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Roll No. : .....

**333675(33)**

**B. E. (Sixth Semester) Examination,  
April-May, 2021**

**(New Scheme)**

**(IT Engg. Branch)**

**ADVANCED COMPUTER NETWORK**

**(Professional Elective-I)**

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note : Part (a) is compulsory from each question.***

***Attempt any two part from (b), (c) and (d)  
from each question. All questions carry equal  
marks.***

**Unit-I**

1. (a) Why it's required to perform switching in computer network?

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- (b) What is Message; explain with important characteristics with advantages and disadvantages. 7
- (c) Let  $G(x)$  be the generator polynomial used for CRC checking. What is the condition that should be satisfied by  $G(x)$  to detect odd number of bits in error and why. 7
- (d) The values of parameters for the stop and wait ARQ protocol are as given below :

Bit rate of the transmission channel = 1 Mbps

Propagation delay from sender to receiver = 0.75 ms

Time to process a frame = 0.25 ms

Number of bytes in the information frame = 1980

Number of bytes in the acknowledge frame = 20

Number of overhead bytes in the information frame = 20

Assume that there are no transmission errors. Then calculate the transmission efficiency (in %) of the stop and wait ARQ protocol. 7

### Unit-II

2. (a) What is Little's theorem? 2

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- (b) Explain the M / M / 1 Queuing System. 7
- (c) At a work station, 5 jobs arrive every minute. The mean time spent on each job in the work station is 1/8 minute. Calculate the mean steady state number of jobs in the system. 7
- (d) Explain Networks of Queues-Jackson's theorem. 7

### Unit-III

3. (a) What is ALOHA? 2
- (b) Explain different access control mechanism in computer network. 7
- (c) Give difference between Pure Aloha and Slotted Aloha. 7
- (d) Consider a network using the pure ALOHA medium access control protocol, where each frame is of length 1,0001,000 bits. The channel transmission rate is 11 Mbps (=  $10^6$  = 106 bits per second). The aggregate number of transmissions across all the nodes (including new frame transmissions and retransmitted frames due to collisions) is modelled as a Poisson process with a rate of 1,0001,000 frames per second. Throughput is defined as the

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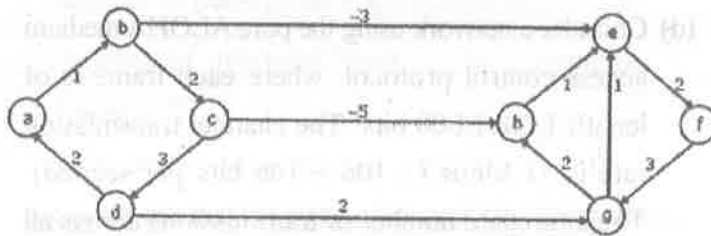
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average number of frames successfully transmitted per second. Calculate the throughput of the network.

7

#### Unit-IV

4. (a) What are the main issues in routing? 2
- (b) Where does Bellman-Ford algorithm is used and why? 7
- (c) What are the Convexity and characteristics of optimal policies in a dynamic routing problem? 7
- (d) Dijkstra's single source shortest path algorithm when run from vertex a in the below graph, computes the correct shortest path distance to all vertex. 7



#### Unit-V

5. (a) What is the effect on line utilization if we increase the number of frames for a constant message size? 2

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- (b) In TCP congestion window changes dynamically depending on congestion window why? 7
- (c) In Go Back N protocol, sender Window size = 10 and  $T_p = 49.5$  ms &  $T_t = 1$  ms. What is the efficiency of the protocol and throughput on given Bandwidth = 1000 bps? 7
- (d) Explain Min-max Vs. Max-min flow control algorithm for optimal computer network. 7