

NAME: \_\_\_\_\_ (4A)

ANSWER THESE QUESTIONS IN THE SPACE PROVIDED ON THIS SHEET.

26. A Wi-Fi network has 2 APs which are operating as follows:

Access Point 1:

- 5 GHz radio has 3 SSIDs as follows:
  - SSID1 = "ACSecure" and has 4 wireless station associations
  - SSID2 = "ACGuest" and has 3 wireless station association
  - SSID3 = "Printer" and has 1 wireless station association
  
- 2.4 GHz radio has 2 SSIDs as follows:
  - SSID1 = "Students" and has 1 wireless station association
  - SSID2 = "Staff" and has 1 wireless station association

Access Point 2:

- 5 GHz radio has 3 SSIDs as follows:
  - SSID1 = "ACSecure" and has 3 wireless station associations
  - SSID2 = "ACGuest" and has no wireless station associations
  - SSID3 = "Printer" and has 1 wireless association
  
- 2.4 GHz radio has 2 SSIDs as follows:
  - SSID1 = "Students" and has 3 wireless station associations
  - SSID2 = "Staff" and has 5 wireless station associations

Hint: Use a diagram to help visualize the scenario and answer the following questions.

a) How many BSS are operating in this network?

Answer \_\_\_\_\_

b) How many ESS are operating in this network?

Answer \_\_\_\_\_

c) How many BSSID are operating in this network?

Answer \_\_\_\_\_

e) How many stations are connected to the ESS in the UNII band?

Answer \_\_\_\_\_

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27. A Wi-Fi radio is transmitting with the following parameters:

Protocol: 802.11n

Number of Subcarriers = 108

Number of Amplitude Modulation Levels = 256

Coding Rate =  $\frac{3}{4}$

Number of Spatial Streams = 2

Symbol Time (i.e. clock period) = 4  $\mu$ s (microseconds)

a) How many data bits are being encoded during each symbol time (i.e. clock period)?

Note: This calculation is the number of data bits across all subcarriers and spatial streams.

Answer \_\_\_\_\_

b. What is the PHY rate of this radio in Mbps?

Answer \_\_\_\_\_

28. A Wi-Fi Channel is operating at a protocol efficiency of 60% and a PHY rate of 130 Mbps.

a) What is the Channel Capacity in Mbps?

Answer \_\_\_\_\_

b) How many wireless stations can connect to this channel if each wireless station has a throughput of 3 Mbps?

Answer \_\_\_\_\_

c. To improve performance, the channel is only being used at 70% of the capacity. How many wireless stations can connect?

Answer \_\_\_\_\_

29. In a Wi-Fi data stream, the radio adds 8 redundancy bits for every 24 bits of user data. What is the coding rate? You can answer as a fraction or a decimal.

Answer \_\_\_\_\_

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ANSWERS:

26 a) 9 b) 5 c) 10

27 a) 1296 b) 324 Mbps

28 a) 78 Mbps b) 26 c) 18

29:  $\frac{3}{4}$  or 0.75