Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

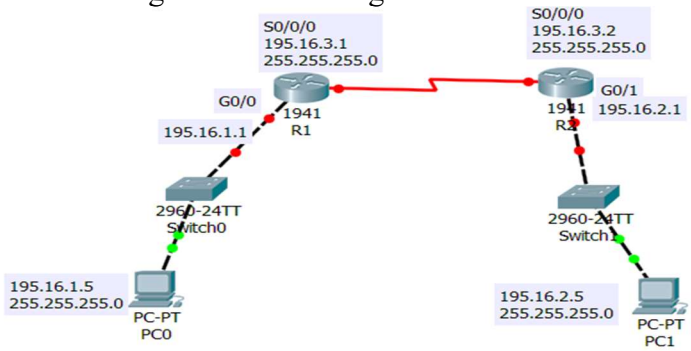
Course: B.C.A **Semester: 3rd**
Programme: Computer Networks **Time: 03 hrs.**
Max. Marks: 100

Instructions: This Paper Consists of 3 Sections namely A, B and C which is of 20,40 and 40 Marks respectively. Section A, Section B and Section C is having 5, 5 and 2 Questions respectively. Section wise instruction is provided before the start of the section. All Questions are compulsory. Answer should be precise and point to point and use diagram wherever asked or required. Answer should be provided in a proper sequence only as the question paper.

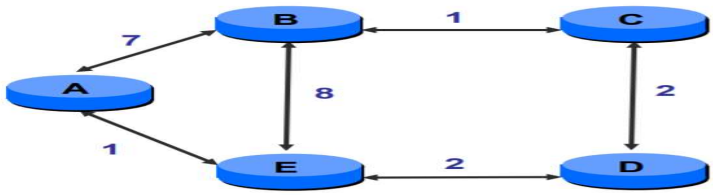
SECTION A

S. No.	Total Marks for SECTION A is 20. Marks for each question is subdivided.	Marks	CO
Q 1	Describe the following: i. Bit Torrent Protocol ii. DHCP iii. IEEE 802.11 iv. SMTP	4(1x4)	CO5, CO4
Q 2	Differentiate between the following a). Firewall and IDS b). Network Security Vs Data Security	4(2+2)	CO5
Q 3	What is utility of port number. Write the port number for the following protocols a).FTP b). DNS c). HTTP	4(1+3)	CO5
Q 4	Explain the 3 Way handshake in TCP for connection establishment.	4(1+3)	CO4
Q 5	A code scheme has a Hamming distance d_{min} = 4. What is the error detection and correction capability of this scheme? Calculate the hamming distance between two codes given below find d(c,d) where c= 00110010 d= 11011011	4(2+2)	CO2

SECTION B

	Total Marks for SECTION B is 40. Marks for each question is subdivided. 9 and 10 is having internal choice.		
Q 6	Follow the given topology and configure. Use the topology to identify port and ip addresses. a). Static routes b). Use RIP to configure the following  	8(4+4)	CO3

<table>
<tr><td>Q 7</td><td>Draw The following is a dump of a TCP header in hexadecimal format.
05320017 00000001 00000000 500207FF 00000000
a. What is the source port number?
b. What is the destination port number?
c. What the sequence number?
d. What is the acknowledgment number?</td><td>8(2x4)</td><td>CO4</td></tr>
<tr><td>Q 8</td><td>The Routing table of some router is provided below
<table>
<tr><td>Mask</td><td>Network Address</td><td>Next Hop</td><td>Interface</td></tr>
<tr><td>/26</td><td>180.70.65.192</td><td>……</td><td>f 0/2</td></tr>
<tr><td>/25</td><td>180.70.65.128</td><td>……</td><td>f 0/0</td></tr>
<tr><td>/24</td><td>201.4.22.0</td><td>……</td><td>f 0/3</td></tr>
<tr><td>/22</td><td>201.4.16.0</td><td>……</td><td>f 0/1</td></tr>
<tr><td>Any</td><td>Any</td><td>180.70.65.200</td><td>f 0/2</td></tr>
</table>
Based on the routing table show the forwarding process
a). if a packet arrives at R1 with the destination address 180.70.65.140
b). if a packet arrives at R1 with the destination address 18.24.32.78</td><td>8(4+4)</td><td>CO3</td></tr>
<tr><td>Q 9</td><td>Solve any part one part of the question (Either a or b):
a). Explain seven layers of ISO-OSI network model. Compare it with the TCP-IP network model. Use diagram and provide each layer datagram and addresses used if any.
b). Describe the Client Server Architecture. Compare It with peer to peer architecture. Take the Web services as a client server architecture and bit torrent protocol as a peer to peer architecture and compare both.</td><td>8</td><td>CO1</td></tr>
<tr><td>Q 10</td><td>Write short notes on any 2.
a). Networking Devices (Switches, Router……)
b). DNS
c). Flow Control and Error Control in TCP</td><td>8(4+4)</td><td>CO1, CO4, CO5</td></tr>
<tr><td colspan="4">SECTION-C</td></tr>
<tr><td></td><td>Total Marks for SECTION C is 40. Marks for each question is subdivided.</td><td></td><td></td></tr>
<tr><td>Q 12</td><td>UPES is an organization and you need to design the network for UPES which is secure, scalable, fast and reliable. Go through the paragraph and answer the following question.</td><td></td><td></td></tr>
<tr><td></td><td>UPES is university situated in Dehradun on lower foothills of Himalayas. It has twin campus one at bidholi and other and kandoli two small villages of Dehradun. The Bidholi campus is having 3 schools named as SOE, SOCS, SOD and the kandoli campus is having 2 schools SOL and SOM. Each of these schools are having different departments. The bidholi and kandoli campus are connected using optical fibers. UPES is using private IP addresses of class A and assigned 2 public IP addresses for</td><td>20</td><td>CO1, CO2, CO4, CO5</td></tr>
</table>

	outside communication. The different schools of UPES has students SOCS-4500, SOE-5000, SOD-500, SOL- 1500 and SOM-800. For internal communication UPES employees uses some internal portals for attendance and other internal services. They also use outlook for official communication through email. The internal portals are available as an intranet service whereas the college website is available over internet.		
a).	Describe Scalability and Reliability for Network Design.	**2**	
b).	On such terrain which way of communication is better wired or wireless and why. Can we use microwave connectivity between the two campuses?	**2**	
c).	The fiber connectivity will between two campuses will be a single mode fiber or a multimode fiber.	**1**	
d).	How the private address gets translated to public IP address using NAT. Explain the process of address translation using NAT.	**3**	
e).	What you can say about outlook. Is it using SMTP or POP. Explain your answer.	**2**	
f).	Why we are not able the access the internal server from outside the campus using internet. Why college website is not provided as a intranet service only.	**2**	
g).	Assume all schools are on different subnet, connected through WAN link. Provide a Subnetting structure for UPES with a class A private address 10.0.0.0/8. Use VLSM to optimize the IP address requirements.	**8**	
12.	Differentiate between routing and forwarding. Describe the routing table. Differentiate between static routing and dynamic routing. Explain the distance vector routing.  Apply the distance vector routing in the following scenario. Or Apply the Link state routing in the following scenario.	**20(2+2 +2+4+ 10)**	**CO4**

Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: B.C.A **Semester: 3rd**
Programme: Computer Networks **Time: 03 hrs.**
Max. Marks: 100

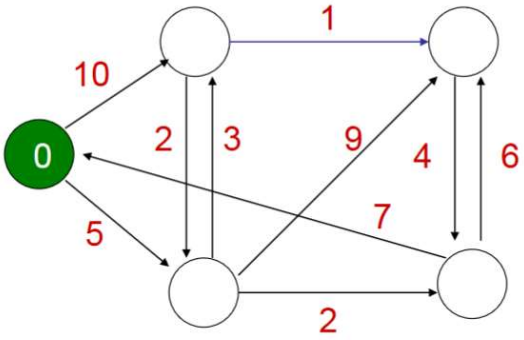
Instructions: The Paper Consists of 3 Sections. Section A, Section B and Section C is of 20,40 and 40 Marks respectively. Section A, Section B and Section C is having 4,4 and 2 Questions respectively. Section wise instruction is provided before the start of the section. All Questions are compulsory. Answer should be point-to-point and brief. Use diagram wherever required.

SECTION A

S. No.	Total Marks for SECTION A is 20. Marks for each question is subdivided.	Marks	CO
Q 1	Describe the following: i. Skype ii. IGMP iii. IEEE 802.5 iv. Ping	**4(1x4)**	**CO5, CO2**
Q 2	Differentiate between the following a). STP Vs UTP b). TCP Vs UDP	**4(1+3)**	**CO2, CO4**
Q 3	Explain the 3 Way handshake in TCP for connection establishment.	**4**	**CO4**
Q 4	What is congestion? Write the requirements of congestion control.	**4**	**CO4**
Q 5	What is a socket address? A TFTP server residing on a host with IP address 130.45.12.7 sends a message to TFTP client residing on a host with IP address 14.90.90.33. What is the pair of sockets used in this communication?	**4**	**CO3, CO2**

SECTION B

	Total Marks for SECTION B is 40. Marks for each question is subdivided. Question 8 is having internal choice		
Q 6	Draw the UDP header format and Explain each field. The following is a dump of a UDP header in hexadecimal form: 06 32 00 0D 00 1C E2 17 What is the (a) Source port number (b) Destination port number (c) Total length of the UDP (d) Considering that an IP frame can have a maximum total length of 65 535 bytes, what is the maximum length of the data in a UDP frame?	**8(4+4)**	**CO**
Q 7	Describe the Client Server Architecture. Compare It with peer to peer architecture. Take the Web services as a client server architecture and bit torrent protocol as a peer to peer architecture and compare both.	**8(2+2+4)**	
Q 8	Using VLSM provide the subnetting for the following organization. The organization is given IP address 191.54.44.0/24. It is having 2 branch offices with	**8**	

	50 host requirements and central office having 30 host. The branch offices are connected to the central office by WAN link. Provide subnet for these links also.		
Q 9	Explain seven layers of ISO-OSI network model. Compare it with the TCP-IP network model. Use diagram and provide each layer datagram and addresses used if any.	**8**	
Q 10	Write the short notes on any 2 a). Data Link Layer b). UDP c). Session Layer	**8(4+4)**	
SECTION C			
	Total Marks for SECTION C is 40. Marks for each question is subdivided. Question 8 is having internal choice.		
Q 11	Explain the routing process. Describe the role of routing table in forwarding. Explain the link state routing protocol. Calculate the minimum path using the link state(dijkstra). Use 0 as the start node.  	**20(4+3+ 5+8)**	**CO5**
Q 12	Design of a network requires reliability, scalability and fault tolerance. Describe these properties. Suppose you need design a network for an organization with these above-mentioned properties. Kindly provide the proper blueprint of your design that can fulfill these properties.	**20(6+12)**	**CO1, CO2, CO5**