

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Answer any five questions.

1. a) Write down four advantages of automatic switching over manual switching.
b) Give brief description of "Dial tone \& Ring tone".
c) Explain the "Selector Hunter" operation used in step-bystep switching with proper diagram. $4+5+5$
2. a) Derive Erlang-B formula for loss system to calculate blocking probability.
b) Define the following :
i) Peak Busy Hour
ii) CCR
iii) BHCR
iv) Erlang.

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c) 10,000 subscribers are connected to an exchange. If the exchange is designed to achieve a call completion rate of $0 \cdot 8$, when the busy hour calling rate is $4 \cdot 8$, what is the BHCA for that exchange? $6+4+4$
3. a) Write down the difference between circuit switching and packet switching.
b) Explain operation of "Load Sharing Mode" centralised SPC. What are the levels of functions in SPC system?
c) If MTTR $=5$ hours and MTBF $=2500$ hours, then calculate the unavailability of single \& dual processor system for 75 years and 50 years. $3+(4+2)+5$
4. a) Write down the advantages \& disadvantages of channelassociated and outband signalling.
b) Explain the operating principle of a four-subscriber diagonal cross-point switching system.
c) A non-blocking cross-bar exchange has 200 subscribers. Calculate its EUF \& CCI.
d) Write the advantages of cross-bar switching over strowger system. $4+4+4+2$
5. a) Give the "Data/Command" frame structure in "Token Ring" system. Explain the access method of token ring LAN.
b) Give the HDLC frame format showing different types of control fields \& write the functions of the other fields.
c) Why transport layer performs the error control functions, though DLL performs the same functions.

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(2+5)+6+1
$$

6. a) Explain the operation of a STS combination switch. What is its disadvantage ?
b) Explain the access arrangement and interface techniques used in N -ISDN. Name two supplementary services served by ISDN.
c) If $M$ channels are multiplexed in each stream of a trunk and 4 trunks can be supported on a time muxed space switch. Give that, CM access time is 200 ns , bus switching time is 150 ns and transfer time is 100 ns . Find the value of $M . \quad(3+1)+(5+1)+4$
7. a) What is the difference between "Multicasting \& Broadcasting".
b) Find the class and subnetwork address, host address :
IP address Mask

| i) | 125.34.12.56 | 255.255 .0 .0 |
| ---: | ---: | :--- |
| ii) | 200.34 .22 .39 | 255.255 .255 .240 |
| iii) | 140.11 .36 .22 | 255.255 .255 .0 |
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c) What is the maximum no. of subnets in Class $B$ \& Class $C$ network using the given masks?
i) $\quad 255.255 .255 .0$
ii) 255.255.255.224
d) Find the plaintext from the given Ciphertext \& Decryption key :

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| D |  | G | G | O | A | O |  | O | O | D |
| D |  | I | I | N | F | E | R |  | S |  |
| R |  | T | T | E | B | T | E | A | H | N |
| A | S | T | U | E | A | R |  | E | R |  |


$K_{d}=$| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 9 | 6 | 3 | 10 | 5 | 1 | 2 | 4 | 8 | 7 | 11 |

What is $P$-box ?
$1+5+2+6$
8. Write short notes on any two of the following :
i) Touch-tone dialling \& its advantages
ii) Associated circuits in step-by-step switching
iii) Client-server model in application layer
iv) Public key method \& authentication technique
v) OSI model
vi) No. 5ESS system.

