# United International University (UIU)

## Dept. of Computer Science & Engineering (CSE)

## Final Exam Trimester: Spring - 2022

**Course Code: CSE 3715 Course Title: Data communications**

**Total Marks:** 40 **Duration:** 2 **h**.

Figures are in the right-hand margin indicating full marks.

**Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules.**

**Q1** Answer the following questions: **[10x1=10]**

i. In OSI model, at which layer error detection and error correction are handled?
ii. How do you differentiate between Checksum and CRC methods?
iii. Why do we need carrier signal to deliver our data signal?
iv. Why do we need to modulate an analog signal when it is already analog?
v. Why do we need a guard band?
vi. Write down the prime difference between TDM and FDM.
vii. How do you differentiate between QAM and FSK?
viii. How do you define 256-QAM?
ix. What is interleaving?
x. Write down the difference between synchronous and asynchronous TDM.

**Q2**

**(a)** Suppose, you have two fair dice with six sides each. What is the information you will get when two dices are rolled and the sum of the numbers on the two dice is 6? **[3]**

**(b)** Suppose that the sender and receiver are using the CRC technique for error detection. Given the message polynomial M(X) = 101101 and generator polynomial, $G(X) = X^2 + X + 1$. **[4]**

***i.*** You have to find the CRC Polynomial or C(X).
***ii.*** Show the receive procedure and conclude whether the message can be received if the CRC value is 101?

**(c)** Suppose that a sender and a receiver are using Checksum while transmitting data. Now at a particular point receiver received the following codeword. **[3]**

1100 1001 1100 1110 1101

You have to detect if there was any kind of error while transmission

**Q3** **(a)** Suppose that 10 links are used in a TDM. If each time slot duration is **t** seconds and data are taken from each line every 10**t** seconds, then **how many** slots does a single frame contain? **[3]**

**(b)** Suppose that five (05) channels, each with a 100-kHz bandwidth, are to be multiplexed together. What is the minimum bandwidth of the link if there is a need for a guard band of 5 kHz between the channels to prevent interferences? **Demonstrate** the configuration using frequency domain. **[3]**

**(c)** What is the advantage of using QAM over ASK, PSK and FSK? What is a constellation diagram? **Draw** the constellation diagram for Binary PSK. **[2+2=4]**

**Q4**

**(a)** Explain the following Term:
1) Base Station 2) Frequency Reuse 3) Handoff procedure 4) 4G and 5) 5G. **[5]**

**(b)** Suppose that a system of 64 cells with a cell radius of 0.8 km, a total frequency bandwidth that supports 336 traffic channels, and a reuse factor of N, where $I$=2 and $J$=2. **Calculate** the total number of concurrent calls that can be handled. **[5]**

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