

**Uva Wellassa University of Sri Lanka**  
**Faculty of Science and Technology**  
**Department of Science and Technology**  
**300 level 1<sup>st</sup> Semester Examination – June/July 2017**  
**SCT307-2 Data Transmission and Signal Processing**



**Instructions to candidates,**

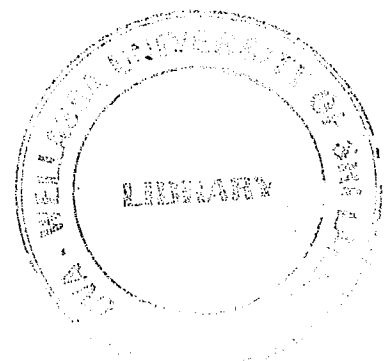
**Duration:** Two (02) Hours

**Number of questions:** Five (05) Essay Questions

**Mark allocation:** 100 mark

**Answer four (04) questions only.**

1.
  - a. List and describe the components of data communication system by using a diagram. (5 mark)
  - b. Briefly, explain 'interface' with an example. (3 mark)
  - c. List and describe the two (02) main types of failure analysis techniques. (6 mark)
  - d. Name any two (02) tools used for failure/ reliability analysis and describe one (01) tool. (4 mark)
  - e. Define the 'GPIB' interface and list any three(03) advantages of 'GPIB' interface. (5 mark)
  - f. List two (02) differences between RS-485 (EIA-485 Standard) and RS-422.(2 mark)
  
2.
  - a. Briefly, describe the necessity of the ISO - OSI reference model. (4 mark)
  - b. Name the ISO - OSI seven (07) layers in the proper order and briefly, explain the functionality of any three (03) layers. (5 mark)
  - c. Using a diagram, describe the lifetime of a Transmission Control Protocol (TCP) connection. (5 mark)
  - d. List any two (02) guided media types and give two (02) characteristics for each of you are mentioned. (4 mark)
  - e. Describe the term 'burst error'. (3 mark)
  - f. If the data to be transmitted is 1010110, then if
    - i. Odd parity is used find the data to be transmitted by the transmitter. (2 mark)
    - ii. Even parity is used find the data to be transmitted by the transmitter. (2 mark)



3.

- a. Describe the usage of computer networks in following application areas.
  - i. Business application. (4 mark)
  - ii. Home application. (4 mark)
- b. If you classify computer networks according to the scale, name and describe the different categories. (6 mark)
- c. Briefly, explain 'Serial transmission'. (2 mark)
- d. List the differences between 'Synchronous transmission' and 'Asynchronous transmission'. (4 mark)
- e. Explain, how you can analysis failures of mechatronic systems? (5 mark)

4.

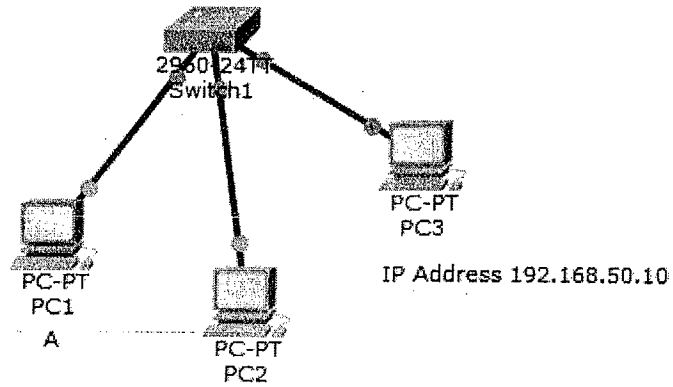
- a. 192.168.48.30 / 27 IP address was assigned to a device in a network.
  - i. What is the class of the above IP address? (1 mark)
  - ii. How many bits were used for this network? (1 mark)
  - iii. What is the Network address? (2 mark)
  - iv. Write the subnet mask (net mask) of the above IP address. (2 mark)
  - v. How many subnets that you can build in the above network. (4 mark)
  - vi. How many hosts (maximum number) could be connected to the above network? (4 mark)
- b. Following is the output generated by 'ipconfig -all' command. Based on the output answer the given questions.

```
Connection-specific DNS suffix . . . : cst.uwu.ac.lk
Description . . . . . : Intel(R) WiFi Link 5100 AGN
Physical Address . . . . . : 00-22-F8-88-A8-E0
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::1591:32f4:7fd6:1e4%LL(Preferred)
IPv4 Address. . . . . : 10.93.9.54(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Tuesday, June 13, 2017 8:33:37 AM
Lease Expires . . . . . : Wednesday, June 21, 2017 8:33:37 AM
Default Gateway . . . . . : 10.93.9.254
DHCP Server . . . . . : 10.93.2.248
```

- i. What is the Internet Protocol address of version 4 (IPv4) of the device. (1 mark)
- ii. What is the hardware address of the device. (1 mark)
- iii. What is the DHCP server address which the above device was attached. (1 mark)
- iv. Briefly, explain the term 'default gate way' by considering the above output. (3 mark)
- c. Explain the client server architecture by using a suitable diagram. (4 mark)

d. Following diagram shows a simple network. Give suitable IP address (IPv4) for PC1/ A.

(1 mark)



5. Write the short notes on following.

- a. Ring topology. (5 mark)
- b. Unguided transmission media. (5 mark)
- c. Ping command. (5 mark)
- d. Switch. (5 mark)
- e. Wide Area Network (WAN). (5 mark)

