Mark Scored:

KATHMANDU UNIVERSITY
End Semester Examination
August/September, 2017

Level : B. E.
Year : III
Course : ETEG 301
Semester : II
Exam Roll No. :
Time: 30 min
F. M. : 20
Registration No.:
Date :

SECTION "A"
[20 Q × 1 = 20 marks]

Choose the most appropriate option.

1. In field of communication and networking, FTTH stands for
   a. Fiber To The Host
   b. Fiber To The Home
   c. Fiber To The Hospital
   d. Fiber To The Hotel

2. If the signal losses its energy during its transmission, then the received signal is called
   a. Attenuated signal
   b. Distorted signal
   c. Noisy signal
   d. Weak signal

3. Cat 5 UTP supports
   a. Upto 16 MHz
   b. Upto 20 MHz
   c. Upto 100 MHz
   d. Upto 1 GHz

4. Among the following, ... is the modulation technique that uses minimum channel bandwidth and transmitted power.
   a. AM
   b. DSB-SC
   c. SSB-SC
   d. VSB

5. If the highest frequency component of Amplitude Modulated wave is 1KHz and the signal bandwidth is 100 Hz, the carrier frequency lies at
   a. 800 Hz
   b. 850 Hz
   c. 900 Hz
   d. 950 Hz

6. Determine the bandwidth of a FM wave when the maximum deviation allowed is 100KHz and the modulating signal has frequency of 10KHz
   a. 90 KHz
   b. 110 KHz
   c. 180 KHz
   d. 220 KHz

7. QPSK technique exploits the phase shift of
   a. π
   b. $\frac{\pi}{2}$
   c. $\frac{\pi}{4}$
   d. 2π

8. If separate channels are provisioned for control and data exchange, the signaling method is referred to as
   a. In-band signaling
   b. Out-of-band signaling
   c. Simultaneous signaling
   d. Multi signaling

9. In OSI reference model, electrical specification is dealt by
   a. Layer 1
   b. Layer 2
   c. Layer 3
   d. Layer 7

10. Of the topology listed, ... topology is known for its highest reliability.
   a. Bus
   b. Ring
   c. Star
   d. Mesh

11. Theoretically MMS can have
    a. 160 character of message size
    b. 1 KB of message size
    c. 1 MB of message size
    d. Unlimited message size

12. Small scale propagation model
    a. Predicts mean signal strength
    b. Characterizes rapid fluctuation of the signal
    c. Estimates the radio coverage of a transmitter
    d. Determines the path loss exponent

13. GSM cellular systems uses
    a. TDMA
    b. FDMA
    c. TDMA and FDMA
    d. SDMA

14. Radio channels of the cellular system can be increased by
    a. Cell sectoring
    b. Cell splitting
    c. Microcell zone concept
    d. Femtocell

15. CDMA 2000 1 × EV allocates the channel of
    a. 1 MHz
    b. 1.25 MHz
    c. 2.25 MHz
    d. 5 MHz

16. Aspect ratio of QFHD TV is
    a. 4:3
    b. 16:9
    c. 48:36
    d. 60:40

17. A satellite stays in orbit because of balance of
    a. Weight
    b. Speed
    c. Gravitational force and Centripetal force
    d. Gravitational force and centrifugal force

18. In radar, the Doppler variations is directly proportional to
    a. Frequency
    b. Range
    c. Travel time
    d. Velocity

19. Navstar satellites take approximately ..... hours to orbit Earth.
    a. 8
    b. 12
    c. 16
    d. 24

20. In PLC, the device acting like high pass filter dividing communication signal and electrical signal is called
    a. Splitter
    b. Duplexer
    c. Coupling
    d. PLC Modem

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SECTION "B"

Attempt *ANY FIVE* questions. Each question carries 11 marks. Symbols have their usual meanings. Urgent appropriate assumptions are permissible. Marks are indicated inside brackets.

1. a. If you are give a task to find out whether the signal is **power signal** or **energy signal;** using mathematical tools, how can you find out the appropriate answer? For the signal $g(t)$ shown in Figure 1, sketch the signals (a) $g(-t)$, (b) $g(t+2)$, and (c) $g(2t)$. [2+3=5]

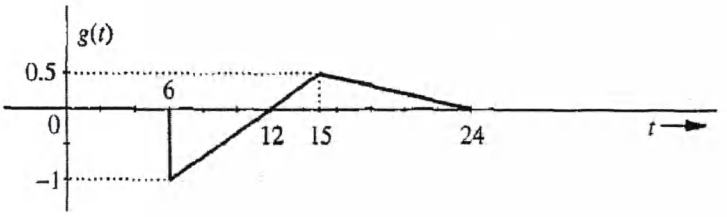

Figure 1

b. List three most essential features of any communication system and explain what adverse role they play if not addressed properly. Assume the scenario where wireless communication channel seems more suitable than optical fiber cable and then justify your answer with appropriate reasoning. [3+3=6]

2. a. Compare AM with ASK. Write three advantages of FM over AM. [2+3=5]
   b. With aid of appropriate diagrams, explain why the bandwidth requirement of DSB-SC is double than that of SSB-SC. Sketch FM wave for the modulating signal $m(t)$ shown in Figure 2 by assuming a carrier signal frequency of your own. [3+3=6]

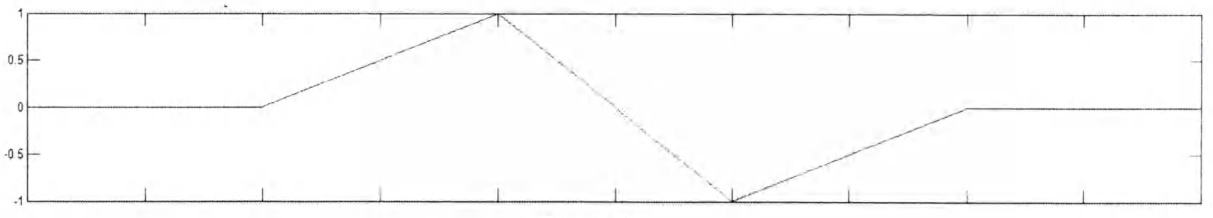

Figure 2

3. a. In a communication channel, how can we correct some errors using channel coding technique? Sketch a model of star topology and then list down its pros and cons. [2+3=5]
   b. Suppose you have to choose between "ADSL internet connection" Vs. "Cable TV & Internet connection" during your office set up, explain on what basis will you make your decision. Draw OSI Models' Seven Layers of networking protocol suite and then briefly summarize the function of layer 1 and layer 2. [3+3=6]

4. a. For what purpose do we use large scale propagation model and small scale propagation model? Explain why outdoor propagation model couldn't be used to predict indoor propagation measurement? [2+3=5]

   b. What is the concept behind deploying umbrella cell in cellular mobile communication? Taking into account the handoff scenario that basically involves in GSM and CDMA network, explain the term hard handoff and soft handoff. [3+3=6]

5. a. Write benefits of SMS service in comparison to legacy Pager service. List three advantages that we can get from deployment of Femtocell. [2+3=5]

   b. "Frequency reuse factor of CDMA technology is 1", Elaborate the term. What significant role does IMEI number play in cellular mobile communication? [3+3=6]

6 a. Present application and limitations of radar. What do you mean by primary and secondary radar? [3+2=5]

   b. Write briefly on how a GPS receiver determines its location? Write opportunities and challenges of PLC technique. [3+3=6]