



National University of Computer & Emerging Science, Karachi

Spring-2020 Department of Computer Science

Final Examination

29<sup>th</sup> June 2020, 09:00 am-12:30pm

Course Code: CL 307	Course Name: Computer Networks
Instructor Name: Rabia Ahmed & Muhammad Kariz	
Roll Number:	Name:

**Instructions:**

- Attempt all questions. This is open book exam. However copy past is not allowed.
- Read each question completely, there are 2 parts with total 9 questions and 9 pages. Suggested time is mentioned in all questions, it will help you in time management.
- For Pack tracer (scenarios based questions) take screenshot and arrange it of word/pdf file. **But** for any justification, short question including subnetting or VLSM, You should use hard paper such as register paper.
  - Note: Any word (file) based written answer or justification will not be acceptable).
- Write your ID on each page with signature on each page, and page number.
- Use CAM SCANNER or MS LENS to scan your answer script and upload a SINGLE file.
- All question must be solved according to sequence and mention question number in all (practical, justifications and in short questions).
- ONLY first submission will be considered via Google classroom.
- Write the following statement at the last page of your answer script: "I solemnly affirm that I have not copied or cheated during the exam."

**Max marks: 50**

**Part 1 (Practical: Packet Tracer) 30 Marks**

**Instructions:**

- a. When using any IP addresses make sure 2<sup>nd</sup> and 3<sup>rd</sup> octet should be your roll number, and in case you need multiple networks (IPs), for that you can add +1 in last network octet.
- b. Let's suppose if your roll number is 17K-1234; 1<sup>st</sup> network will be X.12.23.0, (X is any number from its class range) 2<sup>nd</sup> network will be X.12.24.0, and 3<sup>rd</sup> network will be X.12.25 and so on.
- c. Change display name and hostname (both) of routers with your ID. Such as R1-17k1234.

**Note: For Packet tracer you should need to submit:**

- a. Proper visible topology.
- b. IP address configuration image.

- c. Main configuration task screenshots (While performing in Routers or Switches).
- d. Status of main configuration e.g: send PDU, show layer information, routing table information or running configuring information etc).
  - Only make sure submit such status which give proof of that main task.

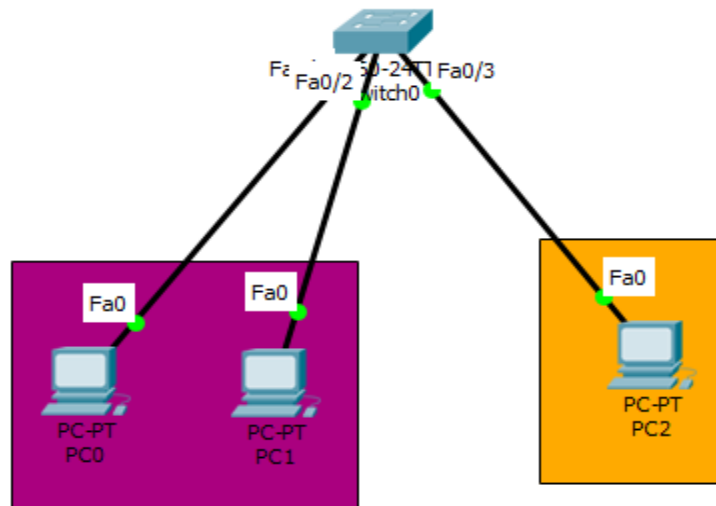
**5 Points (20 minutes)**

**Q:1** Let's suppose you are working in organization which have two branches Consider figure 1, CS and EE and you wants to restrict broadcast storm (from PC1 to PC2 and vice versa) but also if any host from EE/CS branch wants to communicate with other branch's host they can communicate as well.

Suggest solution and perform it in packet trace; follow bellow topology.

**Note:**

- a. In your suggested solution if you wants to use any additional device you can use, also write only 2 line justification that why you are using.
- b. Use class B IP addresses
- c. (Use all above mentioned rules)



*Figure 1: Scenario for question 1*

**5 Points (20 minutes)**

**Q2:** Let's suppose if you are working in an organization as junior Network Administrator, Network Administrator gave network, refer figure 2. And assign you a task of routing protocol. With bellow mentioned instructions.

- a. Although, this is very small network but in future it will extendable.
  - b. Source wants to select shortest path.
  - c. Routers/network does not afford un-necessary message, only wants main updates.
1. Justify your answer why you select this protocol? Not more than 4 lines.
  2. Use class C IP address
  3. Use above mentioned Rules

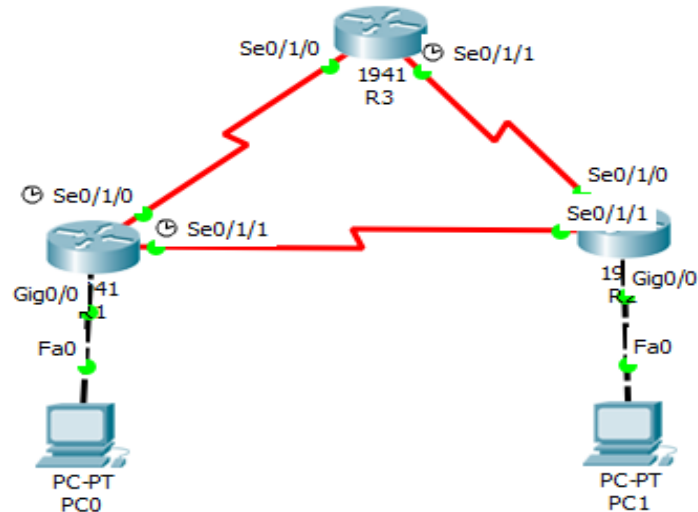


Figure 2: Routing Protocol

**5 Points (15 minutes)**

**Q3.** A network administrator wants to access his company's router remotely with secure connection. Consider figure 3. What solution would you suggest any why? Mention at which layer this protocol works? And perform your suggested solution on packet trace.

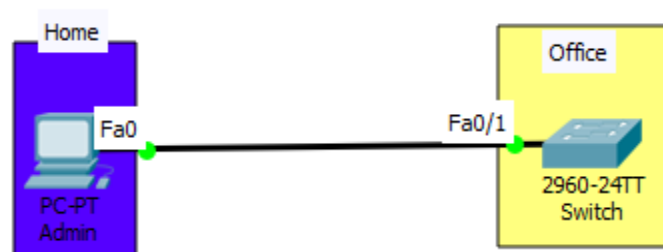


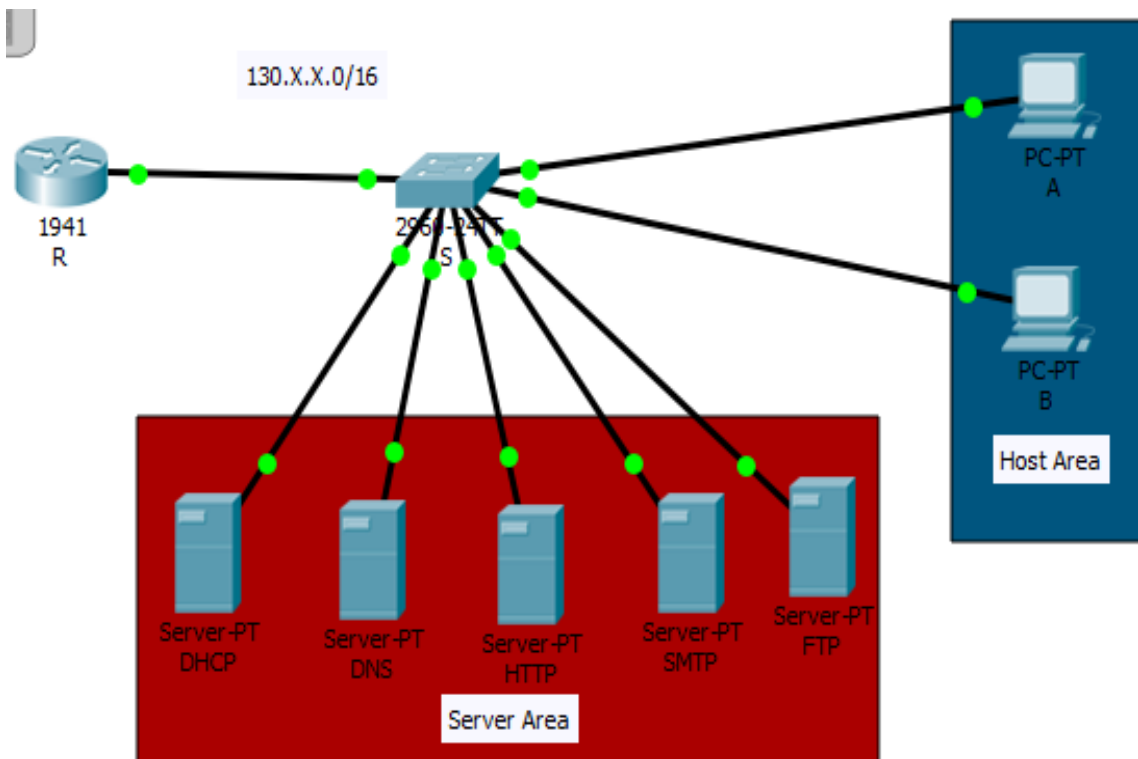
Figure 3: Remote Connection

**10 Points (30 minutes)**

**Q4.** Let's suppose your organization need to create a small server to provide some services to all its consumers. Refer figure 4, with bellow mentioned topology and instructions:

**Note: Show all results**

- Configure DHCP server which provide IP address, and all end devices use dynamic IPs configuration from DHCP.
- Configure DNS server, map host B IP with your first name, to show and verify this from host A: Go to web browser and call host B with your name (it will resolve name of host into its B IP).
- Configure SMTP (create account with your last name) send mail from PC-A to PC-B.
- Configure HTTP server, and show connection results from host-A to http server.
- Configure FTP server create account with your first name, password with your roll number and file name with your last name (.bin extension) show all connection results.



*Figure 4: Services*

**5 Points (20 minutes)**

**Q5.** Describe why VoIP is used? And at which layer? Consider below mentioned scenario in figure 5 and perform VoIP. Use your (4 digit number) roll number to assign number for IP phone and for PC use your roll number reverse. E.g. 17K1234: 1234 for IP phone and 4321 for PC. And use dynamic approach with class A addresses.

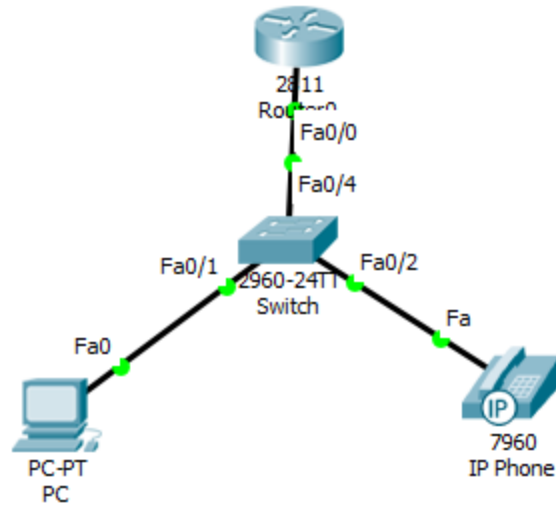


Figure 5: VoIP

## Part 2 (Questions Answers) 20 Marks

3 Points (15 minutes)

**Q6:** Perform VLSM, use figure 6.

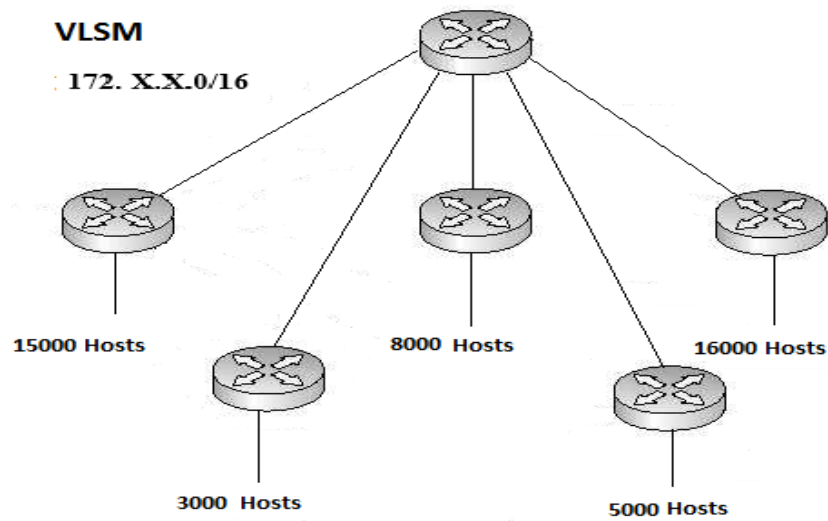


Figure 6: VLSM

(2.5+2.5) 5 Point (15 minutes)

**Q7. Perform Subnetting.**

- a. You are given the IP Address of 175.X.X.0 /16 and need 50 Subnets. How many hosts per network, and total networks do you get once subnetted.
- b. Your company has been given the IP Address of 199.X.X.0 /24 to subnet. Your plan to create in to 4 floors and in each floor number of usable hosts are equal to last 2 digit of your roll number. For example 1234 host will be 34.

**2 Points (15 minutes)**

**Q8. What is ACL? Its need? Its types, differentiate all types. And create correct rules of standard ACL for topology mentioned in figure 7 and apply them on best Router, Interfaces and direction & your Network requirements are:**

- i. PC 3 only wants DNS service from switch 4
- ii. PC 4 only wants to establish connection with 80 server.
- iii. PC 1 and 2 wants to restrict traffic from switch 4.

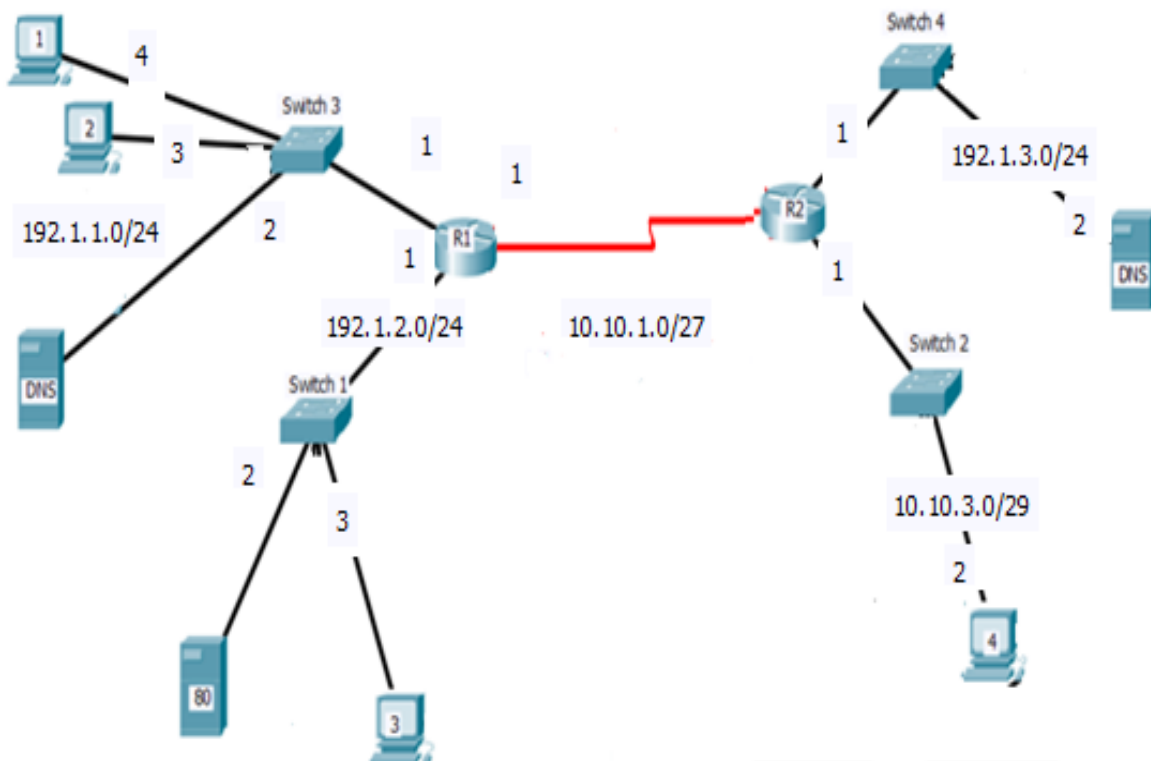


Figure 7: ACL

**10 Points (all question have equal marks) (20 minutes)**

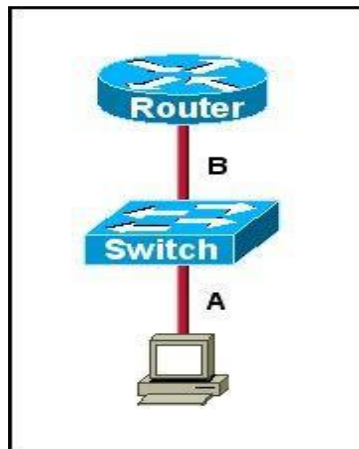
**Q9.**

- a. Subnet the IP Address 203.10.93.0 /24 into 30 Subnets. Is 203.10.93.30 a valid Host ID after subnetting?
- b. For below mentioned scenario in figure 8, we want to communicate from Router 0 to Router 1, which routing protocol is best and why we need routing protocol here?



*Figure 8: Q9.b*

- c. Which routing protocol is better? Justify your answer with any example.
- d. Refer to the exhibit, figure 9 The two connected ports on the switch are not turning orange or green. What would be the most effective steps to troubleshoot this physical layer problem?



*Figure 9: Q9.d*

- e. Write the subnet, broadcast address and valid host range for the following:
  1. 172.16.10.5 255.255.255.128
- f. Where does routing occur within the TCP/IP reference model?

- g. A network administrator is verifying the configuration of a newly installed host by establishing an FTP connection to a remote server. What is the highest layer of the protocol stack that the network administrator is using for this operation? And Why?
- h. For below mentioned scenario in figure 10, which routing protocol is best and why? Justify your answer.

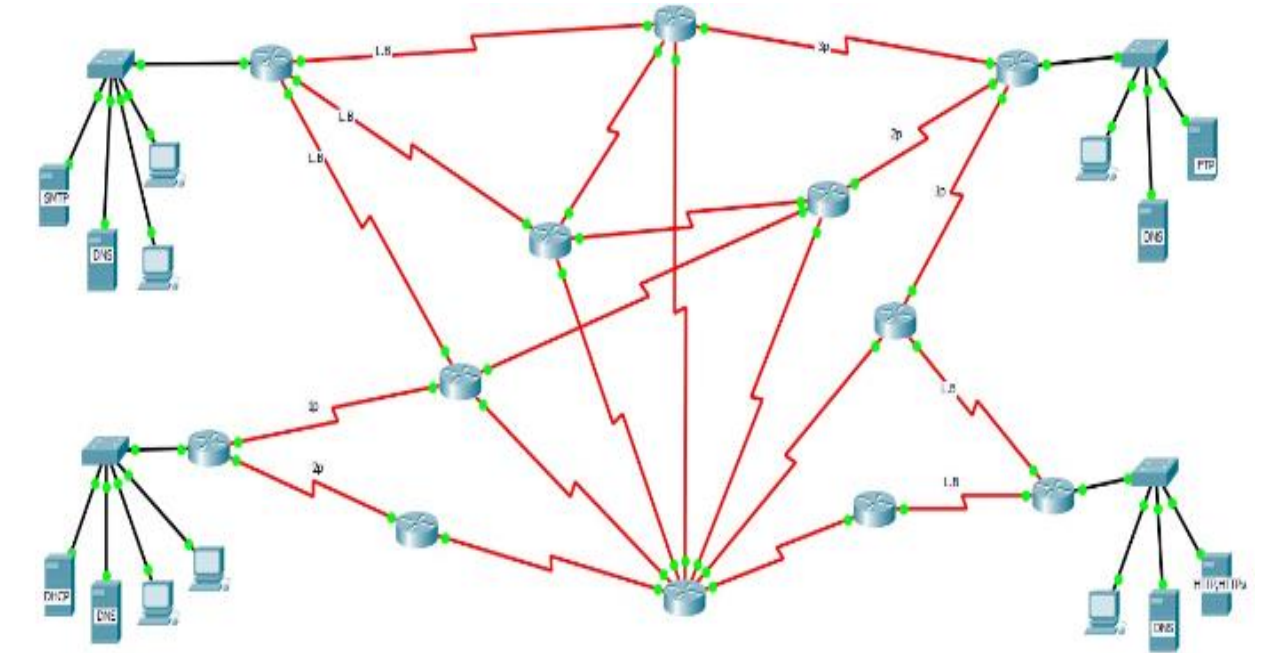
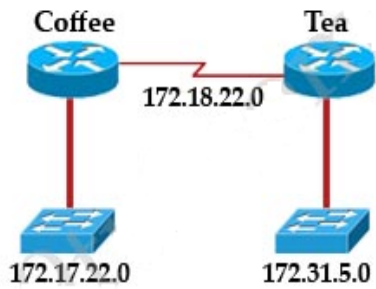


Figure 10: Q9.h

- i. Write a program (java, c or python) which retrieve application names from port number. Use latest two applications protocols.
- j. Consider figure 11. Users on the 172.17.22.0 network cannot reach the server located on the 172.31.5.0 network. The network administrator connected to router Coffee via the console port, issued the show ip route command. Based on the output of the show ip route command and the topology shown in the graphic, what is the cause of the failure?





Coffee #show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP  
 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP  
 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area  
 \* - candidate default, U - per-user static route, o - ODR  
 P - periodic downloaded static route

Gateway of last resort is 172.19.22.2 to network 0.0.0.0

C 172.17.22.0 is directly connected, FastEthernet0/0  
 C 172.18.22.0 is directly connected, Serial0/0  
 S\* 0.0.0.0/0 [1/0] via 172.19.22.2

Figure 11: Q9.j

**Best of Luck ☺**