.3669	0 85	0 3023	0 8023	0.1977
0.35	0 1368	0.6368	0.3632	0 86	0.3051	0.8051	0 1949
0 36	0.1406	0.6406	0.3594	0 87	0.3078	0.8078	0.1922
0.37	0.1443	0.6443	0.3557	0 88	0.3106	0 8106	0.1894
0 38	0.1480	0.6480	0 3520	0 89	0.3133	0 8133	0.1867
0 39	0 1517	0.6517	0.3483	0.90	0.3159	0.8159	0.1841
0.40	0.1554	0.6554	0.3446	0.91	0 3186	0.8186	0 1814
0 41	0 1591	0.6591	0.3409	0 92	0.3212	0.8212	0.1788
0 42	0.1628	0 6628	0.3372	0 93	0.3238	0 8238	0.1762
0.43	0 1664	0.6664	0 3336	0.94	0.3264	0 8264	0 1736
0.44	0 1700	0.6700	0 3300	0 95	0 3289	0 8289	0.1711
0 45	0 1736	0 6736	0 3264	0.96	0 3315	0.8315	0.1685
0 46	0 1772	0.6772	0 3228	0 97	0.3340	0.8340	0.1660
0.47	0 1808	0.6808	0 3192	0.98	0 3365	0 8365	0.1635
0 48	0 1844	0.6844	0 3156	0 99	0 3389	0 8389	0.1611
0 49	0 1879	0.6879	0 3121	1.00	0 3413	0 8413	0.1587
0 50	0 1915	0.6915	0 3085	1 01	0 3438	0 8438	0.1562

Appendix: Probabilities associated with the standard normal distribution (z) continued

z	Mean to z	Larger portion	Smaller portion	z	Mean to z	Larger portion	Smaller portion
1.02	0.3461	0.8461	0.1539	1.53	0.4370	0.9370	0.0630
1.03	0.3485	0.8485	0.1515	1.54	0.4382	0.9382	0.0618
1.04	0.3508	0.8508	0.1492	1.55	0.4394	0.9394	0.0606
1.05	0.3531	0.8531	0.1469	1.56	0.4406	0.9406	0.0594
1.06	0.3554	0.8554	0.1446	1.57	0.4418	0.9418	0.0582
1.07	0.3577	0.8577	0.1423	1.58	0.4429	0.9429	0.0571
1.08	0.3599	0.8599	0.1401	1.59	0.4441	0.9441	0.0559
1.09	0.3621	0.8621	0.1379	1.60	0.4452	0.9452	0.0548
1.10	0.3643	0.8643	0.1357	1.61	0.4463	0.9463	0.0537
1.11	0.3665	0.8665	0.1335	1.62	0.4474	0.9474	0.0526
1.12	0.3686	0.8686	0.1314	1.63	0.4484	0.9484	0.0516
1.13	0.3708	0.8708	0.1292	1.64	0.4495	0.9495	0.0505
1.14	0.3729	0.8729	0.1271	1.65	0.4505	0.9505	0.0495
1.15	0.3749	0.8749	0.1251	1.66	0.4515	0.9515	0.0485
1.16	0.3770	0.8770	0.1230	1.67	0.4525	0.9525	0.0475
1.17	0.3790	0.8790	0.1210	1.68	0.4535	0.9535	0.0465
1.18	0.3810	0.8810	0.1190	1.69	0.4545	0.9545	0.0455
1.19	0.3830	0.8830	0.1170	1.70	0.4554	0.9554	0.0446
1.20	0.3849	0.8849	0.1151	1.71	0.4564	0.9564	0.0436
1.21	0.3869	0.8869	0.1131	1.72	0.4573	0.9573	0.0427
1.22	0.3888	0.8888	0.1112	1.73	0.4582	0.9582	0.0418
1.23	0.3907	0.8907	0.1093	1.74	0.4591	0.9591	0.0409
1.24	0.3925	0.8925	0.1075	1.75	0.4599	0.9599	0.0401
1.25	0.3944	0.8944	0.1056	1.76	0.4608	0.9608	0.0392
1.26	0.3962	0.8962	0.1038	1.77	0.4616	0.9616	0.0384
1.27	0.3980	0.8980	0.1020	1.78	0.4625	0.9625	0.0375
1.28	0.3997	0.8997	0.1003	1.79	0.4633	0.9633	0.0367
1.29	0.4015	0.9015	0.0985	1.80	0.4641	0.9641	0.0359
1.30	0.4032	0.9032	0.0968	1.81	0.4649	0.9649	0.0351
1.31	0.4049	0.9049	0.0951	1.82	0.4656	0.9656	0.0344
1.32	0.4066	0.9066	0.0934	1.83	0.4664	0.9664	0.0336
1.33	0.4082	0.9082	0.0918	1.84	0.4671	0.9671	0.0329
1.34	0.4099	0.9099	0.0901	1.85	0.4678	0.9678	0.0322
1.35	0.4115	0.9115	0.0885	1.86	0.4686	0.9686	0.0314
1.36	0.4131	0.9131	0.0869	1.87	0.4693	0.9693	0.0307
1.37	0.4147	0.9147	0.0853	1.88	0.4699	0.9699	0.0301
1.38	0.4162	0.9162	0.0838	1.89	0.4706	0.9706	0.0294
1.39	0.4177	0.9177	0.0823	1.90	0.4713	0.9713	0.0287
1.40	0.4192	0.9192	0.0808	1.91	0.4719	0.9719	0.0281
1.41	0.4207	0.9207	0.0793	1.92	0.4726	0.9726	0.0274
1.42	0.4222	0.9222	0.0778	1.93	0.4732	0.9732	0.0268
1.43	0.4236	0.9236	0.0764	1.94	0.4738	0.9738	0.0262
1.44	0.4251	0.9251	0.0749	1.95	0.4744	0.9744	0.0256
1.45	0.4265	0.9265	0.0735	1.96	0.4750	0.9750	0.0250
1.46	0.4279	0.9279	0.0721	1.97	0.4756	0.9756	0.0244
1.47	0.4292	0.9292	0.0708	1.98	0.4761	0.9761	0.0239
1.48	0.4306	0.9306	0.0694	1.99	0.4767	0.9767	0.0233
1.49	0.4319	0.9319	0.0681	2.00	0.4772	0.9772	0.0228
1.50	0.4332	0.9332	0.0668	2.01	0.4778	0.9778	0.0222
1.51	0.4345	0.9345	0.0655	2.02	0.4783	0.9783	0.0217
1.52	0.4357	0.9357	0.0643	2.03	0.4788	0.9788	0.0212

Appendix: Probabilities associated with the standard normal distribution (z) continued

z	Mean to z	Larger portion	Smaller portion	z	Mean to z	Larger portion	Smaller portion
2.04	0.4793	0.9793	0.0207	2.55	0.4946	0.9946	0.0054
2.05	0.4798	0.9798	0.0202	2.56	0.4948	0.9948	0.0052
2.06	0.4803	0.9803	0.0197	2.57	0.4949	0.9949	0.0051
2.07	0.4808	0.9808	0.0192	2.58	0.4951	0.9951	0.0049
2.08	0.4812	0.9812	0.0188	2.59	0.4952	0.9952	0.0048
2.09	0.4817	0.9817	0.0183	2.60	0.4953	0.9953	0.0047
2.10	0.4821	0.9821	0.0179	2.61	0.4955	0.9955	0.0045
2.11	0.4826	0.9826	0.0174	2.62	0.4956	0.9956	0.0044
2.12	0.4830	0.9830	0.0170	2.63	0.4957	0.9957	0.0043
2.13	0.4834	0.9834	0.0166	2.64	0.4959	0.9959	0.0041
2.14	0.4838	0.9838	0.0162	2.65	0.4960	0.9960	0.0040
2.15	0.4842	0.9842	0.0158	2.66	0.4961	0.9961	0.0039
2.16	0.4846	0.9846	0.0154	2.67	0.4962	0.9962	0.0038
2.17	0.4850	0.9850	0.0150	2.68	0.4963	0.9963	0.0037
2.18	0.4854	0.9854	0.0146	2.69	0.4964	0.9964	0.0036
2.19	0.4857	0.9857	0.0143	2.70	0.4965	0.9965	0.0035
2.20	0.4861	0.9861	0.0139	2.71	0.4966	0.9966	0.0034
2.21	0.4864	0.9864	0.0136	2.72	0.4967	0.9967	0.0033
2.22	0.4868	0.9868	0.0132	2.73	0.4968	0.9968	0.0032
2.23	0.4871	0.9871	0.0129	2.74	0.4969	0.9969	0.0031
2.24	0.4875	0.9875	0.0125	2.75	0.4970	0.9970	0.0030
2.25	0.4878	0.9878	0.0122	2.76	0.4971	0.9971	0.0029
2.26	0.4881	0.9881	0.0119	2.77	0.4972	0.9972	0.0028
2.27	0.4884	0.9884	0.0116	2.78	0.4973	0.9973	0.0027
2.28	0.4887	0.9887	0.0113	2.79	0.4974	0.9974	0.0026
2.29	0.4890	0.9890	0.0110	2.80	0.4974	0.9974	0.0026
2.30	0.4893	0.9893	0.0107	2.81	0.4975	0.9975	0.0025
2.31	0.4896	0.9896	0.0104	2.82	0.4976	0.9976	0.0024
2.32	0.4898	0.9898	0.0102	2.83	0.4977	0.9977	0.0023
2.33	0.4901	0.9901	0.0099	2.84	0.4977	0.9977	0.0023
2.34	0.4904	0.9904	0.0096	2.85	0.4978	0.9978	0.0022
2.35	0.4906	0.9906	0.0094	2.86	0.4979	0.9979	0.0021
2.36	0.4909	0.9909	0.0091	2.87	0.4979	0.9979	0.0021
2.37	0.4911	0.9911	0.0089	2.88	0.4980	0.9980	0.0020
2.38	0.4913	0.9913	0.0087	2.89	0.4981	0.9981	0.0019
2.39	0.4916	0.9916	0.0084	2.90	0.4981	0.9981	0.0019
2.40	0.4918	0.9918	0.0082	2.91	0.4982	0.9982	0.0018
2.41	0.4920	0.9920	0.0080	2.92	0.4982	0.9982	0.0018
2.42	0.4922	0.9922	0.0078	2.93	0.4983	0.9983	0.0017
2.43	0.4925	0.9925	0.0075	2.94	0.4984	0.9984	0.0016
2.44	0.4927	0.9927	0.0073	2.95	0.4984	0.9984	0.0016
2.45	0.4929	0.9929	0.0071	2.96	0.4985	0.9985	0.0015
2.46	0.4931	0.9931	0.0069	2.97	0.4985	0.9985	0.0015
2.47	0.4932	0.9932	0.0068	2.98	0.4986	0.9986	0.0014
2.48	0.4934	0.9934	0.0066	2.99	0.4986	0.9986	0.0014
2.49	0.4936	0.9936	0.0064	3.00	0.4987	0.9987	0.0013
2.50	0.4938	0.9938	0.0062	3.01	0.4987	0.9987	0.0013
2.51	0.4940	0.9940	0.0060	3.02	0.4987	0.9987	0.0013
2.52	0.4941	0.9941	0.0059	3.03	0.4988	0.9988	0.0012
2.53	0.4943	0.9943	0.0057	3.04	0.4988	0.9988	0.0012
2.54	0.4945	0.9945	0.0055	3.05	0.4989	0.9989	0.0011

[TURN OVER]

Appendix: Probabilities associated with the standard normal distribution (z) continued

z	Mean to z	Larger portion	Smaller portion	z	Mean to z	Larger portion	Smaller portion
3.06	0.4989	0.9989	0.0011	3.19	0.4993	0.9993	0.0007
3.07	0.4989	0.9989	0.0011	3.20	0.4993	0.9993	0.0007
3.08	0.4990	0.9990	0.0010	3.21	0.4993	0.9993	0.0007
3.09	0.4990	0.9990	0.0010	3.22	0.4994	0.9994	0.0006
3.10	0.4990	0.9990	0.0010	3.23	0.4994	0.9994	0.0006
3.11	0.4991	0.9991	0.0009	3.24	0.4994	0.9994	0.0006
3.12	0.4991	0.9991	0.0009	3.25	0.4994	0.9994	0.0006
3.13	0.4991	0.9991	0.0009	..			
3.14	0.4992	0.9992	0.0008	3.50	0.4998	0.9998	0.0002
3.15	0.4992	0.9992	0.0008	
3.16	0.4992	0.9992	0.0008	3.75	0.4999	0.9999	0.0001
3.17	0.4992	0.9992	0.0008	.			
3.18	0.4993	0.9993	0.0007	4.00	0.5000	1.000	0.0000

PART 1 (GENERAL/ALGEMEEN) DEEL 1

STUDY UNIT (e.g. PSY100-X) / STUDIE-EENHEID (bv. PSY100-X) **1**

INITIALS AND SURNAME / VOORLETTERS EN VAN **3**

DATE OF EXAMINATION / DATUM VAN EKSAMEN **4**

PAPER NUMBER / VRAESTELNOMMER **2**

EXAMINATION CENTRE (E.G. PRETORIA) / EKSAMENSENTRUM (BV. PRETORIA) **5**

STUDENT NUMBER / STUDENTNOMMER **6**

UNIQUE PAPER NO. / ONIEKE VRAESTEL NR. **8**

7

9

For use by examination invigilator
Vir gebruik deur eksamenopsiener

◆

- IMPORTANT**
- USE ONLY AN HB PENCIL TO COMPLETE THIS SHEET
 - MARK LIKE THIS ➡
 - CHECK THAT YOUR INITIALS AND SURNAME HAS BEEN FILLED IN CORRECTLY
 - ENTER YOUR STUDENT NUMBER FROM LEFT TO RIGHT
 - CHECK THAT YOUR STUDENT NUMBER HAS BEEN FILLED IN CORRECTLY
 - CHECK THAT THE UNIQUE NUMBER HAS BEEN FILLED IN CORRECTLY
 - CHECK THAT ONLY ONE ANSWER PER QUESTION HAS BEEN MARKED
 - DO NOT FOLD
- BELANGRIK**
- GEBRUIK SLEGS 'N HB POTLOOD OM HIERDIE BLAD TE VOLTOOI
 - MERK AS VOLG ➡
 - KONTROLEER DAT U VOORLETTERS EN VAN REG INGEVUL IS
 - VUL U STUDENTENOMMER VAN LINKS NA REGS IN
 - KONTROLEER DAT U DIE KORREKTE STUDENTENOMMER VERSTREK HET
 - KONTROLEER DAT DIE UNIEKE NOMMER REG INGEVUL IS
 - MAAK SEKER DAT NET EEN ALTERNATIEF PER VRAAG GEMERK IS
 - MOENIE VOU NIE

PART 2 (ANSWERS/ANTWOORDE) DEEL 2

10

1	1) 2) 3) 4) 5)	36	1) 2) 3) 4) 5)	71	1) 2) 3) 4) 5)	106	1) 2) 3) 4) 5)
2	1) 2) 3) 4) 5)	37	1) 2) 3) 4) 5)	72	1) 2) 3) 4) 5)	107	1) 2) 3) 4) 5)
3	1) 2) 3) 4) 5)	38	1) 2) 3) 4) 5)	73	1) 2) 3) 4) 5)	108	1) 2) 3) 4) 5)
4	1) 2) 3) 4) 5)	39	1) 2) 3) 4) 5)	74	1) 2) 3) 4) 5)	109	1) 2) 3) 4) 5)
5	1) 2) 3) 4) 5)	40	1) 2) 3) 4) 5)	75	1) 2) 3) 4) 5)	110	1) 2) 3) 4) 5)
6	1) 2) 3) 4) 5)	41	1) 2) 3) 4) 5)	76	1) 2) 3) 4) 5)	111	1) 2) 3) 4) 5)
7	1) 2) 3) 4) 5)	42	1) 2) 3) 4) 5)	77	1) 2) 3) 4) 5)	112	1) 2) 3) 4) 5)
8	1) 2) 3) 4) 5)	43	1) 2) 3) 4) 5)	78	1) 2) 3) 4) 5)	113	1) 2) 3) 4) 5)
9	1) 2) 3) 4) 5)	44	1) 2) 3) 4) 5)	79	1) 2) 3) 4) 5)	114	1) 2) 3) 4) 5)
10	1) 2) 3) 4) 5)	45	1) 2) 3) 4) 5)	80	1) 2) 3) 4) 5)	115	1) 2) 3) 4) 5)
11	1) 2) 3) 4) 5)	46	1) 2) 3) 4) 5)	81	1) 2) 3) 4) 5)	116	1) 2) 3) 4) 5)
12	1) 2) 3) 4) 5)	47	1) 2) 3) 4) 5)	82	1) 2) 3) 4) 5)	117	1) 2) 3) 4) 5)
13	1) 2) 3) 4) 5)	48	1) 2) 3) 4) 5)	83	1) 2) 3) 4) 5)	118	1) 2) 3) 4) 5)
14	1) 2) 3) 4) 5)	49	1) 2) 3) 4) 5)	84	1) 2) 3) 4) 5)	119	1) 2) 3) 4) 5)
15	1) 2) 3) 4) 5)	50	1) 2) 3) 4) 5)	85	1) 2) 3) 4) 5)	120	1) 2) 3) 4) 5)
16	1) 2) 3) 4) 5)	51	1) 2) 3) 4) 5)	86	1) 2) 3) 4) 5)	121	1) 2) 3) 4) 5)
17	1) 2) 3) 4) 5)	52	1) 2) 3) 4) 5)	87	1) 2) 3) 4) 5)	122	1) 2) 3) 4) 5)
18	1) 2) 3) 4) 5)	53	1) 2) 3) 4) 5)	88	1) 2) 3) 4) 5)	123	1) 2) 3) 4) 5)
19	1) 2) 3) 4) 5)	54	1) 2) 3) 4) 5)	89	1) 2) 3) 4) 5)	124	1) 2) 3) 4) 5)
20	1) 2) 3) 4) 5)	55	1) 2) 3) 4) 5)	90	1) 2) 3) 4) 5)	125	1) 2) 3) 4) 5)
21	1) 2) 3) 4) 5)	56	1) 2) 3) 4) 5)	91	1) 2) 3) 4) 5)	126	1) 2) 3) 4) 5)
22	1) 2) 3) 4) 5)	57	1) 2) 3) 4) 5)	92	1) 2) 3) 4) 5)	127	1) 2) 3) 4) 5)
23	1) 2) 3) 4) 5)	58	1) 2) 3) 4) 5)	93	1) 2) 3) 4) 5)	128	1) 2) 3) 4) 5)
24	1) 2) 3) 4) 5)	59	1) 2) 3) 4) 5)	94	1) 2) 3) 4) 5)	129	1) 2) 3) 4) 5)
25	1) 2) 3) 4) 5)	60	1) 2) 3) 4) 5)	95	1) 2) 3) 4) 5)	130	1) 2) 3) 4) 5)
26	1) 2) 3) 4) 5)	61	1) 2) 3) 4) 5)	96	1) 2) 3) 4) 5)	131	1) 2) 3) 4) 5)
27	1) 2) 3) 4) 5)	62	1) 2) 3) 4) 5)	97	1) 2) 3) 4) 5)	132	1) 2) 3) 4) 5)
28	1) 2) 3) 4) 5)	63	1) 2) 3) 4) 5)	98	1) 2) 3) 4) 5)	133	1) 2) 3) 4) 5)
29	1) 2) 3) 4) 5)	64	1) 2) 3) 4) 5)	99	1) 2) 3) 4) 5)	134	1) 2) 3) 4) 5)
30	1) 2) 3) 4) 5)	65	1) 2) 3) 4) 5)	100	1) 2) 3) 4) 5)	135	1) 2) 3) 4) 5)
31	1) 2) 3) 4) 5)	66	1) 2) 3) 4) 5)	101	1) 2) 3) 4) 5)	136	1) 2) 3) 4) 5)
32	1) 2) 3) 4) 5)	67	1) 2) 3) 4) 5)	102	1) 2) 3) 4) 5)	137	1) 2) 3) 4) 5)
33	1) 2) 3) 4) 5)	68	1) 2) 3) 4) 5)	103	1) 2) 3) 4) 5)	138	1) 2) 3) 4) 5)
34	1) 2) 3) 4) 5)	69	1) 2) 3) 4) 5)	104	1) 2) 3) 4) 5)	139	1) 2) 3) 4) 5)
35	1) 2) 3) 4) 5)	70	1) 2) 3) 4) 5)	105	1) 2) 3) 4) 5)	140	1) 2) 3) 4) 5)

Specimen only