

GRIFFITH COLLEGE DUBLIN
QUALITY AND QUALIFICATIONS IRELAND
EXAMINATION

**POSTGRADUATE DIPLOMA IN SCIENCE IN BIG DATA MANAGEMENT
AND ANALYTICS**
CLOUD PLATFORMS AND APPLICATIONS
Module code: PGDBD-CPA

MASTER OF SCIENCE IN COMPUTING
CLOUD PLATFORMS AND APPLICATIONS
Module code: MSCC-CPA

MASTER OF SCIENCE IN BIG DATA MANAGEMENT AND ANALYTICS
CLOUD PLATFORMS AND APPLICATIONS
Module code: MSCBD-CPA

Lecturer(s): **Barry Denby**
External Examiner(s): **Dr Mubashir Rehmani**

Date: 19th May 2023 **Time: 2.15-5.15**

**THIS PAPER CONSISTS OF SIX QUESTIONS
FIVE QUESTIONS TO BE ATTEMPTED
ALL QUESTIONS CARRY EQUAL MARKS**

**IN ALL CASES CANDIDATES SHOULD READ THE ENTIRE QUESTION BEFORE
ANSWERING ANY PART**

QUESTION 1

Answer both (a) and (b).

- (a) Define all three models of cloud computing. Out of the two models that permit the customer to write code contrast both in terms of effort required, make sure to reference the underlying infrastructure in your answer.

(10 marks)

- (b) When combining the necessary components together to form a cloud a cloud designer will try to respect four attributes during this combination. List the four attributes and explain how a good cloud design enables each attribute.

(10 marks)

Total (20 marks)

QUESTION 2

Answer both (a) and (b).

- (a) x86 processors during the early 2000s had virtualisation instructions added to them along with an extra privilege ring. Summarise why these changes were needed and in your answer make sure to mention deprivileging and guest OS modification.

(10 marks)

- (b) When docker is being ported to a new Operating System there are five mechanisms that OS must support for docker. Identify what these mechanisms are and explain why they are needed.

(10 marks)

Total (20 marks)

QUESTION 3

Answer both (a) and (b).

- (a) Summarise the problem that the multicloud deployment model was designed to avoid. Evaluate the advantages and disadvantages of this approach.

(10 marks)

- (b) Load balancing and energy optimisation are considered to be the opposites of each other. Justify this statement by explaining how both approaches work and a disadvantage of each. Would either of these strategies be used in a cloud?

(10 marks)

Total (20 marks)

QUESTION 4

Answer both (a) and (b).

- (a) With regards to data held in storage in the cloud it is recommended to use encryption. Determine the encryption strength needed for this and defend your choice. In your answer make reference to the life-cycle of data after data has been requested to be deleted.

(10 marks)

- (b) Compare and Contrast synchronous and asynchronous API function calls. Evaluate how this could be used to reduce the time to serve a request. Determine if there is a disadvantage to the asynchronous approach.

(10 marks)

Total (20 marks)

QUESTION 5

Answer both (a) and (b).

- (a) Explain why a chunk server in Google File System (GFS) checks in with the master node periodically. Analyse how files would be affected if the period was made longer.

(10 marks)

- (b) With the aid of a diagram explain the purpose of the Service Orchestration component of a cloud provider and analyse the purpose of each layer in this component.

(10 marks)

Total (20 marks)

QUESTION 6

Answer both (a) and (b).

- (a) State Amdhal's law and derive its proof

(12 marks)

- (b) Compare and contrast the difference between preemptive and non preemptive schedulers. In your answer make sure to refer to circular waits.

(8 marks)

Total (20 marks)