TECHNOLOGICAL UNIVERSITY DUBLIN
KEVIN STREET CAMPUS

BSc. (Honours) Degree in Computer Science (Infrastructure)

Year 3

BSc. (Honours) Degree in Computer Science

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SEMESTER 1 EXAMINATIONS 2019/20

Cloud Computing

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Two Hours

ANSWER QUESTION *ONE* AND *TWO* OF THE OTHER THREE QUESTIONS.
QUESTION *ONE* IS COMPULSORY AND CARRIES *50* MARKS.
ALL OTHER QUESTIONS CARRY *25* MARKS.

1. (a) A 3-tier e-commerce web application is currently deployed on-premises and will be migrated to AWS for greater scalability and elasticity. The web server currently shares read-only data using a network distributed file system. The app server tier uses a clustering mechanism for discovery and shared session state that depends on IP multicast. The database tier uses shared-storage clustering to provide database fall over capability, and uses several read slaves for scaling Data on all servers and the distributed file system directory is backed up weekly to off-site tapes. Describe *three* AWS storage and database services that you can suggest to replace the existing services and meet the requirements of the application.

(12 marks)

(b) List *six* immediate benefits of Cloud Computing on business innovation.

(12 marks)

(c) Design a two-tier web application to be hosted in the *(eu-west-1a, eu-west-1b, and eu-west-1c)* zones of AWS cloud. The application has web servers in public subnets and DB servers hosted in private subnets. Make sure that your design adheres to the five pillars of a well-architected architecture. Draw the final diagram of the architecture.

(8 marks)

(d) In the context of Virtual Private Cloud (VPC), define the following Terms:
    (i) Security groups,
    (ii) Access lists,
    (iii) NAT Instance,
    (iv) Internet Gateway (IGW).

(8 marks)

(e) You would like to create a mirror image of your production environment in another region for disaster recovery purposes. List *five* AWS resources that you need to **recreate** in the second region.

(10 marks)

2. (a) Amazon EBS provides two volume types: Provisioned IOPS (SSD), and Throughput-Optimized (HDD). Describe two use cases for each volume type.

(10 marks)

(b) Define what is meant by the terms AWS Regions and Edge locations.

(5 marks)

(c) Identify five key points about AWS shared responsibility model.

(10 marks)

3. (a) Describe *five* reliability features of AWS Simple Notifications Service (SNS).

(10 marks)

(b) Describe *two* features of AWS API Gateway service.

(5 marks)

(c) Describe *five* features of AWS Lambda that you can use to decouple a cloud infrastructure.

(10 marks)

4. (a) Identify and define *five* different storage classes of AWS S3.

(10 marks)

(b) Define the term *Platform as a Service (PaaS)* and give two examples of PaaS that you have used.

(5 marks)

(c) Describe *five* benefits from employing AWS Simple Queue Service (SQS) in a software solution.

(10 marks)