

LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 7

LEFEL 7

EXAMINATION PERIOD
JANUARY 2017

CYFNOD ARHOLIADAU
IONAWR 2017

MODULE CODE: M7X01691
Emerging Network Technologies

TIME: 2 HOURS (USE 1 ½ NOT 1.5 FOR TIME)

ANSWER THREE QUESTION OUT OF FOUR

Equipment or materials required – Basic Calculator

Adnoddau neu ddefnyddiau sydd eu hangen – Cyfrifiannell Sylfaenol

ANSWER THREE QUESTIONS

Q1.

- a. The Emergence of Internet of Things (IoT) was considered with certain degree of scepticism. It is now part of the dynamic global network infrastructure. Discuss related technologies approaches and concepts such as security, communication, standards, cloud computing, devices, etc. and provide rational for your reasoning. Diagram(s) may be used.

(25 marks)

Q2.

- a. What is your understanding of the IEEE 802.11 architecture, comparing to the OSI model? Provide examples to outline your understanding and diagram may be used.
- b. Your company Information Technology (IT) Manager requested you to write a report on **three** WLANs (with the view to upgrade the existing one). Compare and contrast them. You should include in the comparison their characteristics, any issues such as security, technical challenges and any areas to consider for their enhancements. Also state, which one is most feasible for a particular environment?

(15 marks)

Q3.

- a. Optical fibre is considered advantageous over other communication medium due to its high bandwidth and long distances transmission range. Compare the differences between:
- Wires and fibre
 - Wireless and wires/fibre
 - Satellite and fibre
- b. Refer to Fibre over Radio (FoR), what is your understanding of fibre over radio (FoR)? You should include in your discussion FoR network architecture.

(12 marks)

(13 marks)

Q4.

- a. Refer to figure 1. Critically evaluate each hierarchy cell.

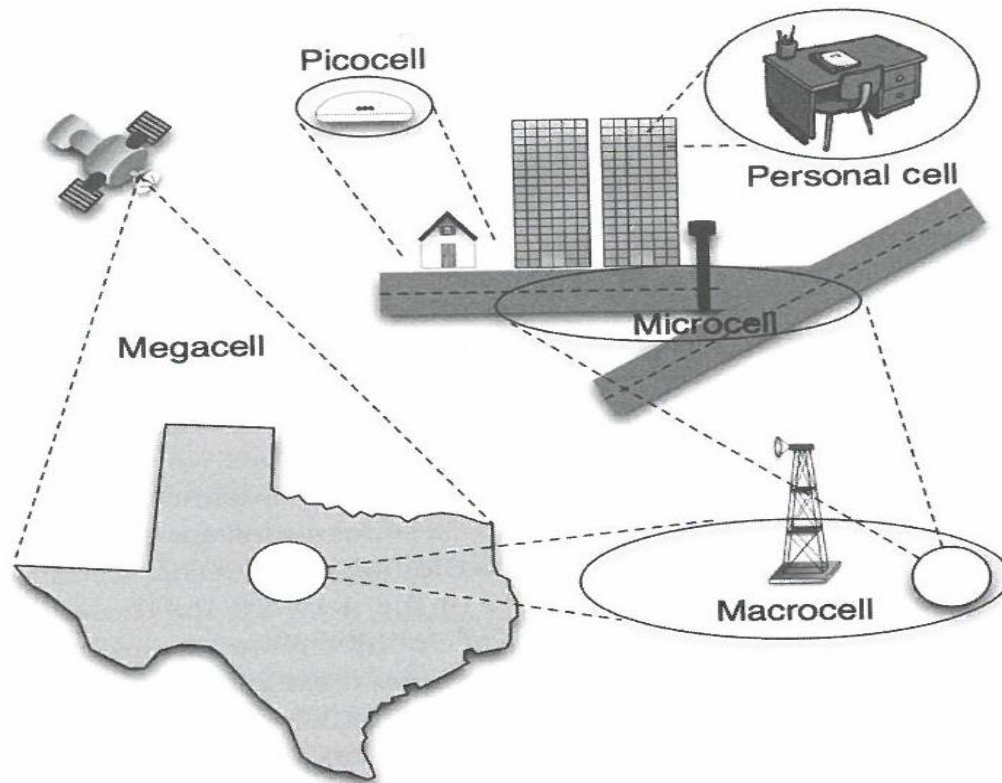


FIGURE 1: CELLULAR HIERARCHY

(10 marks)

- b. Name two types of cellular networks interference and explain any one.

(3 marks)

- c. Consider figure 2 below with a single high-power transmitter which provides a radio communication service to a city with total bandwidth available is 35MHz and each user requires 40 KHz of bandwidth for voice communication.

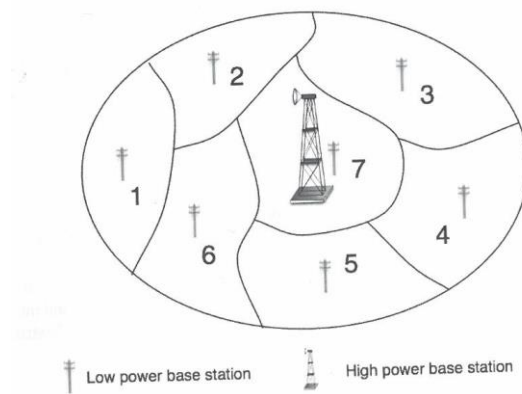


FIGURE 2

- i. If one antenna is use to cover the entire town,
 1. How many users can be supported simultaneously?
- ii. If the city is split into hexagonal cells with seven cells per cluster
 1. How much allocated spectrum each cell has?
 2. Hence, how many users can each cell supported?
- iii. If a cellular topology was employed where 20 lower power antennas are opportunisticly located to minimize both kinds of interference:
 1. Now, what is the total number of simultaneous users?

Note that the number of users supported simultaneously (capacity) can be calculated using the formula: $n = \frac{k(\frac{S}{N})}{W}$ Where S is the total spectrum, W is the bandwidth needed per user, N is the cluster size, and k is the number of cells required to cover a given area.

(12 marks)

Diwedd/End