



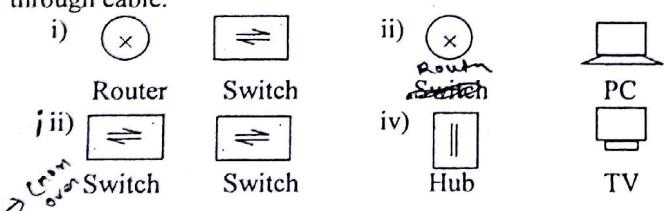
N.B. Answer six questions, taking three from each section.

The questions are of equal value.

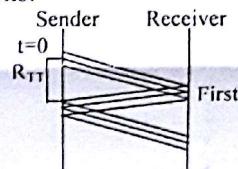
Use separate answer script for each section.

SECTION-A

- Q1. (a) What are the reasons for using layered protocol? Discuss the design issues of the network layers. 4
- (b) Two networks each provide reliable connection oriented service. One of them offers a reliable byte stream and other offers a reliable message stream. Are these identical? If so, why is the distinction made? If not, give an example of how they differ? 5
- (c) What are the differences between connection less communication and connection oriented communication? 2^{2/3}
- Q2. (a) What is network topology? Mention different types of network topology. How many links are required for complete mesh, star and ring topology if there are n nodes? 3
- (b) Briefly explain the responsibilities of different layers (OSI reference model) when sending and receiving messages. List two ways in which the OSI reference model and TCP/IP reference model are the same and in which they differ? 4
- (c) What is hand off? Explain different types of hand off in mobile network. Briefly describe the call management technique in cellular network. 4^{2/3}
- Q3 (a) How do we remove magnetic field effect in copper cabling? 2^{2/3}
- (b) Sometimes when a mobile user crosses the boundary from one cell to another, the current call is abruptly terminated, even though all transmitter and receivers are functioning properly why? 5
- (c) For the following section, determine when you need crossover or copper straight through cable. 4



- Q4. Consider the sliding window protocol as shown in the figure below and answer the following questions: 11^{2/3}



Sliding window protocol parameters

n= number of packets.

L= packet size in bits=10 Kb

R= Link rate in bits/second=10 Mbps

R_{TT}= Round trip time in seconds=99 msec.

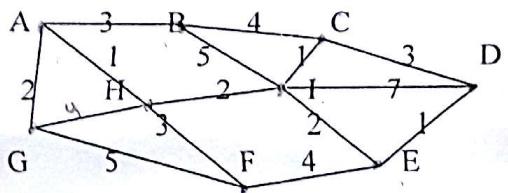
- How long does it take to send the first bits?
- With the value shown in the diagram, what is the effective sending rate as a function of n?
- For an effective rate of 1 Mbps, how many packets must be sent within one window?
- Calculate link utilization, bandwidth delay product.

- Q5. (a) Explain the differences between connection-oriented and connectionless protocols.
 (b) Discuss the count-to-infinity problem.

SECTION-B

2^{2/3}

- Q5. (a) Why ip addressing is necessary in computer network? 6
 (b) IP providing organization is granted the block 172.17.0.0/16 for RUET. The RUET authority is decided to design a VLSM scheme for the different faculties LAN with 2000 hosts, 4000 hosts, 300 hosts, and 800 hosts. For this purpose fill the following table. 3
- | Network address | First usable ip address | Last usable ip address | Subnet mask | Broadcast address |
|-----------------|-------------------------|------------------------|-------------|-------------------|
| | | | | |
- (c) If the network address is 192.168.10.0 and the subnet mask is 255.255.255.240, then how many subnets and how many hosts per subnet are possible? 3
- Q6. (a) Briefly explain the following: i) Optimality principle, ii) Sink tree, iii) Properties of routing algorithm. 4
 (b) Consider a group of routers and their connections in a subnet are shown by the following figure. Build the link state packets for the subnet. 3^{2/3}



- (c) Flooding always choose the shortest path. Justify the statement. 2
 (d) What is fragmentation? Briefly explain the purpose of fragmentation. 2
- Q7. (a) What is delayed duplicate? How does the delayed duplicate affect connection establishment at the transport layer? Mention some ways to overcome the situation. 3
 (b) What is three way hand shake? Briefly explain how the following scenarios are handled while completing the three way hand shake. 6
 - i) Final acknowledgement lost.
 - ii) Response lost.
 (c) Small size of the buffer is one of the main reason of having congestion. Do you think huge size of buffer can easily avoid this congestion? Justify your answer. 2^{2/3}
- Q8. (a) What is the fastest line speed at which a host can blast out 1500 byte TCP payloads with a 120 sec maximum packet lifetime without having the sequence numbers wrap around? 4
 (b) What is "count-to-infinity" problem? "Count-to-infinity" problem can never be solved. State whether the statement is true or false. Justify. 4
 (c) Define DNS and resolver? How does a resolver look up a remote name? Why the query method is called recursive query? 3^{2/3}

Heaven's Light is our Guide
 Rajshahi University of Engineering & Technology
 B.Sc. Engineering 4th Year 7th Semester Examination, 2013
 Department of Computer Science & Engineering
 Course No. CSE 707 Course Title: Computer Networks
 Full Marks: 70 Time: THREE (03) hours

N.B.

Answer SIX questions taking THREE from each section.

The questions are of equal value.

Use separate answer script for each section.

SECTION A

- | | <u>Marks</u> |
|---|-----------------|
| Q1(a) What is computer network? What are the components necessary in computer networks? | 04 |
| (b) What is protocol? List the ways in which the OSI model and TCP/IP model are the same as well as differ from each other. | 04 |
| (c) What is difference between <ul style="list-style-type: none"> (i) physical address and logical address (ii) logical address and port address. | 03 ² |
| Q2(a) Let you are a network administrator and your network address is <u>160.160.0.0</u> . Your authority asks to make subnets where each subnet will contain <u>1024</u> hosts. Now explain the followings: <ul style="list-style-type: none"> (i) How many subnets can be achieved? (ii) What is the subnet mask? (iii) What is the range of IP address of the last subnet? (iv) What is the network and broadcast address of the second subnet? | 08 |
| (b) What is maximum number of subnets in class C networks using the following masks? <ul style="list-style-type: none"> (i) <u>255.255.255.224</u> - 8 (ii) <u>255.255.255.240</u> - 16 | 02 |
| (c) Show by calculation how many networks and number of host in each network for class A, B and C can have? | 01 ² |
| Q3(a) Six stations, A through F communicate using the MACA protocol. Is it possible that two transmissions take place simultaneously? Explain your answer. | 03 |
| (b) Given a 10 bit sequence <u>101001110</u> and a divisor of <u>1011</u> . Find the CRC. Check your answer. | 04 |
| (c) Explain CSMA protocol. What are the advantages of CSMA/CD protocol over CSMA protocol? | 04 ² |
| Q4(a) Briefly discuss the data link layer design issues. | 02 |
| (b) What is hamming code? A 12-bit hamming code whose hexadecimal value is <u>0xE4F</u> arrives at a receiver. What was the original value in hexadecimal? Assume that not more than 1 bit is in error. | 05 |
| (c) What are the differences between Go-back-n approach ARQ error control and selective-reject ARQ error control method? | 02 ² |
| (d) What are the advantages of a wireless network? | 02 |

SECTION B

- | | |
|---|----|
| Q5(a) A message is broken up into three pieces. Discuss the transmission of the packets using the following approaches: <ul style="list-style-type: none"> (i) Datagram approach (ii) Permanent virtual circuit approach (iii) Switch virtual circuit approach. | 06 |
|---|----|

- (b) Which layer and why are the followings used for:
 (i) Bridge
 (ii) Gateway
 (iii) Router
 (iv) Hub
- (c) Why is circuit switching inefficient for transmission of non voice data? How can we solve this problem using packet switching technique?
- Q6(a)** Discuss the situation when the following routing technique is appropriate: **04**
 (i) Static routing
 (ii) Dynamic routing
- (b)** Explain distance vector routing algorithm. **05**
- (c)** Define the following terms with example. **02%**
 (i) Broadcasting
 (ii) Multicasting
 (iii) Unicasting
- Q7(a)** What happen if you write `www.ruet.ac.bd` into your web browser? Briefly explain each step. **03**
- (b)** How physical addressing is performed in WAN? **02%**
- (c)** How congestion is controlled in TCP? **03**
- (d)** Explain that the lost acknowledgement does not necessarily enforce retransmission of the packet. **03**
- Q8(a)** Briefly explain the sliding window protocol for flow controlling. **03**
(b) What is main difference between TCP and UDP? **02%**
- (c)** Which of the OSI layers handles each of the following: **06**
 (i) Determine the next hop address
 (ii) How data is converted?
 (iii) Determining how two devices establish, maintain and manage a connection.

1. Layer 1
Physical layer
2. Layer 2
Data link layer
3. Layer 3
Network layer
4. Layer 4
Transport layer
5. Layer 5
Session layer
6. Layer 6
Presentation layer
7. Layer 7
Application layer

Important instructions
Rajiv Gandhi University of Technology & Technology
B.Tech. Engineering 4th Year 7th Semester Examination, '01
Department of Computer Science & Engineering
Course no: CSE 707 Course Title: Computer Network
Full marks: 70 Time: Three (03) hours

N.B. Answer six questions, taking three from each section.

The questions are of equal value.

Use separate answer script for each section.

SECTION-A

Q1. (a) What is protocol? How does information get passed from one OSI layer to the next? 3

(b) What is computer Network? What are some of the factors that determine whether a communication system is a LAN, MAN or WAN? 3

(c) For each type of network topology, discuss the implication of a single cable fault. 2

(d) Distinguish between a peer-to-peer relationship and a primary-secondary relationship. 3

Q2. (a) What do you mean by Quality of Service? Discuss the techniques for achieving good Quality of Service. 5

(b) What are the differences between Leaky Bucket algorithm and Token Bucket algorithm? 3

(c) Why are connection oriented communication and connection less communication used? 3

What layers in the TCP/IP protocol are responsible for these type of communication?

Q2. (b) Let us say you are network administrator and your network address is 170.170.0.0. Your authority acts to administer seven subnets where each subnet will contain 1024 host. Now explain the following:

(i) How many subnets can be achieved? 2

(ii) What is the range of the subnet掩码? 2

(iii) What is the range of the host identifier in each subnet? 2

(iv) Explain the differences between TCP and UDP protocols. 2

(v) Explain the differences between circuit switching and packet switching. 2

(vi) What is a port? Explain the function of port in networking. 2

(vii) What are the similarities between ATM and Token Ring architecture? 2

(viii) What is the difference between a half-duplex and a full-duplex transmission? 2

(ix) What is the difference between a synchronous and an asynchronous transmission? 2

SECTION-B

Q3. (a) What is stop-and-wait ARQ method? Write the advantages and disadvantages of stop-and-wait and sliding window protocol. 3

(b) What does the number in an ACK and NAK frame mean for (i) Stop-and-Wait ARQ? 2

(ii) Go-back-n ARQ? (iii) Selective-reject ARQ? 2

Q4. (a) What is VSAT necessary? How a VSAT can communicate with another VSAT? Explain with necessary figure. 3

(b) Discuss the main design issues of data link layer. 4

(c) Answer the following questions: 2

(i) Define broadcasting and multicasting. 2

(ii) What are the differences between CSMA and CSMA/CD? 2

(iii) What does repeater do? 2

Q5. (a) Find the following IPs: 2

(i) 19.19.5.190 2

(ii) 19.19.9.25 2

(iii) 175.23.23.235 2

(iv) 172.16.1.1 2

(b) What are generic domain labels? Mention the generic domain labels with their description. 2

(c) What are the Address classes A, E, B, C and D? 2

(d) Difference between ATM and CDMA communication. 2

(e) What are the two types of multiplexing? Are they divisional or statistical? 2

(f) Explain LAN topologies. Chap - 28 2

(g) Explain LAN protocols. Chap - 28 2

(h) Explain CSMA/CD. Chap - 28 2

L = packet size in bits=10 Kb

R = Link rate in bits/second=10 Mbps

RTT = Round trip time in seconds=99 msec.

comm
nes

N.B. Answer six questions, taking three from each section.

The questions are of equal value.

Use separate answer script for each section.

SECTION-A

201

Q1.

- (a) Let you are a network administrator and your network address is 180.180.0.0. Your authority asks to make subnets where each subnet will contain 512 hosts. Now explain the followings: 06

(i) How many subnets can be achieved?

(ii) What is the subnet mask?

(iii) What is the IP address of the last subnet?

(iv) What is the broadcast address of the second subnet? M

(b)

- Compare a host-to-host protocol such as IP to a port-to-port protocol such as TCP. M

03

(c)

- Discuss the concept of redundancy in error detection. M

2 $\frac{2}{3}$

Q2.

- (a) Explain the responsibilities of each of the layer of OSI model. M

4 $\frac{2}{3}$

(b)

- What are headers and trailer and how do they get added and removed? Explain with example. M

02

(c)

- What are some factors that determine whether a communication system is a LAN, MAN or WAN?

02

(d)

- For n devices in a network, what is the number of cable links required for a mesh, ring, bus and star topology? M

02

Q3.

- (a) What are the purposes of I-frames, S-frames, U-frames of HDLC bit oriented protocol? M

1 $\frac{2}{3}$

(b)

- What are the differences time-slot interchange and TDM bus technique in time division switches? M

03

(c)

- What are problems of multistage switches?

03

(d)

- Explain switch virtual circuit and permanent virtual circuit.

03

(d)

- A message is broken up into pieces. Discuss the transmission of the packets using the datagram approach to packet switching.

02

Q4.

- (a) What is the difference between straight through and cross over connection? How can you make this connection? Briefly explain. M

4 $\frac{2}{3}$

(b)

- What are the differences between multicast and broadcast transmission? M

02

(c)

- Suppose an ISP is generated a block of addresses starting with 172.17.0.0/20. The network consists of three following subnets. You have to calculate the following subnet:

05

Subnet 1: EEE dept. hosts up to 100



Subnet 2: CSF dept. hosts up to 60

Subnet 3: FTE dept. hosts up to 60

Find out the network address, broadcast address, 1st host and last host address of each department.

SECTION-B

Q5.

- (a) What are the reasons of making congestion in the network? What are the policies should take a data link layer avoiding congestion? 3 $\frac{2}{3}$

(b)

- Write the steps of link state routing. What are the differences between distance vector routing and link state routing? 03

(c)

- Discuss the count-to-infinity problem? How this problem can be eliminated? M

03

(d)

- Explain TCP header. 02

Q6.

- (a) What is DHCP? How can you use DHCP in networking? Write the advantages of using DHCP. 3 $\frac{2}{3}$

(b)

- Explain the operation of SNMP. M

04

(c)

- What do you mean by propagation delay and transmission delay? M

02

(d)

- What is difference between M

02

(i) Physical address and logical address

(ii) Logical address and port address

Q7.

- (a) Define protocol. List the ways in which the OSI model and TCP/IP model are the same as well as differ from each other. M

3 $\frac{2}{3}$

(b)

- What are the main purposes of using computer network? M

02

(c)

- Where and why are the following used for?

04

(i) Bridge

(ii) Gateway

(iii) Router

(iv) Hub M

- If the IP address of a host PC is 172.17.0.1 and the subnet mask is 255.255.255.0, then what is the network address? 02

Q8.

- (a) Explain CSMA/CD protocol. M

4 $\frac{2}{3}$

(b)

- Discuss collision free bit-map protocol and its problem.

04

(c)

- Explain hidden station problem and exposed station problem.

03

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RA
CSE 706

Course No:

Full Marks: over six questions, taking three from each section
 The questions are of equal value

Q.P. Use separate answer script for each section.

D.M.A

Q1. (a)

What are two reasons for using layered protocols? What does "negotiation" mean when discussing network protocols? Give an example.

Mark

2

(b)

List two ways in which the OSI reference model and the TCP/IP reference model are the same. Now list two ways in which they differ.

3

(c)

Find out what networks are used at your lab or place of work. Describe the network types, topologies and switching methods used there.

4

(d)

List two advantages and two disadvantages of having international standards for network protocol. Give three reasons why networks might use an error-correcting code instead of error detection and retransmission.

2

(b)

Calculate the VRC and LRC for the following bit pattern using odd parity

→ 0011101 1100011 1111111 0000000 ←

3

(c)

The code 11110101101 was received. Using the hamming code algorithm, What is the original code sent? (Check error detection and correction procedure?)

2

(d)

A sender sends 01110001, the receiver receives 01000001. If only VRC is used, can the receiver detect the error? What will happen if LRC or CRC is used to detect the error?

2

(a)

Six stations A through F communicate using the MACA protocol. Is it possible that two transmissions take place simultaneously? Explain your answer. P.Q.Y.O

2

(b)

What does the number on a NAK frame and ACK frame mean for

3

(i)

(i) stop-and-wait ARQ

2

(ii)

(ii) Go-back-n ARQ

3

(iii)

(iii) selective-reject ARQ

4

(c)

In stop-and-wait flow control, define and discuss the handling of

2

(i)

(i) A damaged frame

4

(ii)

(ii) A lost frame

2

(iii)

(iii) What are the two types of sliding window ARQ error control? How do they differ from one another?

2

(d)

Define the following terms with example:

3

(i)

(i) Broadcasting

4

(ii)

(ii) unicasting

2

(d)

(d) A channel has bit rate of 1 kbps and a propagation delay of 20 msec. For what range of frame sizes does stop-and-wait gives an efficiency of least 50 percent.

2

(e)

(e) → M

3

(f)

(f) → M

2

(g)

(g) → M

2

(h)

(h) → M

2

(i)

(i) → M

2

(j)

(j) → M

2

(k)

(k) → M

2

(l)

(l) → M

2

(m)

(m) → M

2

(n)

(n) → M

2

(o)

(o) → M

2

(p)

(p) → M

2

(q)

(q) → M

2

(r)

(r) → M

2

(s)

(s) → M

2

(t)

(t) → M

2

(u)

(u) → M

2

(v)

(v) → M

2

(w)

(w) → M

2

(x)

(x) → M

2

(y)

(y) → M

2

(z)

(z) → M

2

SECTION-A 2010

SECTION-B

Q2. (a)

Why is circuit switching inefficient for the transmission of non voice date? How can we solve this problem using packet switching technique?

2

(b)

Are there any circumstances when connection-oriented service will (or at least should) deliver packets out of order? Explain.

3

(c)

Discuss the situations when the following routing technique is appropriate.

2

(i)

(i) Static routing

4

(ii)

(ii) Dynamic routing

4

(d)

(d) Draw IPV4 header. Clearly point out the various components.

2

(e)

(e) Let you are a network administrator and your network address is 170.170.0.0. Your authority asks to make subnets where each subnet will contain 1024 hosts. Now explain the followings:

8

(i) How many subnets can be achieved?

2

(ii) What is the subnet mask?

2

(iii) What is the IP address of the last subnet?

2

(iv) What is the broadcast address of the second subnet?

2

(f)

(f) What is maximum number of subnets in class C networks using the following masks?

2

(i) 255.255.255.192

1

(ii) 255.255.255.240

3

(g)

(g) Show how many bits are required to address each host for each IP address class (A, B and C only) can have.

1

(h)

(h) → M

3

(i)

(i) → M

3

(j)

(j) → M

3

(k)

(k) → M

3

(l)

(l) → M

3

(m)

(m) → M

3

(n)

(n) → M

3

(o)

(o) → M

3

(p)

(p) → M

3

(q)

(q) → M

3

(r)

(r) → M

3

(s)

(s) → M

3

(t)

(t) → M

3

(u)

(u) → M

3

(v)

(v) → M

3

(w)

(w) → M

3

(x)

(x) → M

3

(y)

(y) → M

3

(z)

(z) → M

3

(aa)

(aa) → M

3

(bb)

(bb) → M

3

(cc)

(cc) → M

3

(dd)

(dd) → M

3

(ee)

(ee) → M

3

(ff)

(ff) → M

3

(gg)

(gg) → M

3

(hh)

(hh) → M

3

(ii)

(ii) → M

3

(jj)

(jj) → M

3

(kk)

(kk) → M

3

(ll)

(ll) → M

3

(mm)

(mm) → M

3

(nn)

(nn) → M

3

(oo)

(oo) → M

3

(pp)

(pp) → M

3

(qq)

(qq) → M

3

(rr)

(rr) → M

3

(ss)

Ques **(a)** Explain the differences between connection-oriented and connectionless services.
(b) Discuss the "source-to-initially problem". How this problem can be eliminated? Give an example.

Ans

(a) Connection-oriented service implement "check and correct (if necessary) the codeword 1101001011 using Hamming coding scheme.

(b) A message is broken up into three pieces. Briefly discuss the transmission of the packet using a switched virtual circuit.

(c) How many cross points are needed if we use a crossbar switch to connect 1200 telephone in a small town?

(d) In an infinite population slotted ALOHA system, the mean number of slots a station waits between a collision and its retransmission is 4. Plot the delay versus throughput curve for this system.

(e) A group of 16 stations share a 16 kbps pure ALOHA channel. Each station output a 800 bit frame on an average of once every 100sec, even if the previous one has not yet been sent (e.g. the station can buffer outgoing frames). What is the maximum value of N?

*** The End ***

M

CT1(CSE 707)

Time:25

Marks: 20

- Q.1. What points you should remember for layered approach? 5
- Q.2. Describe briefly OSI model. What are the difference between OSI and TCP reference model? 6+2=8
- Q3. How do we remove magnetic field effect in copper cabling? 2
- Q.4. Which type transmission you should choose among copper and optical fiber? Explain briefly your choice. 5

~~CT 2.2(CSE 707)~~

Time: 25 Mins

Marks: 20

$1+5=6$

Q.1. What is an IP address? Describe different class of IP address with examples.

Q.2. Suppose 172.15.0.0/16 is a network address.

k) How many useable ip addressing can be generated?

l) If we have three different LANs of 2500, 3000, and 125 host, design an
VLSM scheme. Mention network address/CIDR, first, last, and broadcast address.

Q.3. Describe function of data link layer.

2

8

4

CT3(CSE 707)

Time: ∞

Marks: 20

Q.1 If we want to configure this topology with eigrp routing protocol, Write the appropriate code on R1, R2, and R3 routers.

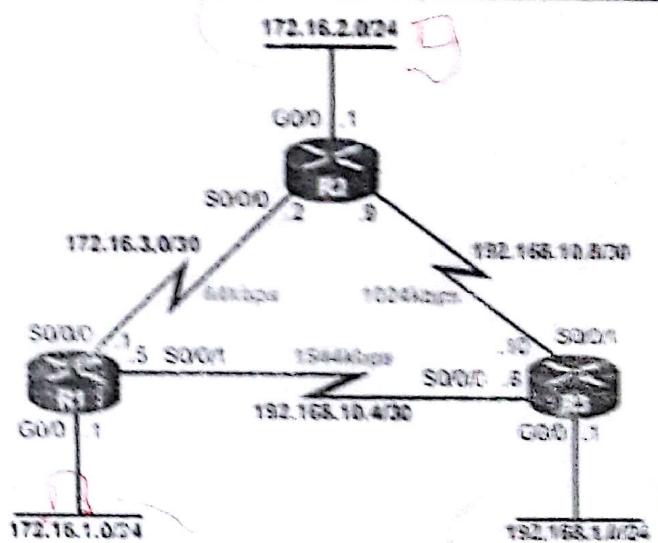
10

Q.2. Configure passive interface (if any)

5

Q.3. Why we use eigrp protocol, instead of RIP.

5



Link	In	Out
10.0	G0/0	0
10.0	S0/0/0	0
10.0	S0/0/0	1

R2	
192.168.20.0	G0/0
10.10.10.0	S0/0/0
192.168.10.0	S0/0/0

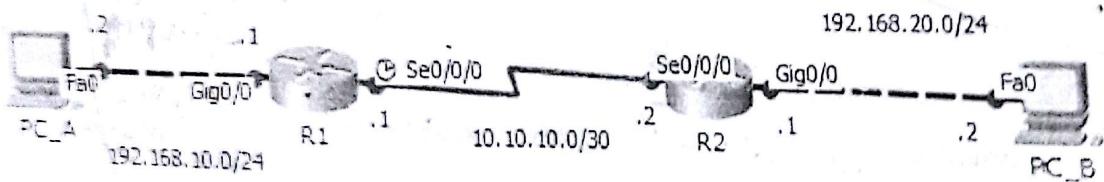
CT3.1 (Routing-CSE 707)

Q.20 Time: As much as you need

Marks: 4*5=20

Q.1. We can overcome limitations of static routing by using dynamic routing or vice versa. Do you agree or not? Explain your choice.

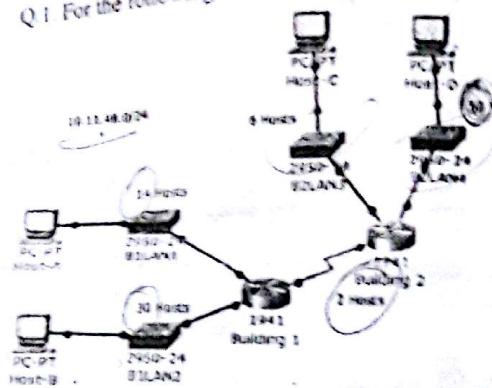
Q.2. From the following figure answer the following questions. *(Routing protocol Q1 code R160)*



- a) If we want to communicate between PC_A and PC_B, what should you must do in R1 and R2 routers?
- b) What will be in R1 and R2 routing table? → *Fig 2 Network IP Fwd 2020 net. is under Q2 g(27)*
- c) What is stub network? How many stub network(s) in this figure?

Time: 30

Q.1. For the following network diagram and host distribution answer the following section.



- ✓ Use the first subnet to accommodate the largest LAN
- ✓ Use the second subnet to accommodate the second largest LAN
- ✓ Use the third subnet to accommodate the third largest LAN
- ✓ Use the fourth subnet to accommodate the fourth largest LAN
- ✓ Use the fifth subnet to accommodate the connection between Building 1 and Building 2

a) How many subnets are needed in the network topology?

~~5~~ 5 subnets will be needed

b) Fill the following Subnet Table.

10

Subnet Description	Number of Hosts Needed	Network Address/CIDR	First Usable Host Address	Last Usable Host Address	Broadcast Address
Host-D LAN	60	10.11.48.0/26	10.11.48.1/26	10.11.48.63/26	10.11.48.127/26
Host-B LAN	30	10.11.48.0/27	10.11.48.1/27	10.11.48.31/27	10.11.48.63/27
Host-A LAN	14	10.11.48.0/28	10.11.48.1/28	10.11.48.15/28	10.11.48.31/28
Host-C LAN	6	10.11.48.0/29	10.11.48.1/29	10.11.48.5/29	10.11.48.15/29
WAN Link	2	10.11.48.0/30	10.11.48.1/30	10.11.48.2/30	10.11.48.3/30

c) Assign the first usable host address to Host-A PC.

~~10.11.48.1/28~~ 10.11.48.16/28

d) Assign the last usable host address to Host-B PC.

~~10.11.48.32/27~~ 10.11.48.223/27

e) Assign the fifth usable host address to Host-C PC.

10.11.48.40/29

f) Assign the second last usable host address to Host-D PC.

10.11.48.190/26

Subnet name	Netwk size	Allocation	Address Range	No. of hosts	Range	Broadcast
1	0 - 60	- 69 -	10.11.48.0/26 - 10.11.48.63/26	1 - 62		63
2	0 - 30	- 39 -	10.11.48.0/27 - 10.11.48.31/27	1 - 29	30	95
3	0 - 14	- 19 -	10.11.48.0/28 - 10.11.48.15/28	1 - 15	16	111
4	0 - 6	- 16 -	10.11.48.0/29 - 10.11.48.5/29	1 - 5	6	119
5	0 - 2	- 9 -	10.11.48.0/30 - 10.11.48.1/30	1 - 1	2	123

