	TANTA UNIVERSITY FACULTY OF COMPUTERS AND INFORMATICS	
	EXAMINATION FOR (LEVEL 4)	
	COURSE TITLE: COMMUNICATION TECHNOLOGY	**COURSE CODE: IT432**
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Note: Assume any missing data

Question (1): Choose the coorect Answer   (40 - Degrees)

1. **Which of the following best defines a communication system?**
   a) A system that exchanges information between two points
   b) A system that converts energy from one form to another
   c) A system that amplifies electrical signals
   d) A system that filters noise from a signal

2. **What is the purpose of an input transducer in a communication system?**
   a) To convert electrical signals into another form of energy
   b) To convert the information from the source into an electrical signal
   c) To amplify the electrical signal generated by the source
   d) To filter noise from the electrical signal

3. **Which component of a communication system is responsible for signal processing?**
   a) Information source   b) Input transducer   c) Transmitter   d) Receiver

4. **Which type of media allows electrical signals to be directed from transmitter to receiver by means of connecting cables?**
   a) Guided media   b) Unguided media   c) Analog media   d) Digital media

5. **What is the function of a receiver in a communication system?**
   a) To convert the received signal into its original form
   b) To amplify the received signal
   c) To filter noise from the received signal
   d) To convert the received signal into a carrier wave

6. **Which type of communication system allows communication between a single transmitter and receiver over a link?**
   a) Point-to-point communication   c) Broadcasting
   b) Point-to-multipoint communication   d) Simplex communication

7. **Which type of noise is caused by the random motion of electrons in a wire?**
   a) Thermal noise   c) Crosstalk
   b) Intermodulation noise   d) Impulse noise

8. **What is attenuation in a communication channel?**
   a) Loss of energy in the signal
   b) Generation of random or unwanted signals
   c) Mixing up of different frequencies in the signal
   d) Irregular pulses generated by external phenomena

9. **What does distortion refer to in a communication channel?**
   a) Mixing up of different frequencies in the signal
   b) Loss of energy in the signal
   c) Random or unwanted signals mixing up with the original signal
   d) Changes in the form or shape of the signal

10. **Which type of communication system allows the sender to send data but not receive it?**
    a) Simplex communication   c) Full duplex communication
    b) Half duplex communication   d) Point-to-point communication

11. **What is the purpose of source coding in a communication system?**
    a) To remove noise from the signal
    b) To convert the signal into a carrier wave
    c) To reduce the bandwidth of the input signal
    d) To amplify the signal strength

12. **In which type of communication system is the baseband signal transmitted without modulation?**
    a) Analog communication system
    c) Baseband communication system
    b) Digital communication system
    d) Carrier communication system
13. **What is the transmission mode in a communication system where the sender can send and receive data but not at the same time?**
    a) Simplex communication
    b) Half duplex communication
    c) Full duplex communication
    d) Point-to-multipoint communication
14. **What is modulation?**
    a) Conversion of higher-frequency signal to lower frequency
    b) Conversion of lower-frequency signal to higher frequency
    c) Conversion of analog signal to digital signal
    d) Conversion of digital signal to analog signal
15. **What is the purpose of modulation?**
    a) Separating signals from different transmitters
    c) Multiplexing
    b) Reducing noise and interference
    d) All of the above
16. **Which modulation technique requires the minimum transmission bandwidth?**
    a) DSB-SC modulation
    c) VSB modulation
    b) SSB modulation
    d) AM modulation
17. **What is the advantage of AM modulation in detection?**
    a) High efficiency
    c) Suitable for broadcasting system
    b) Low power requirements
    d) All of the above
18. **Which modulation technique is used in FM radio broadcasting?**
    a) Amplitude modulation
    c) Phase modulation
    b) Frequency modulation
    d) Angle modulation
19. **What is the purpose of frequency division multiplexing (FDM)?**
    a) Separating signals from different transmitters
    b) Reducing noise and interference
    c) Multiplexing multiple signals onto a single communication channel
    d) Amplifying the received signal
20. **What is the key characteristic of frequency division multiplexing (FDM)?**
    a) It divides the frequency spectrum into multiple non-overlapping bands.
    b) It divides the time slots for each signal.
    c) It divides the amplitude of the carrier wave.
    d) It divides the phase of the carrier wave.
21. **What is the main advantage of digital systems over analog systems?**
    a) Digital systems are not less expensive
    b) Digital systems are less sensitive to noise
    c) Digital systems less flexible
    d) Digital systems are not easier to design
22. **Which of the following operations is NOT needed to convert an analog signal to a digital signal?**
    a) Sampling   b) Quantization   c) Encoding   d) Modulation
23. **Sampling is the process of converting an analog signal into a:**
    a) Continuous-time signal
    c) Digital signal
    b) Discrete-time signal
    d) None of the above
24. **What is the Nyquist rate?**
    a) The maximum frequency of the original signal
    b) The minimum sampling rate required to avoid distortion
    c) The frequency at which the signal can be recovered without distortion
    d) The sampling rate used in pulse code modulation
25. **Quantization is the process of:**
    a) Converting an analog signal to a digital signal
    c) Encoding a digital signal
    b) Sampling an analog signal
    d) Discretizing the amplitude of a sampled signal
26. **Which method uses an impulse train function for sampling?**
    a) Ideal sampling
    c) Flat-top sampling
    b) Natural sampling
    d) Delta modulation

27. **Which theorem states that a signal can be exactly reproduced if it is sampled at a rate greater than twice the maximum frequency?**
    a) Nyquist theorem
    c) Aliasing theorem
    b) Encoding theorem
    d) Quantization theorem
28. **What is the purpose of an anti-alias filter in the sampling process?**
    a) To remove noise from the sampled signal
    c) To increase the sampling rate
    b) To eliminate high-frequency components
    d) To compress the digital data
29. **What is the minimum sampling rate required to avoid distortion, according to the Nyquist theorem?**
    a) The maximum frequency of the original signal
    b) Twice the maximum frequency of the original signal
    c) Half the maximum frequency of the original signal
    d) Three times the maximum frequency of the original signal
30. **Which pulse modulation technique is commonly used to change an analog signal to digital data?**
    a) Pulse Amplitude Modulation (PAM)
    c) Pulse Position Modulation (PPM)
    b) Pulse Width Modulation (PWM)
    d) Pulse Code Modulation (PCM)
31. **Which technique is used to maintain the secrecy of information in digital systems?**
    a) Encryption
    b) Composition
    c) Modulation
    d) Sampling
32. **Which sampling method uses a sample and hold circuit?**
    a) Ideal sampling
    c) Flat-top sampling
    b) Natural sampling
    d) Delta modulation
33. **What is the purpose of differential pulse code modulation (DPCM)?**
    a) Increased data transmission speed
    c) Enhanced error correction capabilities
    b) Improved signal-to-noise ratio
    d) Efficient bandwidth utilization
34. **What is the purpose of encoding in the process of converting an analog signal to a digital signal?**
    a) To remove noise from the signal
    c) To represent the quantized samples
    b) To compress the digital data
    d) To modulate the digital signal
35. **Which type of noise is caused by unwanted signals from other communication channels interfering with the desired signal?**
    a) Thermal noise
    b) Intermodulation noise
    c) Crosstalk
    d) Impulse noise
36. **What are the properties of a communication channel that can affect signal transmission?**
    a) Noise, attenuation, and distortion
    b) Modulation, filtering, and amplification
    c) Source coding, channel coding, and decoding
    d) Thermal noise, intermodulation noise, and crosstalk
37. **What is the purpose of amplification in a communication system?**
    a) To convert the electrical signal into a carrier wave
    b) To filter out unwanted noise from the signal
    c) To increase the strength of the signal
    d) To convert the received signal into its original form
38. **Which process in a communication system is responsible for reducing the bandwidth of the input signal?**
    a) Modulation
    b) Source coding
    c) Amplification
    d) Noise filtering
39. **What are the two major types of communication channels based on the medium used to send the signal?**
    a) Guided and unguided media
    c) Point-to-point and point-to-multipoint media
    b) Analog and digital media
    d) Transmitter and receiver media
40. **What is the purpose of a demodulator in a communication system?**
    a) To convert the analog signal to a digital signal
    b) To amplify the received signal
    c) To separate the carrier signal from the modulated signal
    d) To encode the information signal onto the carrier wave

Question (2): (4 - Degrees)

For **SSB** signal, the average carrier power output is **40** kW and the side band power is **50** kW. Find:

a) The total tramsmitted power.

b) If the modulation index is 50% for sin wave modulation, calculate the side band power.

Question (3): (4 - Degrees)

The total power content of an **AM** signal is **1000** w. Determine:

   a) The power transmitted at the carrier frequency.
   b) The power transmitted at each of side bands,

When the percent modulation is 100%.

Question (4): (6 - Degrees)

Channel 1 of two-channel PAM system handles **0-8** kHz signals; the second channel handles **0-10** kHz signals. The two channels are sampled at equal intervals of time using very narrow pulses at the lowest frequency that is theoretically adequate.

   a) What is the minimum clock frequency of the PAM signal?
   b) What is the minimum cut off frequency of the LPF used before transmission that will preserve the amplitude information on the output pulse?
   c) What would be the minimum bandwidth if the channels were frequency multiplexed, using normal AM technique and SSB technique?

Question (5): (6 - Degrees)

Suppose we need data channel with **bandwidth** of **1500**, **350**, **300**, **150**, **100** Hz (5-signals).

   a) Make TDM by using 8-channel main multiplexer (including a marker).
   b) What's the minimum sampling rate for the system?
   c) What's the total bandwidth of the transmission LPF?

Best Wishes
Dr. Arwa Abulwafa

Model 1

Choose the correct answer :

1- Address bus is used to detect the memory capacity
   a)True   b)False

2- QuickPath Interconnect (QPI) cannot connect multiple components within the system
   a)True

3- A key characteristic of a bus is that it is a shared transmission medium
   a)True   b)False

4- address Bus contains the address of the next instruction pair to be fetched from memory
   a)True   b)False   b)False

5- ARM architecture is best-designed RISC-based systems
   a)True   b)False

6- Data bus is used to control the access and the use of the data and address lines
   a)True   b)False

7- Sequential access method transmits the data in parallel
   a)True   b)False

8- RAM and ROM memory are volatile type of memory
   a)True   b)False

9- All processors have the same of number of instructions
   a)True   b)False

10- Indirect addressing Refers to the address of a word in memory which contains a full-length address of the operand
   a)True   b)False

11- the sign of a binary number typically is represented by Using the rightmost bit (least significant bit)
   a)True   b)False

12- The purpose of the Two's Complement representation in computer arithmetic is Handling floating-point numbers
   a)True   b)False

13- Main memory uses a random access mechanism
   a)True   b)False

14- Suppose that a bus has 16 data lines and requires 4 cycles of 250 nsecs each to transfer data. The bandwidth of this bus would be 2 Megabytes/sec. If the cycle time of the bus was reduced to 125 n secs and the number of cycles required for transfer stayed the same what would the bandwidth of the bus?
   a) 1 Megabyte/sec   b)2 Megabyte/sec   c)4 Megabyte/sec   d)8 Megabyte/sec

15- The average time required to reach a storage location in memory and obtain its contents is called the ------------

a) seek time   b) access time   c) transfer time   d)response time

16-...... refers to those attributes of a system visible to a programmer
a) Computer organization   b) Computer architecture   c) Data type   d)all

17-The operation of each individual component as part of the structure is-----
a) I/O mechanisms   b)Structure   c)Function   d)Computer organization

18-The basic function that a computer can perform is ------------
a) Data Processing   b) Control   c)Data Movement   d) all of the above

19-----------performs the computer's data processing functions.
a) CU   b) ALU   c)Memory   d) system bus

20-----------provides storage internal to the CPU.
a) CU   b) ALU   c)Memory   d) Registers

21-------------an individual processing unit on a processor chip.
a) CU   b) ALU   c)Memory   d) Core

22-----------includes the tasks involved in fetching instructions and decoding each instruction
a) CU   b) Instruction logic   c)Processor   d) Cache

23-----------contains a word to be stored in memory or sent to the I/O unit.
a) MBR   b) MAR   c) IR   d) AC

24-----------specifies the address in memory.
a) MBR   b) MAR   c) IR   d) AC

25-----------architecture refers to a processor architecture that has evolved from RISC design principles.
a) Control   b) data   c) The ARM   d) none of the above

26----------- of the primary memory of the computer is limited
a) Storage capacity   b) magnetic disk   c)optical disk   d)none

27-Cache memory is located between main memory and ---------
a) CPU   b) Memory   c)I/O   d)controller

28-...manages the transfer of data to and from main memory via cache.
a) Load/store logic   b) Bus
c)Processor   d) none of the above

29-Which operations are used for addition function?
a) Bus transfer   b)memory transfer   c) arithmetic operation   d)all

30-How many types of memory transfer operation:
a)4   b)3   c)2   d)4

31-which operation puts memory address in memory address register and data in DR:
a)memory read   b)memory write   c) a,b   d)execute

32-Hardwired program is developed by using -------------
a) C language   b)assembly   c)machine language   d)logic gate

33-what is the *memory* capacity when each word=16bit and the address bus= 3 bits lines
a)8 kbit   b)128 bit   c)48 bit   d)24 kbits

34-------- is the step during which a new instruction is read from the memory
a) decode   b)fetch   c)execute   d)write

35-When data are received from or delivered to a device that is directly connected to the computer, the process is known ....
a) Data Processing   b) I/O
c)Control   d) none of the above

36-Which addressing mode involves specifying the address of the operand in the instruction itself?
   a) Immediate addressing
   b) Direct addressing
   c) Register addressing
   d) Indirect addressing

37-The concept of pipelining in computer architecture is related to:
   a) Simultaneous execution of multiple instructions
   b) Data encryption
   c) Virtual memory management
   d) Input/output operations

38-Which computer bus is responsible for carrying memory addresses between the CPU and RAM?
   a) Data bus
   b) Control bus
   c) Address bus
   d) System bus

39-Which organization is responsible for creating and maintaining the x86 architecture?
   a) IBM
   b) Intel
   c) AMD
   d) Microsoft

40-Which of the following is a characteristic of a Complex Instruction Set Computing (CISC) architecture?
   a) large set of simple instructions
   b) Small set of complex instructions
   c) Reduced instruction set
   d) Explicit parallelism

41-What is the purpose of the "accumulator" in some instruction set architectures?
a) Store intermediate results of arithmetic operations
b) Execute branch instructions
c) Manage memory addresses
d) Control input/output devices

42-Which type of addressing mode involves specifying the address of the operand implicitly using a register?
a) Immediate addressing
b) Register addressing
c) Indirect addressing
d) Direct addressing

43-What is the purpose of the "stack pointer" register in an instruction set architecture?
a) Store intermediate results of calculations
b) Control program flow
c) Manage subroutine calls and returns
d) Execute branch instructions

44-What is the primary advantage of using immediate addressing mode?
a) Efficient use of memory
b) Simplifies instruction format
c) Faster execution
d) Supports complex data structures

45-The output of arithmetic shift right (3 bits) operation of 10100110 is--------
a)00001001
b) 00110101
c)00010100
d)10010011

46-The output of left rotate (3 bits) operation of 10100110 is--------
a)00001001
b)00110101
c)00010100
d)10010011

47-Which computer bus is responsible for carrying data between the CPU and memory?
a) Address bus
b) Data bus
c) Control bus
d) System bus

48-What is the purpose of the Overflow flag in computer arithmetic?
a) Indicate when a division operation results in a remainder
b) Signal an error when a calculation exceeds the representable range
c) Control the flow of data between registers
d) Manage input/output operations

49-In which addressing mode is the operand's address calculated using a fixed offset from a base register?
a) Indexed addressing
b) Base addressing
c) Register addressing
d) Indirect addressing

50-What is a characteristic of auto-increment addressing mode?
a) The operand address is incremented before accessing the operand
b) The operand address is incremented after accessing the operand

c) It requires an external input to increment the operand address

d) It is not used in modern instruction sets

51-What is the function of the Input/Output (I/O) subsystem in a computer?

a)Execute program instructions

b) Manage communication between the CPU and memory

c) Control the flow of data within the CPU

d) Handle data transfer between the computer and external devices

52-Which component stores the firmware and is responsible for booting the computer?

a) Hard Disk Drive (HDD)   b) Random Access Memory (RAM)

c) Read-Only Memory (ROM)   d) Cache memory

53-hard disk uses the ---------- access mechanism

a) random   b)associative   c)direct   d)all

54-16 bit instructions composed of two fields: the first half byte contains the opcode and the remainder the operand address. How many bits are needed for the program counter?

a)16 bits   b) 12bits   c) 8bits   d) 24 bits

55-The maximum data transfer rate in bytes/s across the bus that microprocessor that has 16-bit external data bus driven by an 4-MHz input clock assume that this microprocessor has a bus cycle whose minimum duration equals 5 input clock cycles.

a) 16x105   b)16x106   c) 8x105   d) 8x106

56-What is the main objective of the next instruction (SUB Y,A,B)

a)Y← A+B   b) Y← A/B   c) Y← A*B   d) Y← A-B

57-the type of instruction in previous question (56) is considered as :

a) one-address instruction   b) two-address instruction

c) three-address instruction   d) four-address instruction

58-the type of instruction in previous question (56) is suitable for all processor types

a) True   b)False

59-All memory can be designed without any constraints

a) True   b)False

60-What is the main objective of the next instruction (MOVE Y,A)

a)A← Y   b) Y← A/B   c) Y← A   d) R← A-B