



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2017/2018

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE (HEALTH RECORD AND INFORMATION MANAGEMENT)
SMA 191: AN INTRODUCTION TO COMPUTER PROGRAMMING**

DATE: WEDNESDAY 7TH FEBRUARY 2018

TIME: 2.00 P.M. – 4.00 P.M.

INSTRUCTIONS

SECTION A: COMPULSORY

Question One (20 marks)

- a) List the two parts that make up a Pascal program (2 marks)
- b) Explain how you would find out the range of allowable integers in a Pascal implementation. (2 marks)
- c) Indicate the valid identifiers in Pascal from the following list
H2SO4 alphabetic
Begin Total\$ Total price
- d) Write Boolean expressions which determine whether (2 marks)
 - i) the value of an integer i lies in the range 0 to 50 inclusive
 - ii) either of two values of two integer variables j and k is a multiple of the other
- e) Classify each of the following errors as either syntax errors, execution errors or logical errors (4 marks)
 - i) division by some variable with a value zero
 - ii) a var declaration with a semicolon omitted from the end

- iii) attempting to add to the value of some variable that has not been assigned a value
 - iv) failing to declare a variable that is used in a program
- f) Give four points that indicate the importance of computer programming in your profession (4 marks)
- g) Write the following numbers as valid Pascal literals. (4 marks)
- i) 23,987 ii) One-tenth
 - i) 2.3×10^{-3} ii) 1.2 million integer

SECTION B:

Answer Question two and any other two questions

Question Two [20 Marks]

- a) Consider the following numbers:

[4 Marks]

275	3,475	7.4	.145
6E3	275.0	0.001	27365982
10E-4	0.074E3	275.	146

Which are valid integers in Pascal?
 Which are valid real numbers in Pascal?
 Which are invalid in Pascal? Give reasons

- b) Given the equation
 $y = ax^2 + bx + c$

[4 Marks]

Which of the following Pascal statements are correct representations of the equation? For those that are not state why

- i) $y := a * x ** 2 + b * x + c$
- ii) $y := a * x * x + b * x + c$
- iii) $y := a * \text{sqr}(x) + b * x + c$

- c) Answer each of the following true or false. If your answer is false, state why
[6 Marks]
- i) a comment in curly brackets helps the computer to understand the function to be performed by the program.
 - ii) standard identifiers in Pascal have a predefined meaning and hence they may not be redefined in a program
 - iii) in Pascal, all variables must be declared and their data types must be specified.
 - iv) the function sqrt will take either a real or integer argument but will always return a real result
- (b) Show the evaluation order of the following expressions by placing integers beneath the operators (1 for the first operation, 2 for the second etc) and calculate their values:
[6 Marks]
- (a) $1.1 + 2.25 * 4.0 + (-6.4) * 5.0 / 3.2 * 3.7 - 2.8$
 - (b) $((((6+2) * (7-3)) \bmod (5 + (6+4)))) + 3$

Question Three (15 Marks)

- a) Write a Pascal program that totals the squares of the first 50 positive integers and then print the result. Thus your program will produce the following sum
 $1^2 + 2^2 + 3^2 + \dots + 50^2$
[8 Marks]
- b) When considering potential errors with loops, which areas should you consider? [3 marks]
- c) Assuming X, Y and Z are integer variables, what values will they have after execution of the following sequence of statements? [4 Marks]
- ```

X := 50;
Y := 340;
Z := X + Y - 190;
X := 17;
Y := X + Z;
Z := X + 200;
Z := X + Z - 200;

```

#### Question Four (15 Marks)

- a) Write a Pascal program that reads a pair of integers representing the faces of two dice. Calculate the sum of the faces showing on the two dice. Write a case statement to handle the decision- making operations thus : if the person rolls 2, 3, or 12 write the message “you loose”, if the person rolls 7 or 11 then write “you win” and if the person rolls 4 5 6 8 9 or 10 the write “your point is (sum of the two dice) – roll again.” (7 marks)

- b) Suppose that the first three lines of data given in the input file are
- |   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 6 |   |   |   |   |
| 7 | 8 |   |   |   |

What would be the values of a,b,c and d after execution of the following statements? [4 marks]

```
read(a);
readln(b, c);
readln;
read(d)
```

- c) Draw a syntax diagram for a Pascal program [4 Marks]

#### Question Five [15 Marks]

- a) Evaluate the following expressions clearly showing the steps [6 marks]

Expression

- i)  $3 * 17 - 193 \bmod 19$
- ii)  $193 \bmod 19 \operatorname{div} 3 * 127$
- iii)  $(-4 + 23 * 2) \operatorname{div} 3$
- iv)  $((3 > 7) \text{ or } (3 \leq 7)) \text{ and } (7 < 10)$
- v)  $(37 + 15 \bmod 4) / \operatorname{sqr}(5)$
- vi)  $\operatorname{trunc}(3.2 * 4) \operatorname{div} 3$

- b) Find and correct all errors in the following program. Characterize each error as either a compile-time error, run-time error or logical error. The lines are numbered for ease of reference. [6 Marks]

```
1 program quotients (input, output);
2 {This program computes the quotient of two real
 numbers both
3 read from the input file}
4 var
5 number1, number2, quotient : real;
6 begin
7 read(number1, number2);
8 quotient := number2 / number1;
9 write (number1:8:2, ' divided by ', number2
:8:2)
10 writeln (' is', quotient :8:2)
11 end.
```

Assuming that all errors have been corrected in the preceding program, what result would you get if you run the program with the following data? 15.67, 0

- c) Write a type definition part which defines types suitable for the values of the marital status, height and age of an adult person. [3 Marks]