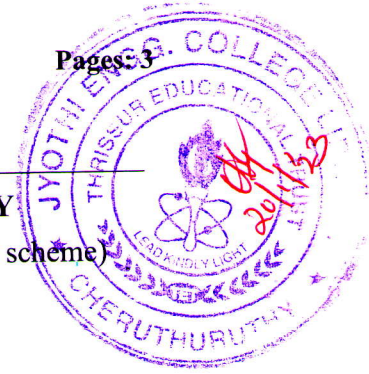


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination December 2022 (2019 scheme)

**Course Code: ECT423****Course Name: COMPUTER NETWORKS****Max. Marks: 100****Duration: 3 Hours****PART A***Answer all questions, each carries 3 marks.*

Marks

- | | | |
|----|--|-----|
| 1 | Explain message encapsulation in layered architecture. | (3) |
| 2 | Compare and contrast SMTP and POP3 protocols. | (3) |
| 3 | Differentiate UDP and TCP. | (3) |
| 4 | Explain stop-and-wait protocol with the help of a timing diagram. | (3) |
| 5 | What are the different services offered by the network layer? | (3) |
| 6 | Compare and contrast link-state and distance-vector routing algorithms. | (3) |
| 7 | Describe Ethernet frame structure. | (3) |
| 8 | Explain any one of the channel partitioning protocols. | (3) |
| 9 | Describe Poisson process. | (3) |
| 10 | Customers arrive in a bank at a rate of five per minute and wait to meet an officer for an average of 5 minutes. At times, customers spend time with the officers during a transaction or just handover the forms and leave immediately. If customers spending time with the officer has a probability 0.5 and others who just handover the application has a probability of 0.5, what is the average number of customers in the Bank? Assume time taken to hand over the form is negligible and can be ignored. | (3) |

PART B*Answer any one full question from each module, each carries 14 marks.***Module I**

- 11 a) Explain the steps for transferring a web page from a server to a client with HTTP protocol. Also describe the HTTP request message format. (9)
- b) Consider a packet of length 5000 bytes. Calculate how long does it take the packet to propagate over a link of distance 3000km with a propagation speed of 2×10^8 m/s, and a transmission rate of 5Mbps. Also find the transmission time of the packet. (5)

OR

- 12 a) Explain the services offered by different layers in a five-layer Internet Protocol stack. (10)
- b) Consider two hosts, A and B, connected by a single link of rate 32kbps. Suppose the two hosts are separated by m meters, and the propagation speed along the link is 3×10^8 m/s. Host A is to send a packet of size 1000bits. Find the distance m so that propagation delay equals transmission delay ($d_{\text{prop}} = d_{\text{trans}}$). (4)

Module II

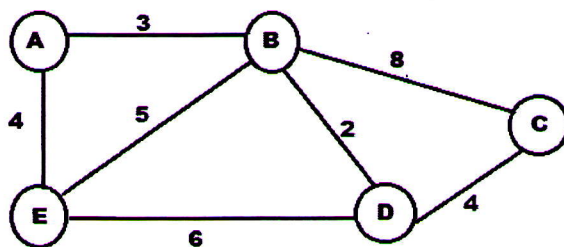
- 13 a) Explain with the help of timing diagrams, how the alternating-bit protocol effectively handles lost data packets and lost acknowledgement (8)
- b) Calculate the value of retransmission timeout interval in a TCP connection, given the SampleRTT=140ms, the values of EstimatedRTT and DevRTT were 120ms and 3ms respectively just before the first sample was obtained. Assume $\alpha = 0.125$ and $\beta = 0.25$. (6)

OR

- 14 a) Differentiate Go-back-N and Selective Repeat protocols with the help of timing diagrams. (8)
- b) Host A sends three TCP segments to Host B back to back over a TCP connection. The sequence numbers of the segments are 40, 80, 120 respectively. (6)
- i) Suppose that the first and the third segments arrive at B, but the second segment is lost. In the acknowledgment that Host B sends to Host A, what will be the acknowledgment number?
- ii) How much data is in the second segment?

Module III

- 15 a) Compute the shortest path from the source node A to all other nodes in the figure given below using Dijkstra's algorithm. (9)

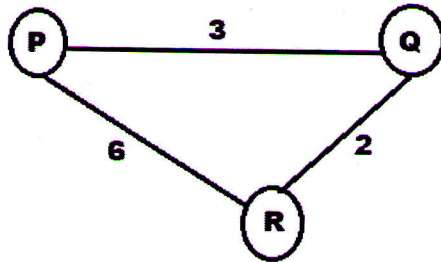


- b) Explain IPv4 datagram format.

(5)

OR

- 16 a) Obtain the updated routing table for all nodes in the network given below using Distance-Vector algorithm. (9)



- b) Explain how error reporting is handled by ICMP protocol.

(5)

Module IV

- 17 a) Explain error-detection technique using cyclic redundancy check with an example. (8)
- b) What are the different steps involved in the address translation using ARP protocol? (6)

OR

- 18 a) Explain how CSMA/CD protocol works. For a 10Mbps Ethernet, what is the waiting time of an adapter, after its frame experiences three collisions in a row, until it is ready to transmit the frame again? (Assume the random value, $K=4$) (8)
- b) Compare ALOHA and Slotted ALOHA Random Access Protocols. (6)

Module V

- 19 a) Derive an expression for the average packet time in queue for a Go-Back-N ARQ system (9)
- b) Explain IEEE 802.11 frame format. (5)

OR

- 20 a) State and prove Little's Theorem. (9)
- b) How does 802.11 MAC protocol work? (5)
