



BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Diploma in Electronics & Communication Engineering

Course Name – Digital and Microwave Communication Engineering

Course Code - DECE501

Semester / Year - Semester V

Time allotted : 85 Minutes

Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 70=70

1. (Answer any Seventy)

(i) If the sampling takes place at a rate which is lower than the Nyquist rate then

- | | |
|---|---|
| a) reconstruction of the signal is not possible | b) an error called aliasing takes place |
| c) no effect on the reconstructed signal | d) none of these |

(ii) The sampling process converts

- | | |
|---|---|
| a) continuous time signal into continuous time signal | b) continuous time signal into a discrete time signal |
| c) discrete time signal into a continuous time signal | d) discrete time signal into discrete time signal |

(iii) The spectrum of a signal extends from 100 Hz to 2100 Hz. The minimum sampling frequency for the signal is

- | | |
|------------|----------|
| a) 6 kHz | b) 3 kHz |
| c) 1.5 kHz | d) 4 kHz |

(iv) The PAM, PWM and PPM are the types of

- | | |
|--|-----------------------------|
| a) analog pulse modulation | b) digital pulse modulation |
| c) analog and digital pulse modulation | d) none of these |

(v) In digital transmission, the modulation technique that requires minimum bandwidth is

- a) DM
- b) PCM
- c) DPCM
- d) PAM

(vi) Which of the following gives minimum probability of error

- a) ASK
- b) FSK
- c) PSK
- d) both ASK and FSK

(vii) Alternate Mark Inversion (AMI) signaling is known as

- a) Bipolar signaling
- b) Polar signaling
- c) Manchester signaling
- d) Unipolar signaling

(viii) Adaptive delta modulation is preferred over delta modulation as

- a) it gives better noise performance
- b) it uses lesser bits for encoding the signal
- c) it has simpler circuitry
- d) it does not suffer from slope overload and threshold effects

(ix) Inter symbol interference is problem in

- a) AM transmission
- b) FM transmission
- c) PCM transmission
- d) PM transmission

(x) In DM granular noise occurs when the modulating signal

- a) increase rapidly
- b) remain constant
- c) decrease rapidly
- d) none of these

(xi) Quantization noise occurs in

- a) time division multiplexing
- b) frequency division multiplexing
- c) pulse code modulation
- d) pulse frequency modulation

(xii) Pulse stuffing is used in

- a) synchronous TDM
- b) asynchronous TDM
- c) channel
- d) any TDM

(xiii) The signal to quantization noise ratio in n bit PCM system

- a) is independent of value n
- b) increase with increasing value of n
- c) depends upon the sampling frequency employed
- d) decreases with the increasing value of n

(xiv) Companding is used

- a) to overcome quantization noise in PCM
- b) to protect small signals in PCM from quantizing distortion
- c) to overcome impulse noise
- d) none of these

(xv) For generation of FSK the data pattern must be given in

- a) RZ format
- b) NRZ format
- c) split phase Manchester
- d) none of these

(xvi) The quantization error in PCM system has

- a) gaussian distribution
- b) uniform distribution
- c) poissons distribution
- d) none of these

(xvii) Flat-top sampling leads to

- a) aliasing
- b) an aperture effect
- c) loss of signal
- d) none of these

(xviii) The quantization error can be improved by

- a) increasing steps size
- b) reducing steps size
- c) keeping equal steps size
- d) none of these

(xix) The number of bits required to represent a 256 level quantization in PCM is

- a) 7
- b) 8
- c) 5
- d) 6

(xx)

In a BPSK signal detector, the local oscillator has a fixed phase error of 20° . By what factor does this phase error deteriorate the SNR at the output?

- a) $\cos^2 20^\circ$
- b) $\cos 20^\circ$
- c) $\cos 40^\circ$
- d) $\cos 70^\circ$

(xxi) ASK is a result of combination of shift keying

- a) analog modulation
- b) amplitude modulation
- c) digital modulation
- d) none of these

(xxii) In differential PCM, each word indicates

- a) difference between a sample amplitude and a reference signal
- b) difference in amplitude between a sample and the previous sample
- c) addition of a sample amplitude and a reference signal
- d) addition of amplitude of a sample and the previous sample

(xxiii) One disadvantage of adaptive delta modulation over linear delta modulation is that it

- a) requires more bandwidth
- b) is more vulnerable to channel errors
- c) requires a larger number of comparators in the encoder
- d) is not suitable for signals with periodic component

(xxiv) MSK (Minimum Shift Keying) is an orthogonal FSK scheme that gets its name from the fact that

- a) the phase shift is minimum
- b) the error probability is minimum
- c) the transmission power required is minimum
- d) the transmission bandwidth required is minimum

(xxv) The bit rate of a digital communication system is 34M bit/s. The modulation scheme is QPSK. The baud rate of the system is

- a) 68 Mbit/s
- b) 34 Mbit/s
- c) 17 Mbit/s
- d) 8.5 Mbit/s

(xxvi) The technique that may be used to reduce to side band power is

- a) BPSK
- b) GMSK
- c) MSK
- d) BFSK

(xxvii) In cyclic redundancy check, what is the CRC?

- a) the divisor
- b) the quotient
- c) the dividend
- d) the remainder

(xxviii) In the eye-pattern, as eye closes

- a) ISI increases
- b) ISI decreases
- c) timing jitter increases
- d) timing jitter decreases

(xxix) High frequency waves are

- a)
- b) reflected by the D layer

absorbed by the F₂ layer

- c) capable of use for long distance communications
- d) affected by the solar cycle

(xxx) Frequencies in the UHF range normally propagate by means of

- a) ground waves
- b) sky waves
- c) surface waves
- d) space waves

(xxxix) The coho in MTI radar operates at the

- a) intermediate frequency
- b) transmitted frequency
- c) received frequency
- d) pulse repetition frequency

(xxxii) A solution to the 'blind speed' problem is

- a) to change the Doppler frequency
- b) to vary the PRF
- c) to use monopulse
- d) to use MTI

(xxxiii) Voltage and current along the antenna are

- a) in-phase
- b) out of phase
- c)
- d)

90° phase shift

45° phase shift

(xxxiv) The glass tube of a TWT may be coated with aquadag to

- a) help focusing
- b) provide attenuation
- c) improve bunching
- d) increase gain

(xxxv) Radio horizon of space wave is

- a) four-third of optical horizon
- b) two-third of optical horizon
- c) three-fourth of optical horizon
- d) none of these

(xxxvi) Duplexer is used

- a) to isolate transmitter and receiver
- b) to isolate transmitter and antenna
- c) to isolate receiver and antenna
- d) none of these

(xxxvii) One of the microwave oscillator which has the negative resistance characteristic is

- a) GUNN
- b) IMPATT
- c) Klystron
- d) all of these

(xxxviii) In T1 system the frame synchronization code repeats every

- a) 125 μ s
- b) 1.5 μ s
- c) 1.2 μ s
- d) 150 μ s

(xxxix) In FDM multiple signals

- a) share a common channel bandwidth
- b) transmit at different time interval
- c) use multiple path
- d) modulate one another

(xl) The modulation method that represents bits as different phase shifts of a carrier is

- a) ASK
- b) FSK
- c) PSK
- d) MSK

(xli) GSM system uses

- a) GMSK
- b) ASK
- c) FSK
- d) DPSK

(xlii) DPSK solves

- a) signal sign problem of BPSK
- b) delay problem of BPSK
- c) noise problem of BPSK
- d) none of these

(xliii) If the symbols emitted by a discrete binary source are equally likely, the amount of information for each symbol will be

- a) 1 bit
- b) 2 bit
- c) 4 bit
- d) n bit

(xliv) The channel capacity of a white channel is given by

- a)
- b)

$$C = B \log_2(1 + S/N) \text{ b/s}$$

$$C = B \log_2(1 + N/S) \text{ b/s}$$

c)

$$C = nB \log_2(1+S/N) \text{ b/s}$$

d)

$$C = B \log_{10}(1+N/S) \text{ b/s}$$

(xlv) VLF propagation is possible for

- a) ground wave propagation
- c) space wave propagation

- b) sky wave propagation
- d) all of these

(xlvi) Duct propagation is

- a) ground wave propagation
- c) HF space wave propagation

- b) sky wave propagation
- d) Microwave space wave propagation

(xlvii) Tropospheric scatter is used with frequencies in the following range

- a) HF
- c) UHF

- b) VHF
- d) VLF

(xlviii) Signals from 2-30 MHz are propagated as

- a) ground wave
- c) space wave

- b) sky wave
- d) duct propagation

(xlix) The refractive index of the ionosphere is expressed as

a)

$$n = \epsilon_r$$

c)

$$n = \sqrt{\epsilon_r}$$

b)

$$n = \epsilon_r^2$$

d)

$$n = \frac{1}{\epsilon_r}$$

(l) The critical frequency related to sky wave

- a) must be sent vertically upward

- b) must be sent horizontally

c) d) is a minimum frequency

must be sent at an angle other than 0° or 90°

(li) Radar range depends on

- a) transmitting power of the antenna
- b) wavelength of the transmitted signal
- c) gain of the transmitting antenna
- d) all of these

(lii) PPI is the abbreviated form of

- a) place position indicator
- b) place position identification
- c) plan position indicator
- d) Plane position identification

(liii) The sensitivity of a radar receiver is ultimately set by

- a) a high S/N ratio
- b) a lower limit of signal power
- c) overall noise temperature
- d) a high figure of merit

(liv) The term RADAR stands for

- a) radio direction and deflection
- b) radio detection and ranging
- c) radio waves dispatching & receiving
- d) random detection and re-radiation

(lv) The resolution of pulse radars can be improved by

- a) increasing the pulse width
- b) decreasing pulse width
- c) increasing the pulse amplitude
- d) decreasing the pulse repetition frequency

(lvi) A large antenna is used in radars, because it

- a) gives higher gain
- b) gives lesser side lobes
- c) increases the beam width
- d) increases bandwidth

(lvii) In multicavity klystron

- a) electrons are amplitude modulated
- b) electrons are frequency modulated

c) gallium arsenide

d) metal semiconductor junction

(lxv) In a Yagi-Uda antenna, the essential element is

a) folded dipole

b) parabolic antenna

c) horn antenna

d) rhombic antenna

(lxvi) Wave guides are used in

a) audio frequency range

b) video frequency range

c) both audio and video frequency range

d) microwave frequency range

(lxvii) The antenna most commonly used for TV broadcasting in the UHF band is

a) turnstile antenna

b) dipole antenna

c) yagi antenna

d) rhombic antenna

(lxviii) Circularly polarized antenna is

a) dipole

b) parabolic dish

c) yagi-uda

d) helical

(lxix) A helical antenna is used for satellite tracking because of its

a) circular polarization

b) maneuverability

c) broad bandwidth

d) good front-to back ratio

(lxx) The direction of an Yagi-Uda array behaves like

a) capacitive element

b) inductive element

c) resistive element

d) none of these