JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

DEPARTMENT OF COMPUTER SCIENCE AND SOFTWARE ENGINEERING

UNIVERSITY SPECIAL/RESIT EXAMINATION FOR THE DEGREE OF BACHELOR SCIENCE IN SECURITY AND FORENICS

4TH YEAR 2ND SEMESTER 2019/2020 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: IIT 3448

COURSE TITLE: BIOMETRIC AUTHENTICATION TECHNOLOGIES

EXAM VENUE: **STREAM: BSC COMP SECURITY**

DATE: 3RD DECEMBER 2020 **EXAM SESSION:**

TIME: 2.00 HOURS

INSTRUCTIONS:

1. **Answer Question 1 (Compulsory) and ANY other two questions**
2. **Candidates are advised not to write on the question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE **[30 MARKS]**

(a) Define the following as applies to biometric authentication technologies. [4 Marks]

(i) False Acceptance Rate
(ii) Iris Recognition
(iii) Minutia Matching
(iv) Biometric Data

(b) "Depending on the application context, a biometric system may operate in any of the two modes". Do you agree with this statement? Explain your answer. [4 Marks]

(c) Give two differences between biometric and other authentication technologies such as tokens or passwords. [4 Marks]

(d) Briefly explain any FOUR basic design specifications of biometric system. [4 Marks]

(e) Using any four biometric identifiers you know, compare them against any four biological measurements that qualifies biometrics. [8 Marks]

(f) Explain any two security challenges of biometric systems. [2 Marks]

(g) Suppose employees of a company has multiple identities associated with different job roles i.e. different job roles has different access privileges for example a System Programmer who is a Technical Manager can enjoy the privilege of company management and also that of a developer. Critically review any two biometric techniques that can be considered when deploying an effective biometric system for the company. [4 Marks]

QUESTION TWO **[20 MARKS]**

(a) Citing relevant example in each case, explain the following types of biometric; [8 Marks]

(i) Multispectral Biometrics
(ii) Behavioral Biometrics
(iii) Physical Biometrics
(iv) Auditory Biometrics

(b) With a well labelled diagram, explain the general operation of a biometric system. [8 Marks]

(c) Name and explain two types of errors made by a biometric verification system. [4 Marks]

QUESTION THREE **[20 MARKS]**

(a) Using appropriate example in each case, differentiate between *positive recognition* and *negative recognition* as seen in biometric applications. [4 Marks]

(b) The following statements were provided by students when discussion multimodal biometric systems during their *Biometric Authentication Technologies* class. For each case, briefly explain in support.

(i) Biometric systems are not general replacement of other authentication technologies. [2 Marks]

(ii) The applications of biometric can be divided into three main groups. [3 Marks]

(iii) There are three levels of fusion when combining two or more biometric systems. [6 Marks]

(iv) There are five scenarios in which multimodal biometric systems operate. [5 Marks]

QUESTION FOUR **[20 MARKS]**

(a) Briefly explain the:

(i) numerous sources of uncertainty and variation in biometric systems. [6 Marks]

(ii) three ways of addressing the possible abuse of biometric information or its derivatives and related accountability procedures. [6 Marks]

(b) "One of the most important factors in the success of a biometric system is its accuracy". Discuss. [8 Marks]

QUESTION FIVE **[20 MARKS]**

(a) Give one merit, one demerit and one application of the following biometric recognition systems. [12 Marks]

(i) Signature

(ii) Voice

(iii) Retina

(iv) Keystroke

(b) Using a suitable diagram, discuss the *biometric-based correlation filter theory*. [8 Marks]

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