Code: D-20   **Subject: ELECTRONIC SWITCHING SYSTEMS**
Time: 3 Hours   **Max. Marks: 100**

NOTE: There are 11 Questions in all.

- **Question 1 is compulsory and carries 16 marks. Answer to Q. 1. must be written in the space provided for it in the answer book supplied and nowhere else.**
- **Answer any THREE Questions each from Part I and Part II. Each of these questions carries 14 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1   **Choose the correct or best alternative in the following:**   **(2x8)**

a.   An off-hook signal will repeat for a/an _____ duration.

   (A) finite   **(B)** infinite
   (C) duration of 40 seconds   **(D)** duration of 80 seconds

b.   Typical human voice is centered around _____ Hz.

   (A) 200-400   **(B)** 280-3000
   (C) 400-600   **(D)** 1400-1800

c.   Using _____ each connected device is assigned a time slot whether or not the device has any thing to send.

   (A) WDM   **(B)** FDM
   (C) TDM   **(D)** STDM

d.   When a switch capacity is full, calls coming into that switch are said to be ____.

   (A) open   **(B)** shorted
   (C) blocked   **(D)** shunted

e.   Using _____ ARQ, a sending modem must wait for a return ACK for each sent block before sending the next block.

   (A) discrete   **(B)** efficient
   (C) continuous   **(D)** delivered

f.   A/An _____ network is typically a company network that connects multiple company locations into a single network.

   (A) local area   **(B)** enterprise
   (C) campus wide   **(D)** protocol.

g.   Ethernet 10 Base 2 is an example of _____ network topology.

   (A) Bus   **(B)** Ring

(C) Star   **(D)** Mesh

h. The_____electro mechanical switch (developed in 1938) had fewer moving parts than earlier switches.

(A) No. 1ESS   **(B)** Strowger
(C) Step-by-step   **(D)** Crossbar

PART I
Answer any THREE Questions. Each question carries 14 marks.

Q.2   a.   What is time multiplexed space switching? With a neat diagram explain its operation.   **(8)**

b. Calculate the number of trunks that can be supported on a time multiplexed space switch given that, 32 channels are multiplexed in each stream, while the control memory access time is 100 ns and the bus switching and transferring time is 100 ns per transfer.   **(6)**

Q.3   a.   What are the major systems of a telecommunication network? Discuss in detail the subscriber loop systems.
(8)

b. An exchange uses a –40 V battery to drive subscriber lines. A resistance of 250 ohms is placed in series with the battery to protect it from short circuits. The subscribers are required to use a standard telephone set which offers a dc resistance of 50 ohms. The microphone requires 23mA for proper functioning given DC resistance of 133 ohms/km, find the farthest distance from the exchange at which the subscriber can be located   **(6)**

Q.4   Classify data networks. Explain with the help of Nyquist theorem, the data rate limitations in PSTN's. Give an account of modems used in data transfer. Explain their importance and list some of the V-series recommendations.   **(14)**

Q.5   a.   What is Grade of service and Blocking probability. What are delay systems in telecommunication networks?   **(8)**

b. A group of 20 servers carry a traffic of 10 erlangs. If the average duration of a call is three minutes, calculate the number of calls put through by a single server and the group as a whole in a one hour period.   **(6)**

Q.6   a.   With the help of neat diagram, explain common control switching system. What are the differences between common control and direct control?   **(8)**

b. What are single stage and multistage networks? Compare the strengths and weaknesses of each. **(6)**

PART II
Answer any THREE Questions. Each question carries 14 marks.

Q.7 a. What are the basic approaches to the design of subscriber access to Strowger systems? Describe them. **(8)**

b. An amplifier has an input resistance of 600 ohms and a resistive load of 75 ohms. When it has an rms input voltage of 100 mV, the rms output current is 20mA. Find the gain in dB. **(6)**

Q.8 a. Explain the basic architecture of digital switching systems. Explain in detail companding. **(8)**

b. A three stage switching structure supports 100 inlets and 400 outlets. Find the number of cross points, and the number of primary and secondary switches used in the design. **(6)**

Q.9 a. Describe the various signalling techniques. Compare in-channel signalling with common channel signalling. **(8)**

b. Explain the following terms: progressive control, common control and stored program control. **(6)**

Q.10 a. What is CCS-7 Common signalling system and explain it in detail. **(8)**

b. Explain what is DTMF signalling. **(6)**

Q.11 a. Write short notes on any **TWO** of the following:-

    (i) Telephone hand set and it's working.
    (ii) CPU based exchange.
    (iii) OSI layers and its importance.
    (iv) Line coding and advantages. **(8)**

b. Explain the terms.

(i)   Register marker.

(ii)   Conditional selection.   **(6)**