

**TECHNOLOGICAL UNIVERSITY DUBLIN**  
**Grangegorman**

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**TU856 - BSc. (Honours) Degree in Computer Science**  
**Year 2**

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**SEMESTER 1 EXAMINATIONS 2022/23**

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**CMPU 2022 – Web Development 2**

Internal Examiner  
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Two Hours

*Please answer Question 1 and any two of the three remaining*

Question (1) is worth 40 marks  
Questions (2), (3) and (4) are worth 30 marks each.

## Question 1

(a) Define and describe the Multi-Tier Application Architecture, using an example to demonstrate how the Multi-Tier Application Architecture applied in your web development program.

(10 marks)

(b) A development team is selecting an appropriate web server to support their suite of web applications. List *six* selection criteria that they should consider in their selection. In your answer, name *three* market leading web servers that they may use in their selection.

(10 marks)

(c) What will be the output of the following PHP code?

```
<?php  
$a = 011;  
$b = 0xA;  
$c = 2;  
  
print $a + $b + $c;  
  
?>  
  
i. 21  
ii. 22  
iii. 18  
iv. $a is an invalid value  
v. 13
```

(4 marks)

- (d) AerAirways uses the following two database tables to record the flights it offers and the airports it uses:

Flight		
flightNum	goingFrom	goingTo
ea101	DUB	STN
ea102	DUB	EDI
ea103	DUB	GLA
ea104	DUB	CDG
ea105	STN	CDG
ea106	STN	BER
...		

Airport	
airport	country
DUB	Ireland
STN	England
EDI	Scotland
CDG	France
BER	Germany
...	

Suppose destinations.html contains this form:

```
<form action="destinations.php" method="get">
<input type="text" name="going_from" />
<input type="submit" />
</form>
```

The user enters the code of the airport from which s/he likes to travel. Write destinations.php which receives the user's input, queries the database, and outputs a well-formed HTML unordered list of countries to which there is at least one direct flight from the user's chosen airport, including nested lists of flight numbers to that country. For example, using the database shown above, if the user enters "DUB", the user's browser will display something like the following:

- England
  - ea101
- France
  - ea104
- Scotland
  - ea102
  - ea103

A stylesheet is not required. Validation of user data is not required

(16 marks)

## Question 2

(a) What are the differences between XML and JSON?

(6 marks)

(b) How to define a function in PHP?

- i. functionName(parameters) {function body}
- ii. function {function body}
- iii. function functionName(parameters) {function body}
- iv. data type functionName(parameters) {function body}

(4 marks)

(c) Which PHP statement will give output as \$x on the screen?

- i. echo "\\$x";
- ii. echo "\$\$x";
- iii. echo "/\\$x";
- iv. echo "\$x;";

(4 marks)

(d) Write a well-formed XML document and JSON object that represents the data shown in Figure 1.

(16 marks)

Car Service Invoice				
S/No Parts and Services		Qty	Unit Price	Amount
1	Engine Oil SAE 30	4 litres	\$7.00	\$28.00
2	Spark Plugs	4Ea	\$4.00	\$16.00
3	Air Filter	1 Sets	\$25.00	\$25.00
4	Coolant	14L	\$16.00	\$16.00
Labour Charges				\$100.00
Total				\$185.00

Figure 1

### Question 3

- (a) Explain the differences between *dynamic* web applications and *static* web applications as used in web application development. In your answer, provide an example of each.

(6 marks)

- (b) What will be the output of the following PHP code?

```
<?php  
  
$php = array("Array", "Function", "Strings", "File");  
  
echo pos($php);  
  
?>
```

- i. Function
- ii. File
- iii. Strings
- iv. Array

(4 marks)

- (c) What will be the output of the following PHP code?

```
<?php  
  
define("VAR_NAME", "test");  
  
${VAR_NAME} = "value";  
  
echo VAR_NAME;  
  
echo ${VAR_NAME};  
  
?>
```

- i. testtest
- ii. testvalue
- iii. error, constant value cannot be changed
- iv. test

(4 marks)

Question 3 continues on the next page

- (d) There are three tables in a database: a *Student* table contains four columns: *StudentID*, *DepartmentID*, *StudentName* and *BirthDate*, a *Course* table contains three columns: *CourseID*, *Course* and *DepartmentID*; a *Study* table contains three columns: *StudentID*, *CourseID* and *ExamResult*. Write code for a PHP Page that select all students and course from the database if the exam result is over 70% and displays the information as a table on a HTML page.

(16 marks)

## Question 4

(a) A web designer is developing a web application and is attempting to determine whether to use *client* or *server* based validation or *both* in the following web pages:

- User registration page that will capture user details for entry to a database
- Search screen, allowing users to enter search parameters that will query a database

Recommend a type of validation that should be used by the designer in *each* of the two pages, providing reasons for your recommendation.

(6 marks)

(b) What is the output of the following code?

```
<?php
$x = 5;
$y = 10;
function fun()
{
    $y = $GLOBALS['x'] + $GLOBALS['y'];
}
fun();
echo $y;
?>
```

- i. 5
- ii. 10
- iii. 15
- iv. Error

(4 marks)

(c) What will be the output of the following PHP code?

```
<?php
$i = 5;

while (--$i > 0 && ++$i)
{
    print $i;
}

?>
```

- i. 555555555...infinitely
- ii. 54321
- iii. error
- iv. 5

(4 marks)

Question 4 continues on the next page

- (d) Create a form similar to that shown in Figure 2 and write PHP code to insert the “First Name, Last Name and Special delivery instructions” collected from the form into an order table.

(16 marks)

### A bike order form

What type of bike do you want to purchase?

Street bike  Mountain bike  dirt bike

What accessories do you need?  Gloves  Helmet  Camel water bag

Where do you go biking?

Shipping information

First Name  Last Name  Address  City  State  Zip code

Special delivery instructions

Payment information

Credit card number  Expires  12/10

**Figure 2**