UOW MALAYSIA KDU PENANG UNIVERSITY COLLEGE

PART OF THE UNIVERSITY OF WOLLONGONG AUSTRALIA GLOBAL NETWORK

School of Engineering, Computing and Built Environment

Department of Computing

Bachelor of Computer Science (Hons) / Bachelor of Computer Science (Hons) in Computer and Network Technology / Bachelor of Information Systems (Hons)

INTERNET OF THINGS (CET3063)

January 2022 Semester

Final Examination

Duration: 2 hours

Total Marks: 100

Instructions

1. This examination paper consists of **3 pages**, including this cover page.
2. There are 2 sections: Section A (50 marks)
   Section B (50 marks)
3. Read carefully the instructions printed at the beginning of each section.
4. All answers are to be written in the answer booklet(s) provided. Use black or blue ink only. Pencils may be used for sketches and diagrams.
5. Students caught copying, or having any unauthorized material, or engaging in any form of action with the intention to cheat will be penalized.

Answer all questions in all sections.

Section A (50 marks)

1) Describe about a sound sensor. (6 marks)

2) Name and discuss four layers of the Internet of things (IoT) system. (12 marks)

3) Given a bit stream data, 0001011, show the data representations which are to be written from Arduino UNO to NodeMCU using the following interfaces.
   (a) UART (4 marks)
   (b) I^2C (5 marks)

4) Compute the duty cycle, D given that a digital output value is 64 in an 8-bits microcontroller unit (MCU). Then, draw two graphs to show the output signal of pulse-width modulation (PWM) that run at 100% and the computed duty cycles, D running at ten milliseconds period. (8 marks)

5) Identify and discuss five service components involved for a medical center IoT system. (15 marks)

Section B (50 marks)

1) Draw a circuit diagram that assembles the connections between a humidity sensor, a microcontroller unit, and a light-emitting diode (LED). (8 marks)

2) Write a HTTP response to set a cookie to store the following information in Table 1. Then, set the availability of the above cookie information to expire on 2nd May 2022 at 5:30am. (7 marks)

Table 1: Cookie information

Key	Value
AUTHORIZE	YES
SESSION_ID	8X9Y0Z
LED_STATE	OFF

3) Format the JavaScript object notation (JSON) object below into Arduino code, before printing the content of this object into the serial monitor. (7 marks)

```
weather = {
  “country”: “MY”,
  “stationName”: “Butterworth, Penang”,
  “date”: “22nd February 2022”,
  “time”: “1500”,
  “temperature”: {
    “Celsius”: 33,
    “Fahrenheit”: 91.4,
  },
 “humidity”: 60
};
```

4) Write a code segment in Arduino Sketch to check the availability of the accelerometer. (7 marks)

5) Fill in the blanks for the wireless fidelity (Wi-Fi) configuration of ESP8266 chipset below. (5 marks)

```
#include <___.h>
IPAddress ___(192, 168, 127, 50);
IPAddress ___(192, 1, 1, 1);
IPAddress ___(255, 0, 0, 0);
IPAddress ___(1, 1, 1, 1);
```

6) Write a function in Arduino code to connect a MCU to a wireless local area network with a set of SSID and password. Then, display the device IP via serial monitor. (16 marks)

THE END

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