**Computer Communication & Networks**

**BS-SE**

***Instructions:***

**Submission Time is 24 hours. It will not be accepted after due time.**

Q.No.1

1. Which layers in the Internet model are the network support layers?
2. Name three types of transmission impairment.
3. What does the Shannon capacity have to do with communications?
4. Compare and contrast flow control and error control.
5. Define piggybacking and its usefulness.
6. HDLC w.r.t station types, transfer modes, frame types supported and flag field purpose?
7. Name the protocols for noiseless channels?
8. What is differential encoding? Also explain the difference between NRZ-L and NRZI. And name the coding schemes of multilevel binary & bi-phase.

Q.No.2 (a) There are several network layer models proposed in the OSI model. Find all of them. Explain the differences between them.

 (b) If a signal does not change at all, its frequency is zero. If a signal changes instantaneously, its frequency is infinite. Three components of a sine wave are amplitude, frequency and phase of a signal. The change in a signal shows the relation between signal’s amplitude w.r.t to time whereas the phase is not shown. Explain your answer why we cannot explicitly show phase in a time-phase plot?

Q.No.3 (a) A device is sending out data at the rate of 100 bps. How long does it take to send out a single character (8 bits)?

 (b) We need a three-stage space-division switch with total inputs of 1000. We use 1000 crossbars at the first and third stages and 4 crossbars at the middle stage.

* 1. Draw the configuration diagram.
	2. Calculate the total number of cross-points.
	3. Find the possible number of simultaneous connections.