PAN AFRICA CHRISTIAN UNIVERSITY

BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

END OF SEMESTER EXAMINATION

DEPARTMENT: **COMPUTING AND INFORMATION TECHNOLOGY**

COURSE CODE: **BIT304**

COURSE TITLE: **SOFTWARE ENGINEERING**

EXAM DATE: **Monday , 9th APRIL,2018**

TIME: **5.30pm- 8.30 pm**

INSTRUCTIONS

- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer All questions in Section **A** and any other Four questions in Section **B.**
- Write only your **student number** on the answer booklet provided.
- None programmable calculator permitted
- Calculators on phones, tablets and computers are NOT permitted in Theory Papers

SECTION A:(Answer ALL questions in this section)

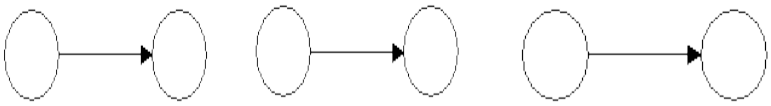
QUESTION 1:

a) Define the following terms as used in Software Engineering: **[3 Marks]**
   i) Software process
   ii) Coupling
   iii) Requirement engineering

b) "Software Engineering is an engineering discipline which is concerned with all aspects of software production." Explain this statement. **[2 Marks]**

c) Most software development projects these days involve system re-engineering. Describe two advantages of system re-engineering. **[2 Marks]**

d) Using the flow graph shown below; compute the McCobe's cyclomatic complexity **[4 Marks]**



e) Current trends in software engineering are moving away from the waterfall model for large projects and moving toward spiral model.
   i) State two advantages of this approach. **[2 Marks]**
   ii) With the aid of a diagram, explain the spiral model. **[4 Marks]**

f) Explain the use of the requirements document to: **[3 Marks]**
   i) System customers
   ii) System engineers
   iii) System Managers

SECTION B: (Answer any FOUR (4) questions in this section)

QUESTION 2:

a) Explain **five** principles contained in the ACM/IEEE code of ethics for software engineers. **[5 Marks]**

b) With the aid of a diagram, describe the requirements engineering process. **[6 Mks]**

c) Consider the program given below

```
void main()
{
int i,j,k;
readln (i,j,k);
if( (i < j) || ( i > k) )
{
writeln("then part");
```



```
if (j < k)
writeln ("j less then k");
else writeln ( " j not less then k");
}
else writeln( "else Part"); }
```

i) Draw the flow graph. **[5 Marks]**

ii) Determine the cyclomatic complexity. **[4 Marks]**

QUESTION 3:

a) Distinguish between the following terms: **[6 Marks]**

i) Functional and non-functional requirements

ii) Black-box testing and white-box testing

iii) Software verification and software validation

b) Explain how the system developer can test whether a system meets the following non-functional requirements. **[4 Marks]**

i) Scalability

ii) Performance

iii) Tolerance against environmental or hardware failures

iv) Portability

c) With the aid of a diagram, describe the risk management process. **[6 Marks]**

d) Explain four types of software risks. **[4 Marks]**

QUESTION 4:

a) Highlight four benefits of software reuse. **[4 Marks]**

b) Explain four generic activities common to all software processes. **[8 Marks]**

c) Describe the Capability Maturity Model levels. **[8 Marks]**

QUESTION 5:

a) Highlight four attributes that all software should have. **[4 Marks]**

b) Describe four software cost estimation techniques. **[8 Marks]**

c) A supermarket needs to develop software to encourage regular customers. For this, the customer needs to supply his name, address, telephone number and driving license number. A customer is assigned a unique customer number (CN) by the computer. When a customer makes a purchase, the value of the purchase is credited against his CN. At the end of each year, surprise gifts to 10 customers who have made the highest purchase is given. In addition, a 22 carat gold coin is given to every customer who has

made a purchase over Ksh.10, 000/-. The entries are reset on the last day of the year. Draw the context diagram. **[8 Marks]**

QUESTION 6:

a) "Software metrics can be classified into three categories: product metrics, process metrics, and project metrics." With the aid of examples, explain each of these metrics. **[6 Marks]**

b) Explain **four** types of Lehman's laws. **[8 Marks]**

c) A security light system has a switch and a motion sensor attached. It can either be armed or unarmed. If the switch is in the off position, the light is off and the system is unarmed. When the switch is turned on, the light stays off but the system is armed. If the system is armed and the motion sensor detects movement, the light comes on. If no more movement is detected for 5 seconds, the light goes off.

Draw a UML state-chart diagram to describe the states of the security light system. **[6 Marks]**

QUESTION 7:

a) Explain the Rational Unified Process phase model. **[4 Marks]**

b) Describe three types of software maintenance. **[6 Marks]**

c) The table below shows the copy services provided by XYZ Graphics for law firms. Use it to answer the question that follows.

Activity	Preceeding activity	Time in days
A	-	8
B	-	10
C	-	6
D	A, B	8
E	B, C	9
F	C	14
G	D, E	14
H	F, G	6

i) Draw a network diagram to represent the execution of the above activities. **[6 Marks]**

ii) Determine the critical path. **[4 Marks]**

