Marks Scored:

KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2017

Level : B.E.
Year : IV
Course : ETEG 417
Semester : II
Exam Roll No. :
Time : 30 mins.
F. M. : 20
Registration No. :
Date AUG 1 8 2017

SECTION "A"
[20 Q. × 1=20 marks]

Choose the most appropriate option.

1. In digital switch interface signaling insertion and extraction functions are eliminated when _____ is used
   a) inter register signaling
   b) common control signaling
   c) line signaling
   d) common channel signaling

2. How many extra cross points are there in 8 × 8 crossbar switch.
   a) 48
   b) 24
   c) 40
   d) 56

3. To convert 8 × 8 crossbar switch into 3 stage switch, how many cross points should be there in intermediate switches.
   a) 32
   b)12
   c) 8
   d)16

4. If separation of wavelength is less than or equal to 100 nm it is _____
   a) CWDM
   b) DWDM
   c) TWDM
   d) SWDM

5. If time division transmission is used with space division tandem switching ,it is necessary to provide _____equipment to _____every channel to audio before switching and multiplexing equipment to retransmit it after switching.
   a) modulate, multiplexing
   b) multiplexing, modulate
   c) multiplexing, demultiplexing
   d) demultiplexing, demodulate

6. If the traffic forecast is wrong and the traffic _____than expected, the GOS will exceed the specified value before the end of the provision period.
   a) grows faster
   b) grows slower
   c) offered exceeds
   d) intensity increases

7. In crossbar switch, the magnets which operate the horizontal bars are called_____ and those operating the vertical bars are called_____
   a) bridge magnet, select magnet
   b) bridge magnet, hold magnet
   c) select magnets, hold magnets
   d) off selector, cross magnet

8. Load sharing configuration increases the effective traffic capacity by about _____when compared to synchronous duplex operation.
   a) 40%
   b) 25%
   c) 20%
   d) 30%

9. Queries and responses sent between SSPs and SCPs are carried in _____ messages.
   a) INAP
   b) MAP
   c) SCCP
   d) TCAP

10. If the first stage has a _____input and a_____ distribution of holding times, the input to the second and subsequent stages are also poissonian.
a) binomial, poisson
b) truncated poissonian, binomial
c) poissonian, negative-exponential
d) poissonian, erlang-k

11. An exchange serves 250 subscribers.If the average BHCA is 5000 and the CCR is 80%, calculate the BHCR.
a) 10 b) 12 c) 16 d) 17

12. GOS is arrived by observing the number of _____subscribers calls, whereas the blocking probability is arrived by observing the_____in the switching system.
a) rejected, busy servers
b) arrived, free lines
c) rejected, blocked calls
d) blocked, blocked calls

13. _____ receive and route incoming signaling message toward the proper destination.
a) SSP b) STP c) SCP d) SCCP

14. What is the signaling rate of TDM T1 systems?
a) 64 kbps b) 8 kbps c)125 kbps d) 56 kbps

15. On average, one call arrives every 5 seconds.During a period of 10 seconds, what is the probability that more than two calls arrive?
a) 0.325 b) 0.15 c) 0.75 d) 0.25

16. During the busy hour, 1200 calls were offered to a group of trunks and six calls were lost. The average call duration was 3 minutes, find the total duration of the period of congestion.
a) 8 s b) 15 s c) 4 s d) 18 s

17. One Erlang is equal to
a) 100 CCS b) 36 CM c) 60 CCS d) 36 CCS

18. In practice, busy-hour grades of service can vary from 1 in 1000 for cheap trunks inside an exchange to 1 in 100 for _____connections and 1 in 10 for _____routes.
a) inter-exchange, expensive international
b) common channel trunks, in channel trunks
c) intra-exchange, in expensive
d) in channel trunks, channel associated trunks

19. A CCR value of _____ is considered excellent and attempts to further improve the value is generally not cost effective.
a) 0.79 b) 0.6 c) 0.75 d) 0.85

20. In _____ mode, when the system is operating normally, the two processors have the same data in their memories at all times and simultaneously receive all information from the exchange environment.
a) load sharing
b) synchronous duplex
c) stand by
d) level 2

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SECTION "B"

[5 Q. × 11 = 55 marks]

Attempt *ANY FIVE* questions.

1. a. Explain different types TDM transmission technology in brief. [7]
   b. A three stage switching structure is to accomodate N=128 input and 128 output terminals. For 16 first stage and 16 last stage,determine the number of crosspoints for nonblocking. [4]

2. a. Draw the block diagram of digital switching system architecture.Explain analogtermination in brief. [6]
   b. Draw the block diagram of distributed SPC organisation.Explain its different processing level in brief. [5]

3. a. Explain the theory of lost call system.Derive the formula for Erlang's lost call(Erlang B) for a full availability group of N trunks offered traffic A erlangs. [7]
   b. A message switching network is to be designed for 90% utilization of its transmission link. Assuming exponential distributed message lengths and an arrivals rate of 10 message per minute. What is the average waiting time and what is the probability that the waiting time exceeds 3 minutes. [4]

4. a. Draw the block diagram of SS7 protocol suite and explain them in brief. [7]
   b. In telephone switching system if the call arrival rate is 8 per hour and service rate is 9 perhour then calculate [4]
      i) length of the system
      ii) waiting time in the queue
      iii) probability of atleast one people in the system
      iv) probability that there is no queue

5. a. Explain infinite queue length single server M/M/1:∞/∞ model and derive the relation $P_n=\rho^n(1-\rho)$. [7]
   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 [4]

6. a. Draw the state transition diagram for the binomial case and obtain the binomial formula for the case in which a call attempt from an idle source is never blocked. [7]
   b. Write short notes on: [2 × 2 = 4]
      i. Erlang-k distribution
      ii. Channel associated signalling