Last name:. . . . .   First Name: . . . .

Student ID:. . . . .   Signature: . . . .

VICTORIA UNIVERSITY OF
WELLINGTON
TE HERENGA WAKA

TRIMESTER II
TERM TEST I – 2022

NWEN304

Advanced Network Applications

Time Allowed: 50 MINUTES

CLOSED BOOK

Permitted materials: Only silent non-programmable calculators or silent programmable calculators with their memories cleared are permitted in this test. No electronic dictionaries are allowed.

Instructions: Attempt ALL **TWENTY One(21)** questions.

There are two sections:

- SECTION A - True/False [10 marks]

- SECTION B - Multiple Choice [20 marks]

- SECTION C - Short ANSWERS [20 marks]

The test consists of 50 marks in total.

You must write your answers in the boxes provided within the questionnaire.

SECTION A   State True or False (10 marks)

Instructions:There are 5 questions in this section. Each question is worth 2 marks.

1. A user requests a Web page that contains some text, a link to a CSS file and another link to a JavaScript file. For this page, the client will send one request message and receive four response messages.

   (a) True
   (b) False

2. Once a persistent connection has been established between a client and the server, multiple distinct web pages can be sent over the same connection.

   1. True
   2. False

3. A one-way asynchronous RPC call to a remote service is *temporally* coupled to the service.

   a. True
   b. False

4. During the execution of the following Node.js code segment, the main thread process sleeps while the function setTimeout executes.

```
let http=require('http');
let s = http.createServer(function(req,res){
   res.writeHead(200,{'content-type':'text/plain'});
   res.write('Hello\n');
   setTimeout(()=>{res.end("world\n")},2000);
});

s.listen(3000);
```

a. True

b. False

5. HTTP response messages can never have an empty message body.

a. True

b. False

SECTION B   Multiple choice questions (20 marks)

Instructions:There are 10 questions in this section. Each question is worth 2 marks.

6. Which of the following network applications have the characteristics of being - tolerant to data loss, bandwidth-sensitive and time-sensitive?

(a) E-mail

(b) Interactive gaming

(c) File transfer

(d) Web based documents

7. Which of the following version of HTTP protocol is based on UDP?

(a) HTTP/0.9

(b) HTTP/1.1

(c) HTTP/2

(d) HTTP/3

8. Which of the following tasks are preferred to be done asynchronously?

    a. I / O

    b. Downloading a remote file

    c. API call

    d. All the above

9. Ability of a client to access a resource from different locations is an example of which of the following distribution transparency?

    a. Location transparency

    b. Relocation transparency

    c. Migration transparency

    d. All the above

10. Fill in the blank. Fetch API is exposed by _____.

    a. Web Browser

    b. Operating System

    c. HTTP protocol

    d. None of the above

11. What is the role of a rendering engine in a browser?

    a. Parse `HTML` document to construct a `DOM` tree

    b. Parse `CSS` files to create a `CSSOM` tree

    c. Combine `DOM` and `CSSOM` trees to form a Render tree

    d. All of the above

12. Which of the following header fields is used to request persistent/non-persistent HTTP connections?

    a. Age
    b. Expire
    c. Connection
    d. Connection-Encoding

13. Which of the following web resources *can* be render blocking?

    i. CSS
    ii. JavaScript
    iii. Images
    iv. Media files

    a. ii Only
    b. i Only
    c. i and ii Only
    d. i, ii and iii Only

14. Under which of the following cases does the <script> tag does **not** block rendering?

    i. <script> tag at the bottom of a web page
    ii. <script> tag in the head of a web page
    iii. <script> tag set with defer attribute in the head of a web page
    iv. <script> tag set with async attribute in the head of a web page

    a. i Only
    b. i and iii Only
    c. i, iv Only
    d. i, iii and iv Only

15. Select **all** valid statements.

    i. `RESTful` services may not always require `HTTP` protocol.

    ii. In `Node.js`, on completion of a network request the associated callback gets immediately pushed onto the call stack by the event loop.

    iii. In `JavaScript`, functions can have properties and methods.

    iv. in HTTP/1.1, the server needs to maintain the response order as requested by the client.

    a. i, iv Only

    b. i, iii Only

    c. i,ii and iii Only

    d. i,iii and iv Only

SECTION C   Short Answer Questions (20 marks)

Instructions:There are 6 questions in this section. Marks for questions in this section are included with the question.

16. What does it mean for a HTTP request method to be idempotent?   **(2 marks)**

17. Explain the difference between network architecture and application architecture. **(3 marks)**

18. What is Head of Line(HOL) blocking in HTTP. Explain how HTTP/2 avoids HOL blocking. **(3 marks)**

19. What will be the output of the following code segment in JavaScript.   **(3 marks)**

```
for(i=0;i<4;i++){
   setTimeout(()=>console.log(i),0);
}
```

20. List two advantages of a Resource based API over a RPC based API, giving suitable examples.   **(4 marks)**

21. Expain the difference between `defer` and `async` attributes of a `<script>` tag.
(4 marks)

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SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.