

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2022

Course Name : Data Communication

Program Name : B. Tech ECE

Course Code : ECEG 3047

No of page : 04

Semester: V

Time : 03 hrs

Max. Marks : 100

Instructions:

- 1) Draw the diagram by using black and blue pen
- 2) Answer must be in brief and diagrams must be clear.

SECTION A

Each Question will carry 4 Marks

S. No.	Question	CO
Q 1	What is the de-capsulation task that take place at each layer of the TCP/IP model. Also write down the type of addresses associated with each layer.	CO1
Q 2	Why a data communication link can be established between earth and the moon on its full moon day? Give at least four valid reasons of it.	CO3
Q 3	An organization has set up some computer labs. There are 15 computers in each lab. The IP assigned to this is 192.112.220.50 and this IP must be subnet among the various labs. How many labs can be there and state the network address of each of them.	CO3
Q 4	State the Class of the following IPv4 addresses. (a) C0. 48. 32. 00 (b) 229.122.6.8.2 (c) DC. FF. FF. F (d) 56. 23.14.1	CO2
Q 5	A data stream consisting of IP address 192. 226. 6. 201 is transmitted. Show using checksum method that it is received successfully at the receiver.	CO2

SECTION B

Each question will carry 10 marks

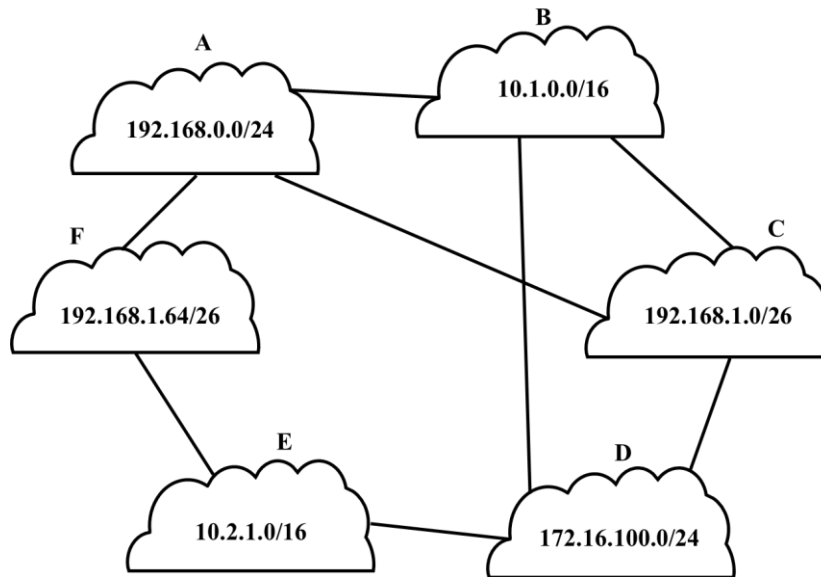
Q 6	A person opens his laptop to browse the live steaming of the soccer world cup. The website for this live streaming is http://fifaworldcup22.com . The website is accessed first time by the user. Write down the various step of connecting with the aforesaid server taking into the fact that the domain is accessed in binary numbers and humans prefer domain name.	CO2
Q 7	What are the methods performed by datalink layer for flow control. Sketch the Go back ARQ sliding window control of data link layer.	CO1
Q 8	A company received specification from 2 vendors for providing internet service. One of the vendors is dealing with electrical cable and another has optical fiber cable. On what specifications the company will decide which to choose. What are the discussion that need to be taken in considering the addition of wireless connectivity along with ethernet.	CO3
Q 9	From the specification given below, find the channel capacity of an optical fiber link established between Delhi and Roorkee. The link has 10 splices and 5 connectors. <div style="text-align: center;"> <p>Transmitted power = 70 dBm</p> <p>Fiber attenuation = 0.2 dB/km</p> <p>Splice loss = 1 W</p> <p>Connector loss = 0.4 W</p> <p>Boltzmann Constant = - 226 dB/k</p> <p>Temperature = 17°C</p> <p>Distance between two earth station = 200 km</p> </div>	CO4

SECTION C

Each Question carries 20 Marks.

Q 10	(a) Suppose we want to transmit the message 1001101 and protect it from error using CRC polynomial x^3+1 . Use the division method to determine the message that should be transmitted. Now corrupt the second bit at right hand side of the transmitted message and show that the error is detected by the receiver using CRC technique.	CO3
------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------

(b) Consider this an inter-connection of **six network** numbering from A to F.



Find the **optimum path in routing** of each of these packets from the correct source network to the correct destination network, between the following pair of source and destination IP given below. If **no path** is available, do mention with reason.

Case No	Source	Destination
1	10.2.100.1	192.168.0.73
2	192.168.1.128	192.168.0.128
3	10.1.254.254	192.168.1.81
4	10.1.1.254	192.168.1.254
5	192.168.1.65	192.168.1.1

CO3

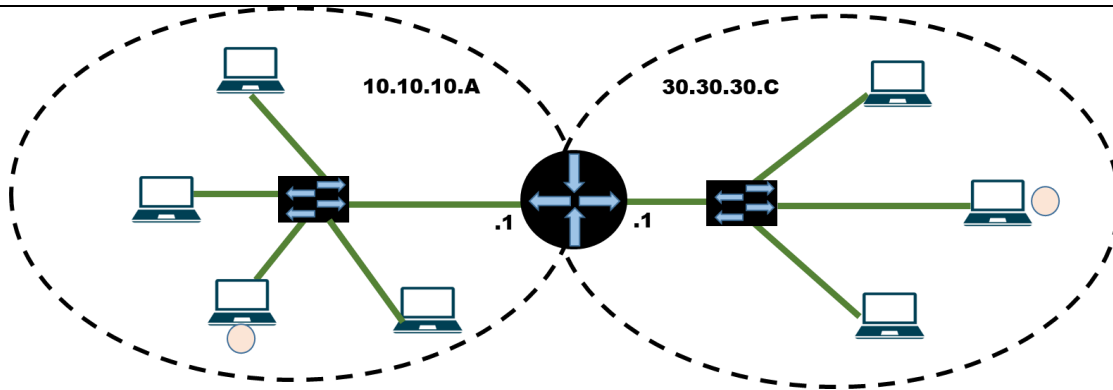
Q 11

(a) Two networks are shown in the figure below.

Here one network has 4 nodes, whereas second network has 3 nodes.

These nodes have PC101, PC102, PC103, PC104, PC301, PC302, and PC303 respectively as the address provided for accessing datalink layer.

CO4



A message is communicating between two nodes (these nodes are shown with a symbolic round data symbol).

- (i) Assign IP to all these 7 nodes.
- (ii) What would be the gateway IP.
- (iii) What is the structure of datagram consisting of MAC and IP address.
- (iv) Write the step of data communication between two nodes.

(b) Apple India Ltd hire 18 students for a new plant at Lucknow. The hired students are Tripathi, Pratham, Poornima, Yash, Rishika, Munn, Titiksha, Rishabh, Dev, Aryan, Hinamshu, Vaibhav, Anubhav, Kirti, Shreyansh, Shivam, Pranshul and Akshay. These students were assigned in 4 divisions in such a manner that no two divisions have same number of students. The divisions are Advertisement, Programming, Networking and Shipping.

Each of these engineers have been facilitated with 5 networking devices.

The net administrator of the Samsung ltd acquired a class C IPv4 designated as 200.100.1.0 and each divisions have been assigned by a routers for interconnection.

Provide the following information.

- (i) Group these engineers into 4 divisions.
- (ii) How many IP are required (in total) without subnetting.
- (iii) How many IP are required if Sub-net is applied on this IP and assigned them to these divisions.
- (iv) Calculate the IP required by applying both FLSM and VLSM.
