KATHMANDU UNIVERSITY
End semester Examination
May/June 2022

Marks Obtained:

Level : B. E.
Year : III
Course : ETEG 301
Semester : II

Exam. Roll No. :
Time: 30 Minutes.
F.M. : 10

Registration No.:
Date :

SECTION "A"
[20Q. × 0.5= 10 marks]

Encircle the appropriate option.

1. _____ to avoid interference in case of simultaneous transmission of many radio wave signals through free space.
   a. Each radio communications uses different power level
   b. Each radio communications uses a different carrier frequency
   c. Each radio transmitter uses a different modulation method
   d. Each radio transmitter uses directional antenna for transmission

2. If the carrier signal frequency (f_c) is 1000 kHz and the message signal frequency (f_m) is 2 kHz, how many frequencies are present in the Amplitude Modulated signal?
   a. 1 b. 2 c. 3 d. 4

3. A carrier signal $S_C(t) = A\cos(\omega_C t + \theta)$ after modulation it becomes $S_C(t) = A\cos[\omega_C t + \theta(t)]$. It is a case of _____.
   a. frequency modulation
   b. amplitude modulation
   c. phase modulation
   d. angle modulation

4. _____ multiplexing used in T1 digital data transmission system.
   a. Frequency division
   b. Binary division
   c. Pulse division
   d. Time division

5. The baud rate of binary shift keying (eg. BFSK, BASK and BPSK) is_____.
   a. always equal to the bit rate
   b. equal to twice the bandwidth of an ideal channel
   c. not equal to the signaling rate
   d. equal to half bandwidth of ideal channel

6. The rate at which information can be carried through a communication channel depends on _____.
   a. carrier frequency
   b. bandwidth
   c. transmission loss
   d. message frequency

7. Which type of network topology is best suited for large businesses, which must carefully control and coordinate the operation of distributed branch outlets?
   a. Ring
   b. Non Hierarchical
   c. Hierarchical
   d. Star

8. Third Generation Mobile (3G) support _____technology.
   a. AMPS b. EDGE c. LTE d. TACS

9. Half-wave dipole antenna is also known as?
   a. High power Dipole
   b. Hertz antenna
   c. Radiator antenna
   d. Omni antenna

10. Shape of the radiation pattern of an isotropic antenna looks like _____.
   a. spherical
   b. dough-nut
   c. elliptical
   d. hyperbolic

11. In terms of the size of the network the correct order (ascending) is _____.
   a. PAN, MAN, LAN, WAN
   b. LAN, MAN, WAN, PAN
   c. PAN, LAN, MAN, WAN
   d. LAN, PAN, MAN, WAN

12. What is the functional role of an antenna in receiving mode?
   a. Radiator b. Converter c. Sensor d. Inverter

13. In which of the following mode of propagation the waves are guided along the surface of the earth?
   a. Ground Wave
   b. Sky Wave
   c. Line of Sight Wave
   d. Space Wave

14. The distance between Radar and target is called?
   a. Pulse Repetition Frequency
   b. Range
   c. Minimum Range
   d. Maximum Unambiguous Range

15. The resolution of pulsed radar can be improved by _____.
   a. increasing pulse width
   b. decreasing pulse width
   c. increasing the pulse amplitude
   d. decreasing the pulse repetition frequency

16. Higher pulse repetition frequency (P.R.F.) in radar will _____.
   a. increase the range of the radar
   b. make week signal discernible
   c. improve the signal to noise ratio of the system
   d. make large size target detection impossible

17. The satellite, which is used as a relay to extend communication distance is known as _____.
   a. Relay Satellites
   b. Communication Satellites
   c. Repeater Satellites
   d. Geosynchronous Satellites

18. A satellite beam that covers almost 40% of the earth's surface is known as _____.
   a. Zone beam
   b. Hemispheric beam
   c. Spot beam
   d. Global beam

19. In an optical fiber, the fiber core _____ the cladding.
   a. is denser than
   b. has the same density as
   c. is less dense than
   d. is another name for

20. In optical fibers, bandwidth is limited by _____.
   a. mode
   b. dispersion
   c. frequency
   d. refractive index of cladding

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SECTION "B"

Attempt *ANY FOUR* questions.
Missing data may be suitably assumed. Each symbol carries their usual meaning.

1. a. Compare Amplitude Modulation and Frequency Modulation technique. [2]

   b. What are the advantage and fundamental limitation of digital communication system? [3]

   c. Explain the working principle of Global Navigation Satellite System. [5]

2. a. What is the difference between Narrow Band FM and Wide Band FM? How are they generated? [4]

   b. Explain the frame format of T1 and E1 Digital Transmission system. [3]

   c. Explain the performance parameters of optical link. [3]

3. a. What are the important properties of antenna? Explain the characteristic of Microstrip (patch) antenna and Helical antenna. [2+1]

   b. Explain Star topology and its significance for the computer networking. [2]

   c. What do you mean by SS7 signaling explain its functions. [5]

4. a. In which condition ground wave and sky wave propagation are used explain with suitable example. [3]

   b. Compare ZigBee and WiFi functional architecture. Express your view when to select ZigBee instead of WiFi with suitable example? [2+3]

   c. Find the round trip delay time for communication system which uses geostationary satellite. [2]

5. a. Explain the frequency reuse concept of cellular communication system. [3]

   b. How can we enhance the range resolution of radar? Find the range resolution of radar system having 180ns pulse width. [2+2]

   c. A fiber of 200 m length has $P_{in\,(max)} = 20\mu w$ and $P_{in\,(min)} = 15\mu w$ and $P_{out} = 11\ \mu w$. Find the minimum and maximum loss in dB/km. [3]