KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2018

Marks Scored:

Level : B.E. Course : ETEG 427
Year : IV Semester : I

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

Registration No: Date MAR 15 2018

SECTION "A"

[20 Q.×0.5=10 marks]

Direction: Choose the most appropriate answer:

1. The perigee of the elliptical orbit is the point where the satellite is…
   a. in the fastest velocity
   b. above the equator
   c. farthest from the earth
   d. nearest to the earth

2. A satellite is on the circular orbit at the height of 10,000 km from the earth, with its cyclic period of 5 hrs 47 min 24 sec. The velocity of the satellite approximately will be……, where the radius of the earth is 6371 km.
   a. 7.8 km/s b. 7.4 km/s c. 4.9 km/s d. 3.1 km/s

3. 4 GHz/6 GHz pair frequency band is commonly used for the satellite communication. This band is also called…
   a. S-band b. C-band c. X-band d. Ku-band

4. Smaller "eccentricity" in astronomy indicates…
   a. the velocity of the satellite is slow
   b. the orbit is close to true circle
   c. the orbit is elliptical
   d. the satellite is on GEO orbit

5. The patent issued in 1973 by Dr. Peter Glaser was the first reasonable idea about…
   a. space elevator
   b. Geo-stationary satellite
   c. space solar power system
   d. Low Earth Orbit for communication satellite

6. Asymmetry of earth shape and tidal force from the moon causes…
   a. space debris
   b. perturbation to the satellite orbit
   c. attenuation by the molecular resonance
   d. the Van Allen Belt

7. What is the approximate delay of the system using GEO satellite? "Delay" means the time until the caller receives the answer from the other side of the link.
   a. 120 ms b. 240 ms c. 360 ms d. 480 ms

8. Quality of the received signal is measured in terms of…
   a. CNR b. EIRP c. Aperture Efficiency d. Antenna Gain

9. Liquid helium (4K) can approximately achieve thermal noise ……. lower than liquid nitrogen (77K) in terms of dB-Hz, assuming that the receiver is cooled to their boiling points, 4K and 77K respectively.
   (Boltzmann constant: 1.38×10^{23})
   a. -12.8 dB-Hz b. -179.7 dB-Hz c. -174.0 dB-Hz d. -192.6 dB-Hz

10. The technology applied to overcome the long distance communication between "Voyager" and the earth was the error correction technology. This topic has close relation to … in the field of "Information Theory."
a. source encoding
b. channel encoding
c. channel capacity
d. entropy

11. Performance of an error correction technology is usually evaluated by BER on the horizontal axis of …
a. Eb/N0
b. Shannon capacity
c. EIRP
d. Noise Figure

12. Optimal horn antenna operating at 2.5 GHz which has width and length 100.0 mm and 200.0 mm respectively has antenna gain of approximately ……..
a. 8.5 dBi
b. 9.5 dBi
c. 10.5 dBi
d. 11.5 dBi

13. Antenna gain of 20 dBi can be referred also as HPBW (Half Power Beam Width) of approximately ……. degrees.
a. 10
b. 20
c. 25
d. 30

14. Aperture efficiency of conventional parabolic antennas are approximately ……..
a. 25 %
b. 45 %
c. 55%
d. 75 %

15. When the transmit power is set to 20 kW with the antenna gain of 69 dBi, EIRP is approximately equal to……
a. 73.0 dBm
b. 82.0 dBm
c. 112.0 dBm
d. 142.0 dBm

16. The rain attenuation for the rain rate of 25 mm/h at 10 GHz is approximately ……..
a. 0.01 dB/km
b. 1 dB/km
c. 3 dB/km
d. 5 dB/km

17. The molecular resonance might cause significant attenuation for the frequencies above ….
a. 2 GHz
b. 5 GHz
c. 8 GHz
d. 10 GHz

18. The solar panel mounted on a satellite will be damaged most seriously at the height of …
a. less than 1,000 km
b. 3,000-10,000 km
c. 15,000-20,000 km
d. 36,000 km

19. Shannon–Hartley theorem makes it possible to calculate the maximum channel capacity in terms of …
a. SNR
b. frequency
c. distance
d. Antenna Gain

20. Friis Transmission Equation is useful to estimate …
a. received signal strength
b. bit error rate of the channel
c. the height of the satellite
d. maximum channel capacity

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