UNIVERSITY OF GHANA

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING
FIRST SEMESTER EXAMINATIONS: 2017/2018
SCHOOL OF ENGINEERING SCIENCES
CPEN 305: COMPUTER NETWORKS *(3 CREDITS)*

TIME ALLOWED: *TWO AND HALF ($2^{1/2}$) HOURS*

INSTRUCTIONS:
Attempt *ALL* questions
All abbreviations have their usual meaning.

Question

1. An Ethernet MAC sublayer receives 42 bytes of data from the LLC sublayer. How many bytes of padding must be added to the data? **[4 Marks]**

2. An Ethernet MAC sublayer receives 1410 bytes of data from the LLC layer. Can the data be encapsulated in one frame? If not, how many frames need to be sent? What is the size of the data in each frame? **[4 Marks]**

3. Find the range of addresses in the following blocks:
   a. 123.56.77.32/29 **[3 Marks]**
   b. 200.17.21.128/27 **[3 Marks]**
   c. 17.34.16.0/23 **[3 Marks]**
   d. 180.34.64.64/30 **[3 Marks]**

4. In classless addressing, we know the first and the last address in the block. Can we find the prefix length? If the answer is yes, show the process and give an example.

   [4 Marks]

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5. Compare distance vector routing with link state routing [6 Marks]

6. Compare TELNET and SECURE SHELL (SSH) protocols [4 Marks]

7. In classless addressing, can two blocks have the same prefix length? Explain.

[4 Marks]

8. In a class B subnet, we know the IP address of one of the hosts and the subnet mask as given below:

IP Address: 145.34.12.56   Subnet mask: 255.255.192.0

What is the first address (subnet address)? What is the last address? [4 Marks]

9. In a class C subnet, we know the IP address of one of the hosts and the subnet mask as given below:

IP Address: 202.44.82.116   Subnet mask: 255.255.255.240

   a. What is the first address (subnet address)? What is the last address? **[4 Marks]**

10. Compare and contrast CSMA/CD with CSMA/CA using three criteria. [6 Marks]

11. Find the subnet mask in each case:

   a. 1024 subnets in class A [2 Marks]
   b. 256 subnets in class B [2 Marks]
   c. 32 subnets in class C [2 Marks]
   d. 4 subnets in class C [2 Marks]

12. In a block of addresses, we know the IP address of one host is 182.44.82.16/26. What is the first address (network address) and the last address (limited broadcast address) in this block? [4 Marks]

13. In fixed-length subnetting, find the number of 1s that must be added to the mask if the number of desired subnets is _____.
   a. 2 [2 Marks]
   b. 62 [2 Marks]
   c. 122 [2 Marks]
   d. 250 [2 Marks]

14. Explain four rationales for the change from IPv4 to IPv6 [8 Marks]