# Computer Architectures
## Course 4nd year 2nd term 2019/2020

## Answer the following question

1..... refers to those attributes of a system visible to a programmer or, put another way, those attributes that have a direct impact on the logical execution of a program.

a) Computer architecture
b) Computer organization
c) Both
Answer :

2. The decoded instruction is stored in _____
a) IR
b) PC
c) Registers
d) MDR
Answer:

3..... refers to the operational units and their interconnections that realize the architectural specifications.
a)Computer architecture
b) Computer organization
c) Both
Answer :

4. Which of the register/s of the processor is/are connected to Memory Bus?
a) PC
b) MAR
c) IR
d) Both PC and MAR
Answer:

5. The basic functions that a computer can perform are control and .....
a) Data processing
b) Data storage
c) Data Movement
d) All of them
Answer :

6. ISP stands for _____
a) Instruction Set Processor
b) Information Standard Processing
c) Interchange Standard Protocol
d) Interrupt Service Procedure
Answer:

7..... Controls the operation of the computer and performs its data processing functions.

a) Central processing unit
b) Main memory

c) I/O
d) System interconnection
Answer :

8. The bus used to connect the monitor to the CPU is _____
a) PCI bus
b) SCSI bus
c) Memory bus
d) Rambus
Answer:

9..... Moves data between the computer and its external environment.

a)Central processing unit
b) Main memory
c) I/O
d) System interconnection
Answer :

10. The advantage of I/O mapped devices to memory mapped is _____
a) The former offers faster transfer of data
b) The devices connected using I/O mapping have a bigger buffer space
c) The devices have to deal with fewer address lines
d) No advantage as such
Answer:

11_____Performs the computer's data processing functions.

a)Control unit
b) Arithmetic and logic unit
c) Registers
d) CPU interconnection
Answer :

12. The method of accessing the I/O devices by repeatedly checking the status flags is _____
a) Program-controlled I/O
b) Memory-mapped I/O
c) I/O mapped
d) None of the mentioned
Answer:

13 .The ENIAC was a ..... rather than a binary machine

a) Decimal
b) binary
c) hexadecimal
Answer :

14. The method which offers higher speeds of I/O transfers is _____
a) Interrupts
b) Memory mapping
c) Program-controlled I/O

d) DMA

Answer:

15..... Is the first electronic digital computer

a) ENIAC
b) Harvard Mark 1
c) ACE
d) Colossus Mark 1

Answer :

16. The interrupt-request line is a part of the _____

a) Data line
b) Control line
c) Address line
d) None of the mentioned

Answer:

17.The transistor is ....,..... than a vacuum tube.

a) lower, faster
b) smaller, cheaper
c) bigger, expensive

Answer :

18. The time between the receiver of an interrupt and its service is _____

a) Interrupt delay
b) Interrupt latency
c) Cycle time
d) Switching time

Answer:

19. to the I/O unit, or is used to receive a word from memory or from the I/O unit.

a) MAR
b) MBR
c) IBR
d) IR

Answer :

20. The code sent by the device in vectored interrupt is _____ long.

a) upto 16 bits
b) upto 32 bits
c) upto 24 bits
d) 4-8 bits

Answer:

21..... capable of operating on binary data.

a) ALU
b) input&output
c) main memory
d) control unit

Answer :

22. _____ register is used for the purpose of controlling the status of each interrupt request in parallel priority interrupt.
    a) Mass
    b) Mark
    c) Make
    d) Mask

    Answer:

23. the last generation computer depends on artificial intelligence on .....
    a)low speed
    b) high speed
    c) normal speed

    Answer :

24. The instructions which can be run only supervisor mode are?
    a) Non-privileged instructions
    b) System instructions
    c) Privileged instructions
    d) Exception instructions

    Answer:

25. The von Neumann architecture is based on which concept?.....
    a) data and instructions are stored in a single read-write memory
    b) the contents of this memory are addressable by location
    c) execution occurs in a sequential fashion
    d) all of the above

    Answer :

26. The Direct Memory Access DMA transfers are performed by a control circuit called as _____
    a) Device interface
    b) DMA controller
    c) Data controller
    d) Overlooker

    Answer:

27. A sequence of codes or instructions is called _____.
    a) software
    b) memory
    c) an interconnect
    d) a register

    Answer :

28. The controller is connected to the ____
    a) Processor BUS
    b) System BUS
    c) External BUS
    d) None of the mentioned

    Answer:

29. The processing required for a single instruction is called a(n) _____ cycle.
    a) execute
    b) fetch
    c) instruction
    d) packet
    Answer :

30. The registers of the controller are _____
    a) 64 bits
    b) 24 bits
    c) 32 bits
    d) 16 bits
    Answer:

31. The action that an instruction may specify that the sequence of execution be altered called .....
    a) Processor-memory
    b) Processor-I/O
    c) Data processing
    d) Control
    Answer :

32. _____ serves as an intermediary between the device and the BUSes.
    a) Interface circuits
    b) Device drivers
    c) Buffers
    d) None of the mentioned
    Answer:

33. The state describes Read instruction from its memory location into the processor called .....
    a) Instruction fetch
    b) Instruction address calculation
    c) Data operation
    d) Instruction operation decoding
    Answer :

34. The use of spooler programs or _____ Hardware allows PC operators to do the processing work at the same time a printing operation is in progress.
    a) Registers
    b) Memory
    c) Buffer
    d) CPU
    Answer:

35. A(n) _____is generated by some condition that occurs as a result of an instruction execution.
    a) timer interrupt

b) I/O interrupt
c) program interrupt
d) hardware failure interrupt
Answer :

36. DDR stands for _____
a) Data Direction Register
b) Data Decoding Register
c) Data Decoding Rate
d) None of the mentioned
Answer:

37. One of the approaches can be taken to dealing with multiple interrupts is to disable interrupts while an interrupt is being processed called .....
a) Disable interrupts
b) Define priorities
c) All of the above
d) None of the above
Answer :

38. The minimum time delay between two successive memory read operations is _____
a) Cycle time
b) Latency
c) Delay
d) None of the mentioned
Answer:

39. The interconnection structure must support which transfer?.....
a) memory to processor
b) processor to memory
c) I/O to or from memory
d) all of the above
Answer :

40. VLSI stands for _____
a) Very Large Scale Integration
b) Very Large Stand-alone Integration
c) Volatile Layer System Interface
d) None of the mentioned
Answer:

41. A bus that connects major computer components (processor, memory, I/O) is called a _____.
a) system bus
b) address bus
c) data bus
d) control bus
Answer :

42. A 16 X 8 Organisation of memory cells, can store up to _____
    a) 256 bits
    b) 1024 bits
    c) 512 bits
    d) 128 bits
    Answer:
43. Control signals transmit ..... among system modules.
    a) Timing signals
    b) Command signals
    c) A and B
    d) none of the above
    Answer :
44. Circuits that can hold their state as long as power is applied is _____
    a) Dynamic memory
    b) Static memory
    c) Register
    d) Cache
    Answer:
45. Consider a hypothetical microprocessor generating a 16-bit address (for example, assume that the program counter and the address registers are 16 bits wide) and having a 16-bit data bus What is the maximum memory address space that the processor can access directly if it is connected to a "8-bit memory"?.....
    a) 64 KB
    b) 32 KB
    c) 16 KB
    d) None of the above
    Answer :
46. The data is transferred over the RAMBUS as _____
    a) Packets
    b) Blocks
    c) Swing voltages
    d) Bits
    Answer:
47. Consider microprocessor having 16 bit-wide external data bus. How many cycles needed to transfer instruction with two bytes long .....
    a) one cycle
    b) two cycles
    c) three cycles
    d) None of them
    Answer :
48. The last on the hierarchy scale of memory devices is _____
    a) Main memory
    b) Secondary memory
    c) TLB

d) Flash drives
Answer:

49. The virtual memory basically stores the next segment of data to be executed on the _____
a) Secondary storage
b) Disks
c) RAM
d) ROM
Answer:

50. The digital information is stored on the hard disk by _____
a) Applying a suitable electric pulse
b) Applying a suitable magnetic field
c) Applying a suitable nuclear field
d) By using optic waves
Answer:

Mathematics Department
Term Exam
Theory of Compilers
Code: 458 MC
Time: 2 hours
July 2020

كلية العلوم- قسم الرياضيات

امتحان الفصل الدراسي الثاني
المستوي: الرابع
المقرر: نظرية المترجمات
الرمز: 458 رك
الزمن: ساعتان
يوليو ٢٠٢٠

## Answer the following questions: (100 Marks)

### I. Complete the following statements from the given table. (60 Marks)

***Note*: each answer may be used several times.**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | DFA | 6 | Regular expressions | 11 | ambiguity | 16 | LL(1) | 21 | Reduce |
| 2 | lexeme | 7 | four | 12 | NFA | 17 | Maximal munch | 22 | Predictive |
| 3 | attributes | 8 | parse tree | 13 | Priority | 18 | DFS | 23 | Top-Down |
| 4 | Optimization | 9 | FOLLOW | 14 | Kleene closure | 19 | Semantic | 24 | handle |
| 5 | NEWLINE | 10 | BFS | 15 | tokens | 20 | Parsing | 25 | Shift |

| | |
|---|---|
| a. ..... that store extra information about the token. | ( ) |
| b. The ..... set represents the set of terminals that might come after a given nonterminal | ( ) |
| c. ..... are a family of descriptions that can be used to capture certain languages. | ( ) |
| d. Lexical analysis splits input text into ..... | ( ) |
| e. ..... can parse in O(n \|G\|) time, where n is the length of the string and \|G\| is the size of the grammar. | ( ) |
| f. ..... encoding the steps in a derivation. | ( ) |
| g. Low-memory ..... has higher scan time. | ( ) |
| h. Leftmost ..... works on all grammars. | ( ) |
| i. Formally, a CFG is a collection of ..... objects. | ( ) |
| j. ..... reduce a handle. | ( ) |
| k. ..... a property of grammars, not languages. | ( ) |
| l. ..... improve the resulting structure. | ( ) |
| m. ..... guess which production should be inverted. | ( ) |
| n. ..... Parsing beginning with the start symbol, try to guess the productions to apply to end up at the user's program | ( ) |
| o. High-memory ..... has lower scan time. | ( ) |
| p. ..... is the leftmost complete cluster of leaf nodes. | ( ) |
| q. ..... is the piece of the original program from which we made the token | ( ) |

| | |
|---|---|
| r. ..... means move a terminal across the split | ( ) |
| s. R* is a regular expression for the ..... of R. | ( ) |
| t. ..... report errors if tokens do not properly encode a structure. | ( ) |
| u. .....pick the rule that was defined first. | ( ) |
| v. .....Identify the meaning of the overall structure. | ( ) |
| w. Lexemes are sets of strings often defined with ..... | ( ) |
| x. .....match the longest possible prefix of the remaining text. | ( ) |
| y. Leftmost ..... Often used in a limited form as recursive descent. | ( ) |
| z. ..... Recover the structure described by that series of tokens. | ( ) |
| aa. ---------- pop some number of symbols from the stack, and then push the appropriate nonterminal. | ( ) |
| bb..... marks the end of a line. | ( ) |
| cc. ...parsing scans from left-to-right, using one token of lookahead to find a leftmost derivation. | ( ) |

## Question 2: (30 Marks)

**Put (√) or (X) for each of the following statements:**

| | |
|---|---|
| ( ) | 1. Sometimes we will discard a lexeme rather than storing it for later use. |
| ( ) | 2. Optimization: Fabricate the structure. |
| ( ) | 3. DEDENT indicates an increase in indentation. |
| ( ) | 4. Not all tokens come directly from the source code. |
| ( ) | 5. Leftmost BFS works on grammars without left recursion. |
| ( ) | 6. Unfortunately, CFG are (usually) too weak to define programming languages. |
| ( ) | 7. Some tokens might be associated with lots of different lexemes. |
| ( ) | 8. A rightmost derivation is a derivation in which each step expands the rightmost nonterminal. |
| ( ) | 9. The token sequence is used in the parser to recover the program structure. |
| ( ) | 10. The leftmost DFS/BFS algorithms are backtracking algorithms. |
| ( ) | 11. Real grammars are often ambiguous. |
| ( ) | 12. There are three main kinds of finite automata |
| ( ) | 13. R1R2 is a regular expression represents the union of the languages of R1 and R2. |
| ( ) | 14. In DFA, every state must have exactly one transition defined for every letter. |
| ( ) | 15. BFS is slow. |
| ( ) | 16. Each token is associated with two lexemes. |
| ( ) | 17. We discard irrelevant information (e.g. whitespace, comments). |

| | |
|---|---|
| ( ) | 18. Regular expressions can be implemented using infinite automata. |
| ( ) | 19. All tokens come directly from the source code. |
| ( ) | 20. Leftmost DFS Rarely used in practice. |
| ( ) | 21. The symbol ε is a regular expression matches the empty string. |
| ( ) | 22. Keywords can be used as identifiers. |
| ( ) | 23. There are many algorithms for eliminating ambiguity. |
| ( ) | 24. ε-moves are not allowed in DFA . |
| ( ) | 25. ab*c\|d is parsed as ((a(b*))c)\|d |
| ( ) | 26. If R is a regular expression, (R) is a regular expression with the same meaning as R. |
| ( ) | 27. Complexity of DFA is O(mn2) for strings of length m and automata with n states. |
| ( ) | 28. Uppercase letters at the end of the alphabet will represent terminals. |
| ( ) | 29. IR Optimization simplify the intended structure. |
| ( ) | 30. Some tokens might be associated with lots of different lexemes. |

**Question 3 (Oral):** **(10 Marks)**

**Chosse the correct answer and write its letter in the answer table:**

1. The ---------- transitions are followed automatically and without consuming any input.

a) 0 b) 1 c) ε d) a

2. --------- can be in many states at once.

a) DFA b) NFA c) NFA & DFA d) NFA or DFA

3. When parsing, our alphabet is the set of ----------

a)ASCII b) Unicode c) Alphabets d) Tokens

4. A nonterminal A is said to be left recursive iff ----------

a) $A \rightarrow \gamma$ b) $\alpha \Rightarrow^* \beta$ c) $A \Rightarrow \alpha$ d) $A \Rightarrow^* A\omega$

5. ---------- techniques scan the input from left-to-right.

a) Directional b) Predictive c) Reverse d) CFG

**Answer Table**

| Question | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Answer | | | | | |

With My Best Wishes

Dr. Dalia Nashat

| | |
|---|---|
| Assiut University | Computer Security |
| Faculty of Science | Fourth Level (MC453) |
| Mathematics Department | Time: 2 hours |
| Exam (90 marks) & Oral exam (10 marks) | July 2020 |

Answer the following questions: (90 Marks)

Question 1: Answer the following (MCQ) questions: (20 Marks)

1-An assault on system security that derives from an intelligent threat
A.Attack B. Threat. C. Vulnerability D. Risk

2-An expectation of loss expressed as the probability that a particular threat will exploit a particular vulnerability with a particular harmful result
A.Attack B. Threat C. Vulnerability D. Risk

3-Possible danger that might exploit a vulnerability
A.Attack B. Threat C. Vulnerability D. Risk

4-Flaw or weakness in a system's design, implementation, or operation and management that could be exploited to violate the system's security policy.
A.Attack B. Threat C. Vulnerability D. Risk

5-An action, device, procedure, or technique that reduces a threat, a vulnerability
A.System resource B. Countermeasure C. Security policy D. Adversary

6-An entity that attacks, or is a threat to, a system.
A.System resource. B. Countermeasure C. Security policy D. Adversary

7-Attack that does not affect system resources
A.Passive B. Active C. Insider D. Outsider

8-Attack that initiated from outside the perimeter
A.Passive B. Active C. Insider D. Outsider

9-Attack that initiated by an entity inside the security perimeter
A.Passive B. Active C. Insider D. Outsider

10-means used to deal with security attacks
A.Prevent B. Detect C. Recover D. All previous choices.

Question 2: Answer the following (MCQ) questions: (20 Marks)

1-A loss of ..... is the unauthorized disclosure of information.
A. confidentiality B. integrity C. availability

2-A loss of .....is the unauthorized modification or destruction of information.
A. confidentiality B. integrity C. availability

3-A loss of ..... is the disruption of access to or use of information or an information system.
A. confidentiality B. integrity C. availability

4-..... means the property of being genuine and being able to be verified and trusted.
A. confidentiality B. accountability C. availability D. authenticity

5-..... means verifying that users are who they say they are and that each input arriving at the system came from a trusted source.
A. confidentiality B. accountability C. availability D. authenticity

6-..... : The security goal that generates the requirement for actions of an entity to be traced uniquely to that entity.
A. confidentiality B. accountability C. availability D. authenticity

7-..... supports nonrepudiation, deterrence, fault isolation, intrusion detection and prevention, and after-action recovery and legal action.
A. confidentiality B. accountability C. availability D. authenticity

8-.....: Because truly secure systems aren't yet an achievable goal, we must be able to trace a security breach to a responsible party.
A. confidentiality B. accountability C. availability D. authenticity

9-.....: Systems must keep records of their activities to permit later forensic analysis to trace security breaches or to aid in transaction disputes.
A. confidentiality B. accountability C. availability D. authenticity

10-Usurpation is a threat to .....
A. confidentiality B. accountability C. availability D. system integrity.

Question 3: Answer the following (MCQ) questions: (20 Marks)

1-Exposure attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

2- Interception attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

3- Inference attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

4- Intrusion attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

5-Masquerade attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

6-Falsification attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

7-Repudiation attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

8-Incapacitation attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

9-Corruption attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

10-Obstruction attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

Question 4: Answer the following (MCQ) questions: (20 Marks)

1-Misappropriation attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

2-Misuse attack can result in the following threat consequence .....
A. Unauthorized disclosure B. Deception C. Disruption D. Usurpation

3-A symmetric encryption scheme has ..... ingredients.
A. two B. three C. four D. five

4-Data Encryption Standard (DES) uses .... bit plaintext block.
A. 56 B. 64 C. 128 D. 256

5-Data Encryption Standard (DES) uses .....bit key.
A. 56 B. 64 C. 128 D. 256

6-Triple DES uses .... bit plaintext block.
A. 56 B. 64 C. 128 D. 256

7-Advanced Encryption Standard (AES) uses .... bit plaintext block.
A. 56 B. 64 C. 128 D. 256

8-One of the means of authenticating a user's identity is something the individual possesses: Examples include electronic keycards, smart cards, and physical keys. This type of authenticator is referred to as a .....
A.token B. static biometrics C. dynamic biometrics

9-One of the means of authenticating a user's identity is something the individual is: Examples include recognition by fingerprint, retina, and face. This type of authenticator is referred to as a .....
A.token B. static biometrics C. dynamic biometrics

10-One of the means of authenticating a user's identity is something the individual does: Examples include recognition by voice pattern, handwriting characteristics, and typing rhythm. This type of authenticator is referred to as a .....
A.token B. static biometrics C. dynamic biometrics

Question 5: Answer the following (MCQ) questions: (10 Marks)

1-.....: Advertising that is integrated into software. It can result in pop-up ads or redirection of a browser to a commercial site.
A. Adware B. Attack kit C. Auto-rooter D. Backdoor (trapdoor)

2-.....: Set of tools for generating new malware automatically using a variety of supplied propagation and payload mechanisms
A. Adware B. Attack kit C. Auto-rooter D. Backdoor (trapdoor)

3-.....: Malicious hacker tools used to break into new machines remotely.
A. Adware B. Attack kit C. Auto-rooter D. Backdoor (trapdoor)

4-.....: Any mechanism that bypasses a normal security check; it may allow unauthorized access to functionality in a program, or onto a compromised system.
A. Adware B. Attack kit C. Auto-rooter D. Backdoor (trapdoor)

5-.....: Code that installs other items on a machine that is under attack. It is normally included in the malware code first inserted on to a compromised system to then import a larger malware package.
A.Downloaders B. Drive-by-Download C. Exploits D. Flooders (DoS client)

Oral Question : Mark false or true. (10 marks)

1- the use of the CIA triad to define security objectives is well established, and there is no need to additional concepts to present a complete picture. ()

2-computer security is simple as it might first appear to the novice. ()

3-potential attacks on the security features must be considered ()

4-attackers need to find all weakness.()

5-users and system managers tend to not see the benefits of security until a failure occurs. ()

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Dr. Tarik M. A. Ibrahim

Faculty of Science
Math. Dept.

Final Exam
الفرقة الرابعة – علوم الحاسب الآلي
حاسبات موزعة
452 رك
الأحد 2020/7/12 ساعتان

Assiut University

**Mark T or F for each true of false sentence, respectively (80 marks).**

1- Threads interact through sending messages among themselves.
2- Operating system scheduler decides when to run which threads.
3- Sharing data with synchronization is an easy process.
4- The C++ compilers replace OpenMP codes with many lines.
5- It is easy to implement Runge–Kutta method by OpenMP.
6- In OpenMP, synchronization means that bringing one or more threads to a well defined and known point in their execution.
7- In tree data structure, it is recommended to process node information in one thread.
8- False sharing can reduce the speed of the OpenMP programs.
9- Mutual exclusion is defined as each thread wait at the barrier until all threads arrive.
10- Data locks is a type of low level synchronization.
11- OpenMP, we Synchronize one or more threads to a well- defined and known point in their execution.
12- There are two types of synchronization: barrier and mutual exclusion.
13- The command **#pragma omp barrier** enforces each thread to wait until all threads arrive to the same commands.
14- The command **#pragma omp critical** is a type of barrier synchronization.
15- The command **#pragma omp critical** enforces threads to wait their turn, where only one at a time execute one sentence.
16- Atomic provides mutual exclusion but only applies to the update of a memory location.

--------Please see the next page--------

17- We can use the command **#pragma atomic** into the for loop.

18- The command **#pragma omp for** is the easiest command to implement for loop in multi-core applications.

19- The command **#pragma omp for** is the easiest command to implement for loop in multi-core applications.

20- Implementing for loop with **#pragma omp critical** is faster than **#pragma omp for.**

21- The Sections worksharing construct gives a different structured block to each thread.

22- In OpenMP, we can assign each thread to perform a different task to the other threads.

23- The command **#pragma omp single** denotes a block of code that is executed by only one thread (not the master thread).

24- OpenMP can be used to lock the access to memory locations.

25- The function **omp_num_procs()** returns the number of processes.

26- The data sharing can be used to share the variables among threads and the main program.

27- In the command #pragma omp parallel for private(X), the variable X is not initialized.

28- In the command #pragma omp parallel for firstprivate (X), each thread has a different value for the variable X.

29- In the command #pragma omp parallel for lastprivate(X), the variable X in the main program is updated after this OpenMP command.

30- Tasks are independent units of work.

31- The tasks contain code, data, and internal variable control.

32- Tasks may be executed immediately.

33- The runtime system decides when tasks are executed.

34- Task region is the dynamic sequence of instructions produced by the execution of a task by a thread.

It is better to use OpenMP and MPI in the same program.

**--------Please see the next page--------**

35- Cluster contains large number of nodes.

36- We must to use the command **#pragma omp task** inside one thread not all threads.

37- For the code, there is only one task that calls the function foo.

```
#pragma omp parallel
        {
            #pragma omp task
            foo();
        }
```

38- We use **#pragma omp parallel** to create team of threads.

39- MPI runs a cope of the code between the functions MPI_Init and MPI_Finalize in different nodes.

40- Fortran programs can contain OpenMP.

## الشفوي عشر درجات

**Mark T or F for each true of false sentence, respectively**

1- Gordon Moore predicted that semiconductor density would double every 24 months.

2- After Pentium 4, there is no significant change in the speed of the processors.

3- Capacitance measures the ability of a circuit to store energy.

4- The main limitation in Moore's law is that power decreases quadratically with decrease the voltage (V).

5- Multi-core technology can be used to overcome the Moore's law limitations.

6- Most of the current software uses multi-core programming.

7- OpenMP is one of the most common parallel programming models in use today.

8- Intel SCC Processor contains 48 cores.

9- Concurrency is a condition of a system in which multiple tasks are active at one time.

10- Parallelism is a condition of a system in which multiple tasks are logically active at one time.

**End Of questions** **Best Wishes,** **Dr. Ibrahim Elsemman**

| | | |
|---|---|---|
| قسم الرياضيات | الإختبار النهائي للفصل الثاني | 2019/2020 |
| كلية العلوم | إحصاء رياضي –المستوى الرابع | الزمن: ٣ ساعات |

The Exam contains 3 parts (A-B-C)

***All questions are required and the solution is in the question paper and attached with the answer sheet***

## Part (A): True–False Questions

**In the following statements put T or F between brackets**

**A1-** The correlation coefficient between $X$ and $Y$ is a positive value. ( )

**A2-** If $X$ and $Y$ are discrete random variables with $F_{X,Y}(x,y)$, then bpmf $f_{X,Y}(x,y)$ cab not be given by $f_{X,Y}(x,y) = \frac{\partial^2}{\partial x \partial y}\left(F_{X,Y}(x,y)\right)$. ( )

**A3-** The distribution of $\bar{X}$ determined by $E(\bar{X}) = \mu$ and $V(\bar{X}) = \frac{\sigma^2}{n}$. ( )

**A4-** $X$ and $Y$ are random variables then $E(XY) = Cov(X,Y) + EX\,EY$. ( )

**(A5)** Let $X$ and $Y$ have the bpdf $f_{X,Y}(x,y) = e^{-x-y}, \quad x > 0,\ y > 0$ then $f_X(x) = e^{-x},\ x > 0$. ( )

**(A6)** For the bpdf as in (5) we have $f_{Y|X}(y|x) = e^{-x},\ y > 0\ (x > 0)$. ( )

**(A7)** If $X$ and $Y$ has bpdf as in (5) then $X$ and $Y$ are independent. ( )

**A8-** If $X$ and $Y$ are independent then $f_{X|Y}(x|y) = f_Y(y)$. ( )

**(A9)** A bpdf $f_{X,Y}(x,y)$ is defined on the area $0 \le x \le 1,\ 0 \le y \le 1$ then $P(X < Y) = \int_0^1 \int_0^y f_{X,Y}(x,y)dxdy$. ( )

**A10-** If $V(\hat{\theta}) \ge \left[E\left(\frac{\partial\,[lnL(x;\theta)]}{\partial\theta}\right)^2\right]^{-1}$, then $\hat{\theta}$ is a MVUE of $\theta$. ( )

**A11-** $X$ and $Y$ are continuous, then $F_{Y|X}(y|x) = \int_{-\infty}^{y} f(u|x)du$. ( )

**A12-** Let $\hat{\theta}$ be an estimator of $\theta$. The function $\mathcal{L}(\hat{\theta},\theta) = (\hat{\theta} - \theta)^2$ is called the squared error loss. ( )

**A13-** If $V(X+Y) = V(X) + V(Y)$, so $X$ and $Y$ are dependent. ( )

**A14-** In Bayes estimation we consider $\theta$ as fixed value. ( )

**A15-** If the loss function is squared error, then the Bayes' estimator $\hat{\theta}$ of parameter $\theta$ is given by $\hat{\theta} = E(\Theta\,|x_1,\ldots,x_n)$. ( )

**A16-** The covariance of $X, Y$ is equal to $\sigma_X \sigma_Y\, \rho(X,Y)$. ( )

**(A17)** If $X \sim N(0,1)$, and $Z = X^2$ then $Z \sim \chi^2(1)$. ( )

**(A18)** The Jacobian value of transformation $z = \frac{x}{x+y}$, $w = x + y$ is $w$. ( )

**(A19)** If $f_{X,Y}(x,y) = k,\ 0 < x + y < 1$, then it is a valid bpdf at $k = 2$. ( )

**A20-** Estimator $\hat{\theta}_n$ of $\theta$ is consistent estimator if $\lim_{n\to\infty} V(\hat{\theta}_n) = 0$. ( )

**A21-** The conditional pdf $f_{\Theta|X}(\theta|x)$ is called the posterior distribution and exactly equal to prior times likelihood function. ( )

**(A22)** The bpmf $f_{X,Y}(x,y) = x + y,\ x = 1,2,,\ y = 1,2$, is valid bpmf. ( )

**A23-** The pivot quantity is a function of the parameter only. ( )

**A24-** For any variables $X$ an $Y \Rightarrow E(XY) = E(X)E(Y)$. ( )

**(A25)** If $M_{Y|X}(s|x) = (1-s)^{-1}e^{sx}$, then $E(Y|X) = 1$. ( )

**Part (B): Multiple Choice Questions**

**Choose the correct from (a), (b) and (c)**

**B1-** The Bayes' estimator $\hat{\theta}$ of parameter $\theta$ based on squared error loss is the posterior... **(a)** median **(b)** mode **(c)** mean

**B2-** The marginal cdf of $X$, is equal to

**(a)** $\lim_{x\to\infty} F_{X,Y}(x,y)$ **(b)** $\lim_{y\to\infty} F_{X,Y}(x,y)$ **(c)** $\lim_{x,y\to\infty} F_{X,Y}(x,y)$

**B3-** For either value of the point $(x,y)$ the value of $F_{X,Y}(x,y)$ is equal one

**(a)** $F_{X,Y}(-\infty,y)$ **(b)** $F_{X,Y}(\infty,\infty)$ **(c)** $F_{X,Y}(x,\infty)$

**B4-** For any $X$ and $Y$ the expression $E[V(Y|X)] + V[E(Y|X)]$, is equal to

(a) $E(Y)$ (b) $E(Y|X)$ (c) $V(Y)$

**B5-** If $\hat{\theta}$ is an estimator for $\theta$, then if $E(\hat{\theta}) = \theta$ we call that $\hat{\theta}$ is

**(a)** sufficient for $\theta$ **(b)** unbiased for $\theta$ **(c)** consistent for $\theta$

**(B6)** If the bpmf of $X$ and $Y$ is $f_{X,Y}(x,y) = \frac{1}{21}(x+y),\ x = 1,2,\ y = 1,2,3.$

Then: $f_Y(y) = \cdots$ **(a)** $\frac{y+3}{21}$ **(b)** $\frac{2y+3}{21}$ **(c)** $\frac{y+1}{7}$

**B7-** Let $X_1, X_2, \ldots, X_{16}$ be a random sample of size 16 from a normal distribution with $\mu = 20$ and $\sigma^2 = 4$. Then, $\bar{X} \sim$ ...

**1)** $N(20,1/4)$ **(b)** $N(20,1/2)$ **(c)** $N(20,4)$

**(B8)** The bivariate probability density function of $X$ and $Y$ is given by

$$f_{X,Y}(x,y) = kx\,y^2,\quad 0 < x < y < 1,$$

and $(= 0)$ otherwise, then the value of $k = \cdots$

**(a)** 10 **(b)** 0.1 **(c)** $\int_0^1 \int_0^y xy^2 dxdy$

**B9-** Given the bpdf of $X$ and $Y$ as $f_{X,Y}(x,y) = 1,\ y < x < y,\ 0 < y < 1,$ and $(= 0)$ otherwise, then $X$ and $Y$ are...

**(a)** independent **(b)** dependent **(c)** correlated

**(B10)** If $X$ and $Y$ has bpdf $f_{X,Y}(x,y) = e^{-y},\quad 0 < x < y < \infty$. Then $f_{X|Y}(x|y)$, for $0 < x < y\ (y > 0)$, is ...**(a)** $e^{-(x+y)}$ **(b)** $1/y$ **(c)** $e^{y-x}$

**(B11)** The bivariate moment generating function $M_{X,Y}(t,s)$ is $\frac{1}{(1-s)(1-s-t)}$, then $M_X(t)M_Y(s)$=... **(a)** $\frac{1}{(1-s)^2(1-t)}$, **(b)** $\frac{1}{(1-s)(1-t)}$, **(c)** $\frac{1}{(1-t)^2(1-s)}$

**(B12)** If the bpdf of $X$ and $Y$ is: $f_{X,Y}(x,y) = 2,\ 0 < x < y, 0 < y < 1,$ and $(= 0)$ otherwise, then $f_X(x)$ is... **(a)** $2(1-x),\ (0 < x < y)$ **(b)** $2(1-x),\ (0 < x < 1)$ **(c)** $2(1+x),\quad 0 < x < y$

**(B13)** Let $f_{X|Y}(x|y) = \frac{2x}{y^2}, 0 < x < y < 1,$ and $f_Y(y) = 5y^4, 0 < y < 1$. So, the value $3y^2/(1-x^3)$, represents ...**(a)** $f_{X,Y}(x,y)$ **(b)** $f_X(x)$ **(c)** $f_{Y|X}(y|x)$

**(B14)** Using the result of $f_{Y|X}(y|x)$ you have chosen in (13) the value of $E[Y|X = x]$ is... **(a)** $\frac{3(1-x^4)}{4(1-x^3)}$ **(b)** $\frac{4(1-x^4)}{3(1-x^3)}$ **(c)** $\frac{3(1+x^4)}{4(1-x^3)}$

**(B15)** For any $X, Y$ the variance of $X - Y$ is equal to

**(a)** $V(X) + V(Y)$ **(b)** $V(X) + V(Y) - 2Cov(X,Y)$ **(c)** $V(X) - V(Y)$

**(B16) If** $X$ and $Y$ such that $V(X) = 4,\ V(Y) = 9$ and $V(X - Y) = 16$. So $Cov(X,Y)$ is... **(a)** $3/2$ **(b)** $2/3$ **(c)** $-3/2$

**(B17)** If $V(X) = 16,\ V(Y) = 4,$ and $Cov(X,Y) = 2$, then $V(3X - 2Y) = \cdots$

**(a)** 32 **(b)** 136 **(c)** 16

**(B18)** Let $X$ be a Bernoulli random variable with parameter $p$ and pmf is given by $f(x;p) = p^x(1-p)^{1-x},\quad x = 0,1$. The maximum likelihood estimator of $p$ is... **(a)** $\sum_{i=1}^n X_i$ **(b)** $n\sum_{i=1}^n X_i$ **(c)** $\frac{1}{n}\sum_{i=1}^n X_i$

**(B19)** Suppose that $X_1, X_2, \ldots, X_n$ is a random sample from a normal distribution with parameters $\mu$ and $\sigma^2$. Then the moment estimator of $\sigma^2$ is... **(a)** $\overline{X^2} - \overline{X}^2$ **(b)** $\overline{X} - \overline{X}^2$ **(c)** $\overline{X^2} - \overline{X}$

**(B20)** If $X$ has a binomial distribution with parameters $n$ and $p = \theta$, and the prior of $\theta$ is beta distribution with parameters $\alpha, \beta$. The posterior distribution of $\theta$ distributed as: **(a)** Beta $(\alpha, n - x + \beta)$ **(b)** Beta $(x+\alpha, n - x + \beta)$ **(c)** Beta $(x+\alpha, n + \beta)$.

**B21-** The CDF of the $\max\{X_1, \dots, X_n\}$ is equal to

**(a)** $1 - [1 - F_X(x)]^n$ **(b)** $1 - [F_X(x)]^n$ **(c)** $[F_X(x)]^n$

**(B22)** If you know that $X_j \sim \text{bin}(m_j, \text{p})$ and with $M_{X_j}(t) = (q + pe^t)^{m_j}$. If the random variable $Z$ is such that $Z = \sum_{j=1}^{n} X_j$, then

**(a)** $Z \sim bin(\sum_{j=1}^{n} m_j, p)$ **(b)** $Z \sim bin(\sum_{j=1}^{n} m_j, np)$ **(c)** $Z \sim bin(m_j, p)$

**B23-** Suppose $\hat{\theta}_1$, $\hat{\theta}_2$ are both unbiased for $\theta$, then $\hat{\theta}_1$ more efficient estimator for $\theta$ if **(a)** $V(\hat{\theta}_1) > V(\hat{\theta}_2)$ **(b)** $V(\hat{\theta}_2) > V(\hat{\theta}_1)$ **(c)** $V(\hat{\theta}_1) \leq V(\hat{\theta}_2)$

**B24-** Then mean square error of an estimator $\hat{\theta}$ for $\theta$ is

**(a)** $E(\hat{\theta} - \theta)^2$ **(b)** $E(\hat{\theta} - \theta)$ **(c)** $E(\hat{\theta} - E\theta)^2$

**(B25)** Suppose $\hat{\theta}_1$, $\hat{\theta}_2$ and $\hat{\theta}_3$ are estimators of $\theta$. We know that $E(\hat{\theta}_1) = E(\hat{\theta}_2) = \theta$, $E(\hat{\theta}_3) \neq \theta$, $V(\hat{\theta}_1) = 12, V(\hat{\theta}_2) = 10$, $V(\hat{\theta}_3 - \theta)^2 = 6$. The good estimator is... **(a)** $\hat{\theta}_1$ **(b)** $\hat{\theta}_2$ **(c)** $\hat{\theta}_3$

**Part (C): Oral Question**

Write briefly on **one only** of the methods of finding point estimators for unknown parameters (moments – maximum likelihood – Bayes).

**Help formulas:**

(1) $X \sim Beta(\alpha, \beta) \Rightarrow f_X(x) = \frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1}(1-x)^{\beta-1}, \quad 0 < x < 1$

(2) $X \sim bin(n; p) \Rightarrow = \binom{n}{x} p^x (1-p)^{n-x}, \quad x = 0,1, \dots, n \quad (0 < p < 1)$

(3) $Y \sim \chi^2(k) \Rightarrow f_Y(y) = \frac{1}{\Gamma(\frac{k}{2}) 2^{\frac{k}{2}}} y^{\frac{k}{2}-1} e^{-\frac{y}{2}}, \quad y > 0$

(4) $X \sim N(0,1) \Rightarrow f_X(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}, \quad -\infty < x < \infty$

*Best wishes ,,,* **Prof.Dr. Abd EL-Baset . Ahmad**

Faculty of Science
Mathematics Department
Second Term Exam
Cryptography
Code: MC466
Time: 2 hour
July 2020

كلية العلوم
قسم الرياضيات

امتحان الفصل الدراسي الثاني
المستوي: الرابع
المقرر: التشفير
الرمز: ٤٦٦ رك
الزمن: ساعتان
يوليو ٢٠٢٠

## Answer the following questions (80 Marks)

### Question 1: (50 Marks)

**Complete the following statements from the given table.**

***Note*: each answer may be used several times.**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Statistical Tests | 6 | XOR | 11 | Block | 16 | PRG | 21 | Randomized |
| 2 | Uniform random variable | 7 | Semantically secure | 12 | Predictable | 17 | PRF | 22 | OTP |
| 3 | RC4 | 8 | Salsa20/12 | 13 | Encryption | 18 | Vigener | 23 | none |
| 4 | Non-negligible | 9 | Caesar | 14 | Independent | 19 | CSS | 24 | Handshake |
| 5 | Decryption | 10 | Perfect secrecy | 15 | S-box | 20 | Plaintext | 25 | Deterministic |

( ) a..... Cipher has no key.

( ) b.We write $r \xleftarrow{R} U$ to denote a ..... over U.

( ) c..... of two strings in $\{0,1\}^n$ is their bit-wise addition mod 2.

( ) d..... is often randomized.

( ) e.A cipher has ..... if $Pr[E(k,m_0) = c] = Pr[E(k,m_1) = c]$.

( ) f. E is ..... if for all efficient A $Adv_{SS}[A,E]$ is negligible .

( ) g. A PRP is a ..... where X = Y and is efficiently invertible.

( ) h..... must be unpredictable .

( ) i. ..... Ciphers built by Iteration

( ) j. .....⇒ key-len > msg-len.

( ) k.....: function $\{0,1\}^6 \longrightarrow \{0,1\}^4$ , implemented as look-up table.

( ) l. An algorithm A is ..... if A(x) outputs "0" or "1".

( ) m. ..... is an algorithm that transform ciphertext to plaintext.

( ) n..... used in DVD encryption.

( ) o. OTP used ..... function

( ) p. $f: K \times \{0,1\}^n \longrightarrow \{0,1\}^n$ a secure .....

⇒ 3-round Feistel $F: K^3 \times \{0,1\}^{2n} \longrightarrow \{0,1\}^{2n}$ a secure PRP

( ) q..... used in HTTPS and WEP.

( ) r..... becomes "more secure" as $\lambda$ increases.

( ) s. Stream ciphers are .....

( ) t. ..... is always deterministic.

( ) u. ..... Protocol establish shared secret key using public-key cryptography

( ) v. In ..... algorithm, output is a random variable.

( ) w. ..... has perfect secrecy.

( ) x.an unpredictable ..... is secure

( ) y.Shannon`s idea: CT should reveal no "info" about .....

## Question 2: (20 Marks)

**Put (√) or (X) for each of the following statements:**

( ) 1. E is semantically secure if for all efficient A AdvSS [A,E] is negligible.

( ) 2. 3DES is stream cipher.

( ) 3. A PRF is secure if a random function in Funs[X,Y] is distinguishable from a random function in SF

( ) 4. E is often randomized.

( ) 5. Events A and B are dependent if Pr[ A and B ] = Pr[A] · Pr[B]

( ) 6. We write $r \xleftarrow{R} U$ to denote a uniform random variable over U.

( ) 7. Inversion is basically the same circuit, with f1, …, fd applied in the same order.

( ) 8. (E,D) has perfect secrecy if $\forall m_0, m_1 \in M$ ( $|m_0|$ $|m_1|$ )

( ) 9. Perfect secrecy means that $|\mathcal{K}| < |\mathcal{M}|$

( ) 10. Stream cipher key can be used more than once.

( ) 11. Record Layer transmit data using shared secret key Ensure confidentiality and integrity

( ) 12. Single use key need more machinery than for one-time key

( ) 13. Cryptography is not the solution to all security problems.

( ) 14. For events $A_1$ and $A_2$ $Pr[A_1 \cup A_2] < Pr[A_1] + Pr[A_2]$

( ) 15. $E$ is often randomized.

( ) 16. stream cipher have perfect secrecy since the key is shorter than the message

( ) 17. In theory ε is a scalar and In practice ε is a function

( ) 18. In OTP, modifications to ciphertext are undetected and have predictable impact on plaintext

( ) 19. In eStream, the pair (k,r) is used more than once.

( ) 20. Statistical test on $\{0,1\}^n$: an alg. A s.t. A(x) outputs "0" or "1"

## Question 3 (Oral): (10 Marks)

**Chosse the correct answer and write its letter in the answer table:**

1. Functionally, any PRP is also a .....

a) OTP b) PRF c) PRG d) CRC

2. a PRF is secure if a random function in Funs[X,Y] is ..... from a random function in SF

a) not b) distinguishable c)indistinguishable d) b&c

3. In Block Ciphers, R(k,m) is called a/an ..... function

a) round b) random c) Unicode d) iteration

4. ECB is not semantically secure for messages that contain more than ..... block

a) one b) two c) three d) four

5. Encryption algorithm is ..... known.

a) not b) partly c) incompletely d) publicly

**Answer Table**

| Question | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Answer | | | | | |

== Best Wishes ==

*Dr Dalia Nashat*

| | | |
|---|---|---|
| Department of Mathematics,<br>Faculty of Science,<br>University of Assiut . | | كلية العلوم<br>قسم الرياضيات |

| | | |
|---|---|---|
| اسم المادة : تحليل عددي (2) 424 ر | امتحان المستوي الرابع | العام الدراسي 2020/2019 م |
| الدرجة : 90 درجة + 10 درجات أعمال سنة | زمن الإمتحان : 3 ساعات | تاريخ الإمتحان : 2020/7/27 م |

| Question No. | I | II | III | IV | V | Total |
|---|---|---|---|---|---|---|
| Mark | | | | | | |

## أجب عن الأسئلة التاليه:

**(I) Choose the correct answer : (10 Marks)**

(1) To solve the ordinary differential equation $5\frac{dy}{dx} + y^2 = \cos x,\ 0 \le x \le 1,\ y(0) = 5,$ by Euler's method, you need to rewrite the equation as

(a) $\frac{dy}{dx} = \frac{1}{5}(\cos x - y^2),\ y(0) = 5,$ (b) $\frac{dy}{dx} = \cos x - y^2,\ y(0) = 5,$

(c) $\frac{dy}{dx} = \frac{1}{5}(\cos x - y^3),\ y(0) = 5,$ (d) $\frac{dy}{dx} = \cos x + y^2,\ y(0) = 5.$

(2) To solve the ordinary differential equation $e^x\frac{dy}{dx} + y^3 = x,\ 0 \le x \le 1,\ y(0) = 1$ by Taylor's method, you need to rewrite the equation as

(a) $\frac{dy}{dx} = (x - y^2)\,e^x,\ y(0) = 1,$ (b) $\frac{dy}{dx} = (x - y^3)\,e^{-x},\ y(0) = 1,$

(c) $\frac{dy}{dx} = x - y^3,\ y(0) = 1,$ (d) $\frac{dy}{dx} = x + y^2,\ y(0) = 1.$

(3) To solve the ordinary differential equation $x\frac{dy}{dx} - 2y = x^3,\ 1 \le x \le 2,\ y(1) = 0,$ by Runge- Kutta of second order method, you need to rewrite the equation as

(a) $\frac{dy}{dx} = \frac{2y}{x} + x^2,\ y(1) = 0,$ (b) $\frac{dy}{dx} = 2y + x^2,\ y(1) = 0,$

(c) $\frac{dy}{dx} = x + y^3,\ y(1) = 0,$ (d) $\frac{dy}{dx} = x + y^2,\ y(1) = 0.$

(4) To solve the ordinary differential equation $x\frac{dy}{dx} - 2y = \cos x,\ 1 \le x \le 2,\ y(1) = 0,$ by Runge- Kutta of second order method, you need to rewrite the equation as

(a) $\frac{dy}{dx} = \frac{2y}{x} + \frac{\cos x}{x},\ y(1) = 0,$ (b) $\frac{dy}{dx} = 2y + x^2,\ y(1) = 0,$

(c) $\frac{dy}{dx} = x + y^3,\ y(1) = 0,$ (d) $\frac{dy}{dx} = \frac{y}{x} + \frac{\cos x}{x},\ y(1) = 0.$

(5) To solve the ordinary differential equation $x\frac{dy}{dx} - y = x,\ 1 \le x \le 2,\ y(1) = 2$ By Runge- Kutta of fourth order, you need to rewrite the equation as

(a) $\frac{dy}{dx} = \frac{y}{x} + 1,\ y(1) = 2,$ (b) $\frac{dy}{dx} = \frac{y}{x} + \sin x,\ y(1) = 2,$

(c) $\frac{dy}{dx} = x - y^3,\ y(1) = 2,$ (d) $\frac{dy}{dx} = 1 + \frac{y}{x},\ y(1) = 2.$

(6) To solve the ordinary differential equation $\frac{dy}{dx} + y^2 = \sin x,\ 0 \le x \le 1,\ y(0) = 5,$ by Euler's method, you need to rewrite the equation as

(a) $\frac{dy}{dx} = \frac{1}{5}(\cos x - y^2),\ y(0) = 5,$ (b) $\frac{dy}{dx} = \sin x - y^2,\ y(0) = 5,$

(c) $\frac{dy}{dx} = \frac{1}{5}(\cos x - y^3)$, $y(0) = 5$, (d) $\frac{dy}{dx} = \cos x + y^2$, $y(0) = 5$.

(7) To solve the ordinary differential equation $e^{2x}\frac{dy}{dx} + y^3 = x$, $0 \leq x \leq 1$, $y(0) = 1$ by Taylor's method, you need to rewrite the equation as

(a) $\frac{dy}{dx} = (x - y^2)\, e^x$, $y(0) = 1$, (b) $\frac{dy}{dx} = (x - y^3)\, e^{-2x}$, $y(0) = 1$,

(c) $\frac{dy}{dx} = x - y^3$, $y(0) = 1$, (d) $\frac{dy}{dx} = x + y^2$, $y(0) = 1$.

(8) To solve the ordinary differential equation $2x\frac{dy}{dx} - 2y = x^3$, $1 \leq x \leq 2$, $y(1) = 0$, by Runge- Kutta of second order method, you need to rewrite the equation as

(a) $\frac{dy}{dx} = \frac{y}{x} + \frac{1}{2}x^2$, $y(1) = 0$, (b) $\frac{dy}{dx} = 2y + x^2$, $y(1) = 0$,

(c) $\frac{dy}{dx} = x + y^3$, $y(1) = 0$, (d) $\frac{dy}{dx} = x + y^2$, $y(1) = 0$.

(9) To solve the ordinary differential equation $2x\frac{dy}{dx} - 2y = \cos x$, $1 \leq x \leq 2$, $y(1) = 0$, by Runge- Kutta of second order method, you need to rewrite the equation as

(a) $\frac{dy}{dx} = \frac{y}{x} + \frac{\cos x}{2x}$, $y(1) = 0$, (b) $\frac{dy}{dx} = 2y + x^2$, $y(1) = 0$,

(c) $\frac{dy}{dx} = x + y^3$, $y(1) = 0$, (d) $\frac{dy}{dx} = \frac{y}{x} + \frac{\cos x}{x}$, $y(1) = 0$.

(10) To solve the ordinary differential equation $x\frac{dy}{dx} - y = x^3$, $1 \leq x \leq 2$, $y(1) = 2$ By Runge- Kutta of fourth order, you need to rewrite the equation as

(a) $\frac{dy}{dx} = \frac{y}{x} + x^2$, $y(1) = 2$, (b) $\frac{dy}{dx} = \frac{y}{x} + \sin x$, $y(1) = 2$,

(c) $\frac{dy}{dx} = x - y^3$, $y(1) = 2$, (d) $\frac{dy}{dx} = 1 + \frac{y}{x}$, $y(1) = 2$.

**(II) Choose the correct answer : (20 Marks)**

(1) Given $\frac{dy}{dx} = y - x$, $y(0) = 2$, and using $h = 0.1$, the value of $y(0.1)$ using Euler's method is most nearly

(a) 2.2000, (b) 2.6255, (c) 2.2234, (d) 1.0222.

(2) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 1 + x + e^x$ is most nearly

(a) 0.0052, (b) 0.0255, (c) 0.0234, (d) 0.0222.

(3) Given $\frac{dy}{dx} = y + 1$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Euler's method is most nearly

(a) 1.1107, (b) 1.2000, (c) 1.2200, (d) 1.0222.

(4) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 2e^x - 1$ is most nearly

(a) 0.0103, (b) 0.0055, (c) 1.0004, (d) 0.0222.

(5) Given $\frac{dy}{dx} = y + x$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Euler's method is most nearly

(a) 0.8367, (b) 1.1000, (c) 1.0034, (d) 1.0222.

(6) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 2e^x - x - 1$ is most nearl

(a) 0.0103, (b) 0.0100, (c) 1.0000, (d) 0.0222.

(7) Given $\frac{dy}{dx} = y + x^2$ , $y(0) = 1$ , and using $h = 0.1$ , the value of $y(0.1)$ using Euler's method is most nearly
(a) 1.1000 , (b) 1.2000 , (c) 1.2204 , (d) 1.0200 .

(8) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 3\,e^x - x^2 - 2x - 2$ is most nearly
(a) 0.0055 , (b) 0.0025 , (c) 0.0234 , (d) 1.0002 .

(9) Given $\frac{dy}{dx} = y + x^3$ , $y(0) = 1$ , and using $h = 0.1$ , the value of $y(0.1)$ using Euler's method is most nearly
(a) 1.0307 , (b) 1.1000 , (c) 1.2200 , (d) 1.0222 .

(10) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 7e^x - x^3 - 3x^2 - 6x - 6$ is most nearly
(a) 0.0367 , (b) 0.0052, (c) 0.2234 , (d) 0.0222 .

**(III) Choose the correct answer : (20 Marks)**

(1) Given $\frac{dy}{dx} = y - x$ , $y(0) = 2$ , and using $h = 0.1$ , the value of $y(0.1)$ using Taylor's method of order 2 is most nearly
(a) 2.2000, (b) 2.2050 , (c) 1.2234 , (d) 1.0032 .

(2) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 1 + x + e^x$ is most nearly
(a) 0.0052 , (b) 0.0002 , (c) 0.0088 , (d) 0.0222 .

(3) Given $\frac{dy}{dx} = y + 1$ , $y(0) = 1$ , and using $h = 0.1$ , the value of $y(0.1)$ using Taylor's method of order 2 is most nearly
(a) 1.2100 , (b) 1.2000 , (c) 1.2200 , (d) 1.0233 .

(4) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 2\,e^x - 1$ is most nearly
(a) 0.0003, (b) 0.0001 , (c) 0.0034 , (d) 0.0002 .

(5) Given $\frac{dy}{dx} = y + x$ , $y(0) = 1$ , and using $h = 0.1$ , the value of $y(0.1)$ using Taylor's method of order 2 is most nearly
(a) 1.2200 , (b) 1.1100 , (c) 1.1050 , (d) 1.0222 .

(6) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 2e^x - x - 1$ is most nearl
(a) 0.0003 , (b) 0.0100, (c) 0.0005 , (d) 0.0202 .

(7) Given $\frac{dy}{dx} = y + x^2$ , $y(0) = 1$ , and using $h = 0.1$ , the value of $y(0.1)$ using Taylor's method of order 2 is most nearly
(a) 1.1050 , (b) 1.0255 , (c) 1.2234 , (d) 1.0200 .

(8) In the above question, the actual error between the approximate s1olution at $x = 0.1$ with the exact solution $y(x) = 3\,e^x - x^2 - 2x - 2$ is most nearly
(a) 0.0005 , (b) 0.0055 , (c) 0.0034 , (d) 0.0022 .

(9) Given $\frac{dy}{dx} = y + x^3$ , $y(0) = 1$ , and using $h = 0.1$ , the value of $y(0.1)$ using Taylor's method of order 2 is most nearly
(a) 1.0307 , (b) 1.1050 , (c) 1.2200 , (d) .0222 .

(10) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 7e^x - x^3 - 3x^2 - 6x - 6$ is most nearly
(a) 0.0067, (b) 0.0002, (c) 0.0004, (d) 0.0033.

**(IV) Choose the correct answer : (20 Marks)**

(1) Given $\frac{dy}{dx} = y^2$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 2 is most nearly
(a) 0.0367, (b) 1.1000, (c) 1.1105, (d) 1.1100.

(2) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = \frac{1}{1-x}$, is most nearly
(a) 0.0111, (b) 0.6255, (c) 0.0006, (d) 0.0011.

(3) Given $\frac{dy}{dx} = 1 + x$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 2 is most nearly
(a) 1.1050, (b) 0.0255, (c) 1.0004, (d) 1.0222.

(4) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = \frac{1}{2}(x^2 + 2x + 2)$, is most nearly
(a) 0.0000, (b) 0.0050, (c) 0.0034, (d) 0.0222.

(5) Given $\frac{dy}{dx} = -2y$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 2 is most nearly
(a) 0.8000, (b) 0.8200, (c) 1.2234, (d) 1.2000.

(6) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = e^{-2x}$, is most nearly
(a) 0.0067, (b) 0.0013, (c) 0.0034, (d) 0.0222.

(7) Given $\frac{dy}{dx} = e^{-x} + y$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 2 is most nearly
(a) 0.8367, (b) 1.2000, (c) 1.2052, (d) 1.0220.

(8) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = \frac{3}{2}e^x - \frac{1}{2}e^{-x}$, is most nearly
(a) 0.0007, (b) 0.0053, (c) 0.0001, (d) 0.0002.

(9) Given $\frac{dy}{dx} = x^3 + x^2$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 2 is most nearly
(a) 1.0006, (b) 0.6255, (c) 1.2234, (d) 1.0033.

(10) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = \frac{1}{12}(3x^4 + 4x^3) + 1$, is most nearly
(a) 0.0002, (b) 0.0040, (c) 0.0034, (d) 0.0044.

**(V) Choose the correct answer : (20 Marks)**

(1) Given $\frac{dy}{dx} = y - x$, $y(0) = 2$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 4 is most nearly

(a) 2.2100, (b) 2.2052, (c) 2.2234, (d) 2.0202.

(2) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 1 + x + e^x$ is most nearly
(a) 0.0052, (b) 0.00003, (c) 0.0005, (d) 0.0054.

(3) Given $\frac{dy}{dx} = y + 1$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 4 is most nearly
(a) 1.2100, (b) 1.2000, (c) 1.2103, (d) 1.0352.

(4) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 2e^x - 1$ is most nearly
(a) 0.0203, (b) 0.0255, (c) 0.00004, (d) 0.0021.

(5) Given $\frac{dy}{dx} = y + x$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 4 is most nearly
(a) 1.8367, (b) 1.1103, (c) 1.1050, (d) 1.0220.

(6) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 2e^x - x - 1$ is most nearly
(a) 0.0303, (b) 0.00004, (c) 0.0005, (d) 0.0202.

(7) Given $\frac{dy}{dx} = y + x^2$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 4 is most nearly
(a) 1.1055, (b) 0.6255, (c) 1.2234, (d) 1.0200.

(8) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 3e^x - x^2 - 2x - 2$ is most nearly
(a) 0.00001, (b) 0.0006, (c) 0.0002, (d) 0.0022.

(9) Given $\frac{dy}{dx} = y + x^3$, $y(0) = 1$, and using $h = 0.1$, the value of $y(0.1)$ using Runge - Kutta method of order 4 is most nearly
(a) 1.8307, (b) 1.1051, (c) 1.2200, (d) 1.1052.

(10) In the above question, the actual error between the approximate solution at $x = 0.1$ with the exact solution $y(x) = 7e^x - x^3 - 3x^2 - 6x - 6$ is most nearly
(a) 0.0003, (b) 0.0001, (c) 0.0023, (d) 0.00001.

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إنتهت الأسئلة : بالتوفيق والنجاح
ا. د. عبدالحي عزوز سلامة

كلية العلوم قسم الرياضيات

امتحان نمذجة رياضية (434ر) للفصل الثاني 19- 2020

للفرقة الرابعة علوم شعبة الرياضيات الزمن :3 ساعات

الاربعاء 22-7-2020 من 10ص:1 ظهرا

السؤال الأول :ضع علامة √أمام العبارة التي تراها صحيحة و علامة Xأمام العبارة التي تراها خطأ.(45 درجة)

1-الوظيفة الرئيسية في النموذج الرياضي تقطن في أن النموذج يمكن أن يحسن فهمنا العام عن سلوك العملية( ).

2-لكنه لا يحسن العلاقة بين البارامترات الداخلة فيها( ).

3-أيضاالنموذج يمكن أن يعرفنا نطاق المتغيرات الداخلة في العملية( ).

4-لكنه لا يمكن أن يساعد في حساب وتحديد منشأ الخطأ( ).

5-احدي المجموعات الاساسية للنماذج الرياضية تعتمد علي ادخال بيانات( ).

6- لكنه ليس من الضروري ان يكون هناك مخرجات( ).

7-من سلبيات النمذجة والمحاكاة أن تصميم النماذج يعتبرفنا يتطلب معرفة وتجربة وتدريبا أساسيا ( ).

8-من سلبيات النمذجة والمحاكاة أن تطبق العمليات علي النظام باستخدام أرقام عشوائية يصعب معها توقع النتائج ( ).

9-لا تتطلب المحاكاة يدا عاملة وعمليات تستغرق وقتا محددا( ).

10-من الصعب ترجمة نتائج المحاكاة دون الاستعانة بذوي الخبرة( ).

11-طريقة أدوميان تساعدنا في ايجاد حلول تقريبيه فقط( ).

12- طريقة أدوميان تساعدنا في ايجاد حلول مضبوطة فقط( ).

13-طريقة الهوموتوبي تساعدنا في ايجاد حلول تقريبيه فقط( ).

14- طريقة الهوموتوبي تساعدنا في ايجاد حلول مضبوطة فقط( ).

15-طريقة أدوميان تعتمد علي المؤثرات التفاضلية فقط( ).

16- طريقة الهوموتوبي تعتمد علي المؤثرات التكاملية فقط( ).

17-نجاح طريقة أدوميان يكمن في كيفية التعبير عن الحدود الغير خطية باستخدام متسلسلات أدوميان( ).

18- طريقة الهوموتوبي للحصول علي حل لبعض المعادلات قد تفشل احيانا( ).

19-هناك مسائل أمثلية مقيدة ومسائل أمثلية غير مقيدة( ).

20-اذا تعقد النموذج الرياضي فاننا نلجأ الي النموذج الفيزيائي( ).

21- لا يستحب استخدام الآلة الحاسبة في اختبارات الحسابات التقريبية( ).

22- يمكن استخدام ورق بياني خطي لوغاريتمي لرسم المنحنيات ( ).

23-لا توجد الا طريقة واحدة لتقريب الكسور العشرية( ).

24- من الضروري استخدام التحليل البعدي عند انشاء نموذج رياضي جديد( ).

25-قد تطلق كلمة نموذج علي سيارة أو طيارة أو براد شاي( ) .

26-يمكن القول بأن النمذجة هي انشاء نموذج يحاكي النظام مع كافة خصائصة ( )

27-اما المحاكاة فهي دراسة اداء النظام باستخدام النموذج( )

28- تتيح النمذجة والمحاكاة فهم واستيعاب طريقة العمل الحقيقية للنظام دون الحاجة لاستخدام انظمة حقيقية ( )

29-وهذا ما يسمي سهولة الفهم ( )

30- يمكن من خلال النمذجة والمحاكاة باجراء تغييرات علي النظام وملاحظة تاثيرها علي النظام دون الحاجة لاستخدام انظمة حقيقية( )

31-وهذا ما يسمي سهولة سهولة الاختبار والتجريب ( )

32- يمكن من خلال النمذجة والمحاكاة تحديد متطلبات النظام من خلال تطبيق تصورات وافتراضات مختلفة وتجربتها( )

33- وهذا ما يسمي سهولة التحديث ( )

34-لكن من خلال النمذجة والمحاكاة اصبح بالامكان استيعاب كافة التفاعلات وتحليل تاثيراتها اضافة الي امكانية اكتشاف طرق وعمليات تشغيل واجراءات جديدة دون ان يتغير النظام الحقيقي( )

35- وهذا ما يسمي سهولة معرفة العوائق ( )

36- من أهداف موضوع النمذجة الرياضية هو استخدام ما تعلمناه في فهم مسائل جديدة( )

37- وتعلم مهارات قديمة ( )

38- والعمل علي حل مسائل قديمة ( )

39-واكتساب حسن التصرف في اي موقف في حياتنا العملية( )

40-وكيفية اختيار أنسب الطرق للتعامل مع نوعية المشكلة( ) .

41-النمذجة العلية(نسبة الي سيدنا علي ) تحل لنا بعض المعضلات الحسابية( )

42-النمذجة السنغافورية لا تساعد في مسائل التقسيم وتوزيع الأنصبة ( )

43- لا يجب ان يحتوي موضوع النمذجة علي تحليل عددى ( )

44-ولا معادلات تفاضلية ( )

45-ولكن يجب أن يحتوي علي معادلات تكاملية ( )

السؤال الثاني :اعد كتابة العبارة بعد اختيار الكلمة المناسبة(45 درجة)

1-من المعلوم أن المحاكاة تتطلب تكلفة مادية---( منخفضة-عاليه- لا تتطلب)

2-على وجه العموم فان الصياغة الرياضية هي ---(أصعب أسهل-أعقد) أطوار إنشاء النموذج خاصة إذا كانت مرحلة الإعداد قد انتهت بنجاح.

3-المقصود بالنمذجة الرياضية هو إجراء عملية.....( حسابية- تقييم-جبرية)

4- النموذج الرياضي يمثل عملية.... (فيزيائية-حسابية-منطقية) أو جزء من عملية بمدلول فئة من المعادلات الجبرية أو التفاضلية.

5- طريقة الهوموتوبي تعتمد علي كتابة المعادلة الهوموتوبية بحيث تحقق ----(شرطين هامين-ثلاثة شروط هامة- الشروط الحدية)

6-تعتمد مسائل الأمثلية علي -----(ايجاد النقاط الحرجة-المشتقة الأولي-المشتقة الأولي والثانية)

7- فى دالة المتغير الواحد لكي نوجد النقاط الحرجة --- (ليس من الضروري - من الضروري - ليس دائما)أن تكون المشتقة الأولي مساوية للصفر.

8-بدراسة الامثلية ------- (لا يمكننا معرفة نقطة السرج -يمكننا معرفة نقطة السرج- ليس دائما ).

9-يجب أن نراعى فى النموذج الميكانيكي أن يكون مطابقاً للقوانين الأساسية للبقاء وهذا ما يعرب بمبدأ (الاتزان -التعادل-القصور) فى الصياغة الرياضية .

10- الرياضيات السنغافورية تستخدم النمذجة المبنية علي ----( التقسيم-الشرائح- الرسم الهندسي ).

11-يمكن حل المعادلات التفاضلية الشاذة باستخدام متسلسلات لانهائية وهذه الطريقة تعرف بطريقة-----(فوربينس- فورير-لاجرانج).

12-وقد ----(تنجح-لا تنجح-تساعد) الطريقة الهوموتوبية في حل معادلات تفاضلية شاذة ايضا .

13-بالرغم من استخدام الطريقة الهوموتوبية في كثير من المسائل الا أن صحة هذه الطريقة ------(لم تبرهن بعد-من السهل برهنتها- من البديهيات).

14-يمكن استخدام طريقة أدوميان لايجاد أحد جذور معادلة جبرية ولكن ----(بقيمة تقريبية-وبقيمة مضبوطة- الجذور التربيعية فقط).

15-قد نستخدم موضوع بحوث العمليات في ايجاد نموذج ----(رياضي- فيزيائي- احصائي) في حل مسألة اقتصادية.

16- وقد نوجد حلا لهذا النموذج يكون ---(بيانيا- هندسيا- احصائيا).

17-----(يمكن-لايمكن-من المستحيل)استخدام الطريقة الهوموتوبية في حل مجموعة من المعادلات في أن واحد.

18-قد نستخدم ------(الطريقة الهوموتوبية-نيوتن رافسون-طرقا احصائية) مع طريقة أخري مساعدة لحل معادلة تفاضلية أو تكاملية.

19- النموذج الرياضي $y=1|2\ gt^2$ يصف العلاقة بين المسافة والزمن لجسم ساقط مبتدأ من----( السكون - أعلي- قمة برج).

20-موضوع تطوير النماذج الفيزيائية يخدم ----(التكنولوجيا- الاقتصاد- البورصة).

21-المحاكاة هي عملية ----(تقليد-تشييد- رسم) لآداة حقيقية.

22- بصفة عامة تعني الأمثلية ----(الافضلية-المساواة-العدل) أو الحسن .

23-ولكن في البرمجة فان الأمثلية تعني تصغير حجم الشفرة البرمجية بطرق مختلفة مما يساعد في جعل الكود ---(أسرع -أطول -أقصر) .

24- الشد السطحي لفقاعة الصابون يساوي ----(ضعف- نصف-ثلث) الشد السطحي للقطرة العادية.

25- وذلك لأن فقاعة الصابون يكون لها ----(سطحان- سطح دائري-سطح أكثف).

26-المراحل الأساسية لعملية النمذجة الرياضيةهي ....(ثلاث- أربع-خمس) مراحل

27-أولها مرحلة.....(الاعداد-البدء-التجميع)

28-وثانيها مرحلة.....(العلاقة-الصياغة-الرسم)

29- وثالثها مرحلة.....(البناء-الحل-المحاكاة)

30- وآخرهامرحلة.....(الاختبار-التطبيق-البناء).

31- تقسم النماذج الرياضية الي ....(ثلاث- أربع-خمس) مجموعات أساسية منها المجموعةالمبنيه علي عمليتي..... (جمع وطرح-ادخال واخراج-عزل وتسخين)

32-ومنهاالمجموعةالمبنية علي .....( تجربة أو نظرية-دفع أو طرد ).

33- من دراستنا لموضوع النمذجة فان منشأ الخطأ يمكن ان يكون من.....(خيانة الذاكرة-الجمع والطرح-الضرب والقسمة)

34-أومن.....( التقريب-الرسم-الحساب)

35-أومن.....( القطع العشري-خطأ الدالة-المنشأ)

36-أو من .....(التراكمات-الاحصاء-الأسس).

37-مثلا خارج قسمة واحد علي ثلاثة ينشأ خطأ .....(تراكميا-قطع عشري-تقريبي)

38-ومفكوك الدالة الأسية قد ينشأ خطأ.....(تراكميا-قطع عشري-تقريبي)

39- ايجاد الانحراف المعياري قد ينشأ خطأ.....(تراكميا-قطع عشري-تقريبي)

40-طريقة أدوميان تساعدنا في حل معادلات.....تفاضلية (خطية-أسية آنية)

41-أو.....(خطية-غيرخطية-تفاضلية)

42-أو.....(تكاملية-متباينات-تبادلية).

43-طريقة الهوموتوبي أيضا تساعدنا في حل معادلات.....(تفاضلية-أسيه-مركبة)

44-أو.....(تكاملية-متسلسلات-دوال)

45-أو.....(نظام-زوج-متوالية) من المعادلات.

السؤال الثالث:أكمل خطوات عملية النمذجة الرياضية لمسألة ما من خلال الاختيار المناسب:10 درجات)

صياغة مسألة .....(هندسية - حسابية- كهربية) أو مسألة ..... (ميكانيكية-وصفية-بيانية) تبدأ ب .....(تصميم تجربة- بالمحاكاة-بجمع النتائج ) يلي ذلك رسم أو وضع هذه.....(النتائج-الفروض-القيم)ومن ثم يمكن استخدام هذا الرسم في تخليق علاقة بين .....(المتغيرات-القيم-القواعد ) وفي هذه الحالة يمكن استخدام النموذج لإيجاد العلاقة بين (متغيرات أخرى -نماذج سابقة - تجارب أخري ) أو في معرفة ..... (التوقعات الناجمة -العلاقات-الطرق المستخدمة) عن استخدام هذا النموذج يلي ذلك .....(اختبار- تحليل -تصحيح ) صحة هذا النموذج بعمل قياسات أكثر وعمل تطبيقات إحصائيةفان كانت هذه التوقعات .....(صحيحة -سليمة-مرضية)فان هذا يعني أن هذا هو .....(النموذج الرياضي - الرسم البياني-العلاقة الخطية ) السليم وان كان غير ذلك فان النموذج يكون .....( تقريبيا -خاطئا-تجريبيا) ويلزمنا اختبار النموذج الرياضي المبدئي من جديد لنشيد تجربة أخري .

==========

اعداد: ا د محمود حامد عبيد الله

*with my best wishes*

Faculty of Engineering
Assiut University
2nd Semester – Final Exam
2019/2020 – June, 2019
Time: 2 Hours
Marks: 100

Industrial chemistry Program
Course: Industrial Pollution Control and Industrial safety
code: Chem 400
3 rd level, – bylaw:

| Important remarks | This exam measures<br>• A.7, b4, c1,, d3, d12<br>No. of papers : 5 - No. of questions: 100 | الإجابة فى ورقة الأسئلة |
|---|---|---|

**Answer the following questions:**

| A) Mark (Yes) or( NO) | | (50 marks) |
|---|---|---|
| 1 | Visual pollution is not environmental parameter | |
| 2 | The existence of substances into the normal air in quantities less than the permissible called air pollution | |
| 3 | Mists are considered as particulate pollution | |
| 4 | Smoke is considered as gases | |
| 5 | parts per million (ppm) are used to measure the concentration of particulate pollutants in the air | |
| 6 | Particles smaller than 10 μm are called total dust | |
| 7 | Dust concentration is measured by $mg/m^2$ | |
| 8 | Exposure time is not affect the health risk of dust breathing | |
| 9 | CO cannot affect the human health | |
| 10 | High volume dust sampler is used when dust concentration is high | |
| 11 | Cascade impactor is used to measure dust concentration | |
| 12 | The unit to measure dustfall is $g/m^3$*30 days | |
| 13 | Stacks are called movable –source of air pollution | |
| 14 | The efficiency of a cyclone dust control depends upon the cyclone diameter | |
| 15 | smaller cyclone diameter, lower is the efficiency, | |
| 16 | Cyclone dust collectors connected in series are more efficiency than those connected in parallel | |
| 17 | Electrostatic precipitators use gravity force to remove the particles from air stream | |
| 18 | Higher particle dust resistivity leads to a decrease in removal efficiency. | |
| 19 | Scrubbers are used to control gases and particulate pollutants | |
| 20 | Fumes are considered as gaseous pollutants | |
| 21 | Particles as small as one-tenth of a micrometer can be removed by cyclones | |
| 22 | Gravitational settling chamber needs A source of high voltage | |

| | | |
|---|---|---|
| 23 | Single stage or two stage is considered as a type of bagfilter | |
| 24 | Plate type precipitators are horizontal or vertical, depending on the direction of the gas flow | |
| 25 | The Electrostatic precipitator is made of a rectangular or cylindrical casing | |
| 26 | Continues dust measurements cannot be done for stacks | |
| 27 | Low pressure drop is one of the disadvantages of gravitational settling chamber | |
| 28 | Settling chambers are mostly used as pre-cleaners for dust control devices. | |
| 29 | The usual velocity ($V_h$) through the settling chamber is high | |
| 30 | Cyclones use gravitational forces for removing the fine particles | |
| 31 | The efficiency of a cyclone can be decreased by the use of cyclones in parallel | |
| 32 | A battery of smaller cyclones can treat a large gas flow | |
| 33 | Parallel cyclones capturing smaller particles | |
| 34 | Low pressure drop one of the disadvantages of cyclone dust collector | |
| 35 | low collection efficiency for particles below 5 μ in diameter, | |
| 36 | A decrease in cyclone efficiency at low particulate concentration | |
| 37 | Erosion is not considered one of the operating problems of cyclone | |
| 38 | ESP is the device uses inertial impaction to remove particles from the air | |
| 39 | The cyclone collection efficiency is not affected by with particle size variation | |
| 40 | $d_{50}$ is the particle size for which the collection efficiency is 50 % in the cyclone | |
| 41 | The safety grounding system is extremely important when using scrubber dust collector | |
| 42 | Plate type precipitators are horizontal or vertical | |
| 43 | Dry precipitator is used when particulate matter is removed from the collecting electrodes, by rapping only | |
| 44 | It is found that the cyclone dust collector is more efficiency than ESP | |
| 45 | Particulates can remain suspended in air for a long time based on their size and density. | |
| 46 | Smog is considered gaseous pollutant | |
| 47 | Part per millions are used to measure the concentration of particle pollutants in the air. | |
| 48 | Inertial separators are referred to bag filters | |
| 49 | Solid particles of large size and high speed can cause damage to the material by abrasion. | |
| 50 | Collection efficiency of ESP is decreased by decreeing the area of plate | |

| B) Choose the correct answer (Write the letter of correct answer) (50 marks) اكتب الحرف المقابل للإجابة الصحيحة | | |
|---|---|---|
| | | الحرف |
| 51 | Which one of the followings is considered to be one of the factors affecting the human health<br>a. Particle color b. Particle diameter c. Not In the above | |
| 52 | TLV-TWA is the maximum exposure limit to pollution for a period up to<br>a. 8-Hrs b. 2 Hrs c. 4 Hrs. d. Not In the above | |
| 53 | Particle concentration are measured in<br>a. $mg/m^2$ b. $\mu g/m^4$ c. $count/cm^3$ d. All the above | |
| 54 | Respirable particles are those:<br>a. Smaller than 5 µm b. Greater than 10 µm c. All the previous | |
| 55 | Particle re-entrainment is a problem facing the<br>a. Cyclones b. Bag filters c. Wet scrubbing systems d. Not in the previous | |
| 56 | In Anisokinetic sampling from stacks:<br>a. $U=U_o$ b. $U\#U_o$ c. $U\geq 25V_s$ d. The velocity is not considered | |
| 57 | The 10-mm cyclone in personal sampler is used to collect<br>a. Respirable dust b. Coarse dust c. Total dust d. All the previous | |
| 58 | Exposure limit of pollutants for 15 minutes is considered as:<br>a. TLV-TWA b. TLV-STEL c. TLV-C | |
| 59 | The device that used to measure the dust concentration with the size distribution is<br>a. Laser dust monitor b. Dusttrak c. Personal sampler d. Not in the above | |
| 60 | The factor that is not affecting the development of lung diseases is<br>a. composition, b. size c. concentration d. Color | |
| 61 | Sampling instruments can be classified according to the<br>a. measured Parameter and design. b. size and shape c. All the previous | |
| 62 | The unit of measurement in Laser dust monitor is the :<br>a.Count Per Minute b.$\mu g/m^3$ c. Both the previous | |
| 63 | $\mu g/m^2$ is a unit to measure pollution concentration in<br>a .air b. gases c. sound d. Not in the previous | |
| 64 | Particles are collected by a combination of several mechanisms such as<br>a. absorption , b. Condensation c. centrifugal impaction, d. Not in the previous | |
| 65 | The efficiency of a cyclone dust collector depends upon the:<br>a. Cyclone size . b. Particle size c. Particle density d. All the previous | |
| 66 | Dust particles can be considered in:<br>a. Explosive b. color c. Count d. All the previous | |

| | | |
|---|---|---|
| 67 | Particle shape is more dangerous to human health if it is ;<br>a. irregular b. Spherical c. Both the previous | |
| 68 | Classifications of Sampling instruments can be done according :<br>a.The measured parameter b. Their design. c. Both the previous | |
| 69 | The unit of measuring the gravimetric dust concentration is :<br>a. PPm b. count c. Percentage d. Not in the previous | |
| 70 | DUSTTRAK is device to measure Dust concentration by :<br>a. ppm b. CPM b. Weight / $m^3$ b. Not in the previous | |
| 71 | Deposit gauge is a device used to measure<br>a. Dust size b. Dust fall c. Dust shape d. All the previous | |
| 72 | A representative sample from the moving air stream is called :<br>a.Isokinetic sample b.Anisokinetic sample c. Continuous sample | |
| 73 | one's surroundings is defined as:<br>a. environmental science b. environmental pollution<br>c. environmental engineering d. Not in the previous | |
| 74 | Solids and liquid particles in submicron size are called :<br>i. Smog ii. Smoke iii. dust iv. All the previous | |
| 75 | Polluted air can be treated as ideal with respect to :\<br>a.Temperature and pressure. b. Temperature iii. Pressure | |
| 76 | Inertial impaction of particles on the surface of liquid droplets is the dominant control mechanism in :<br>a. Cyclone b. wet scrubbers c. Bagfilter d. All the previous | |
| 77 | Jet venture is a device used :<br>a. Dust measurement b. Only dust Control c, Gas and dust control | |
| 78 | a. Cyclone b. ESP c. Bagfilter d. Not in the previous<br>.....can handle flammable and explosive dusts | |
| 79 | Corrosion problems can be found in<br>a. Cyclone b. wet scrubbers c. d. All the previous | |
| 80 | i. Singeing: ii. Napping: iii. iii. All the previous<br>.....is done by passing the filter material over an open flame | |
| 81 | Operating Problems in bag filter because :<br>a. humidity b. Temperature c. Rupture d. All the previous | |
| 82 | Mechanisms that are used for cleaning the filters in a bag:<br>a. rapping b. Reverse air flow c. vibration, d. All the previous | |
| 83 | The design of fabric filters is based on:<br>a. filtering rates b. air-to-cloth ratio b. all the previous | |
| 84 | If the particulate matter is sticky or wet, the device to be used for control is<br>a. wet scrubber b. cyclone c. all the previous | |

| | | |
|---|---|---|
| 85 | Gas control by passing the gas mixture through a solvent is done by:<br>a.Adsorption b Absorption c. Both the previous | |
| 86 | Bleeding is a problem facing :<br>a. Cyclone b. ESP c. Bagfilter d. Not in the previous | |
| 87 | low filter ratios in case of fabric filter are recommended for:<br>a.high concentration of particulate. b. low concentration of particulate | |
| 88 | Among the factors affecting the selection of the filter medium for bag filters:<br>i.Gas flow rate ii. Particle shape iii. Carrier gas composition iv. All the previous | |
| 89 | Particles less than 1 micron in diameter ca be collected by :<br>a. Cyclone b. ESP c. scrubbers d. Not in the previous | |
| 90 | When using Laser dust monitor, the value of the conversion factor K is calculated as : a. K=C/R b. K=C/R | |
| 91 | Nylon cyclone in the personal sampler is used to separate .....to its bottom:<br>a. respirable dust particles. b. non-respirable dust particles | |
| 92 | The instrument of dust measurements with particle size is:<br>a.Personal sampler b. Dusttrak c.Cascade impactor iv. All the previous | |
| 93 | Error associated with sampling in still air, is due to:<br>a. Particles settling velocity b. Particle inertia. c. All the previous | |
| 94 | Anisokinetic sampling is not due to :<br>a. The probe is aligned with gas flow streamlines.<br>b. The velocity in the probe is different from the stream velocity<br>c. The velocity in the probe is same as the stream velocity | |
| 95 | Threshold Limit Value-Time weighted Average is for time exposure of :<br>a.40-hour workweek b. 15 minutes c. 12-hour workday | |
| 96 | Particle size is a factor affecting the:<br>a. Human health risk b. Selection of dust control devices c. All the previous | |
| 97 | Among these parameters is not environmental pollution<br>a.Gaseous pollution b. Particulate pollution c. Soil pollution<br>d. Not in the previous | |
| 98 | ..... is known as inertial separators<br>a. Cyclone b. ESP c. bagfilter d. Not in the previous | |
| 99 | Humidity is a problem facing :<br>a. Bagfilter b. Cyclone c. All the previous | |
| 100 | Pulse jet is a type of<br>a.Bagfilter c. Cyclone d. scrubber | |

**Prof. Mohamed Abuel-kassem Mohamed** M. Abuel-Kassem

| | | | | |
|---|---|---|---|---|
| | Assiut University<br>Faculty of Science<br>Mathematics Dept. | Final Exam 2019-2020<br>Course: Data Mining<br>Course code: MC464 | Level: Fourth<br>Time: 2 Hours | |

"اسْتَعِـنْ بالله ولا تَعْجَـز"

الامتحان خمس صفحات - الإجابة فى نفس الورقة

**Question 1: Put *True* or *False* for each of the following items (included oral questions No. 29 and 30)**

1. We can compute the basic central tendency measures except the mean value for the Nominal attribute.
2. Results of some medical test is considered a Boolean variable.
3. knowledge discovery process involves data cleaning, data integration, data selection, data transformation, pattern discovery, pattern evaluation, and knowledge presentation.
4. In some experience, we measure the weight of students, this weight variable is considered ration-scale variable.
5. Data mining functionalities are used to specify the kinds of knowledge to be found in data mining tasks.
6. Training set is the data objects for which the class labels are known.
7. Clustering is dividing data objects without consulting class label.
8. Information is an interesting pattern which has meaningful use.
9. Classification is a process of finding the pattern which occur frequently.
10. Semi-supervised learning is a class of machine learning techniques that make use of both labelled and unlabelled examples when learning a model.
11. Data warehousing is an essential process where intelligent methods are applied to extract data patterns.
12. Selection and interpretation is an important topic in data mining functionality.
13. The information is the output of the KDD process.
14. Data discrimination is a summarization of the general characteristics or features of a target class of data.
15. Data classification is the process of finding a model that describes and distinguishes data classes or concepts.
16. KDD stands for knowledge discovery in Database.
17. Unsupervised learning is a task of inferring a model from labeled training data.
18. Bayesian classifier is a class of learning algorithm that tries to find an optimum classification of a set of examples using the probabilistic theory.
19. Binary attribute takes only two values. In general, these values are 0 and 1.
20. Data mining is the stage of selecting the right data for a KDD process.
21. Data mining can also apply to other forms such as data streams and text data.
22. Data cleaning is the process of removing noise and inconsistent data.
23. Data integration is the process of combining multiple data sources in a single database.
24. Pattern evaluation and knowledge representation, these two steps are considered data preprocessing in KDD process.

25. Relational database is a collection of tables which consist of a set of attributes and usually stores a large set of tuples, each tuple represents an object.
26. Frequent sequential pattern occurs when customer tend to purchase first something, followed by purchase another something.
27. Regression tends to predict the class label when these labels represent continuous variables.
28. Statistics studies the collection, analysis, interpretation or explanation, and presentation of data.
29. An ordinal attribute is an attribute with possible values that have a meaningful order or ranking among them.
30. A major problem with the mean as a statistical representing is its sensitivity to extreme/outlier values.

**Question 2: Choose the correct answer (included oral question No. 20):**

1. Celsius temperatures can measure through
   a) Nominal attribute
   b) Ratio-scale attribute
   c) Ordinal attribute
   d) Interval-scale attribute

2. Results of some medical test
   a) Nominal attribute
   b) Ratio-scale attribute
   c) Ordinal attribute
   d) Interval-scale attribute

3. Grades corresponding to marks of students
   a) Nominal attribute
   b) Ratio-scale attribute
   c) Ordinal attribute
   d) Interval-scale attribute

4. Number of sons for each Egyptian family
   a) Nominal attribute
   b) Ratio-scale attribute
   c) Ordinal attribute
   d) Interval-scale attribute

5. we can compute the basic central tendency except the mean value for the …
   a) Nominal attribute
   b) Ratio-scale attribute
   c) Ordinal attribute
   d) Interval-scale attribute

6. The essential process in KDD process is …
   a) Data selection
   b) Data enhancement
   c) Data mining
   d) Pattern evaluation

7. Which of the following is not a data mining functionality?
   a) Characterization and Discrimination
   b) Classification and regression
   c) Selection and interpretation
   d) Clustering and Analysis

8. … is a summarization of the general characteristics or features of a target class of data.
   a) Data Characterization
   b) Data Classification
   c) Data discrimination
   d) Data selection

9. … is a comparison of the general features of the target class data objects against the general features of objects from one or multiple contrasting classes.
   a) Data Characterization
   b) Data Classification
   c) Data discrimination
   d) Data selection

10. KDD process stands for …
   a) Knowledge Database
   b) Knowledge Discovery Database
   c) Knowledge Data House
   d) Knowledge Data Definition

11. The problem of finding hidden structure in unlabelled data is called …
   a) Supervised learning
   b) Unsupervised learning
   c) Machine learning
   d) Reinforcement learning

12. Task of inferring a model from labelled training data is called …
   a) Supervised learning
   b) Unsupervised learning
   c) Machine learning
   d) Reinforcement learning

13. Some telecommunication company wants to segment their customers into distinct group in order to send appropriate subscription offers, this is an example of ...
   a) Supervised learning
   b) Reinforcement learning
   c) Data extraction
   d) Unsupervised learning

14. Data mining is
   a) The actual discovery phase of knowledge discovery process
   b) The stage of selecting the right data for a KDD process
   c) A subject-oriented integrated time variant non-volatile collection of data in support of management
   d) None of these

15. Which of the following are the properties of entities?
   a) Groups
   b) Tables
   c) Attributes
   d) Switchboards

16. Classification is …

a) A subdivision of a set of examples into a number of classes
b) A measure of the accuracy, of the classification of a concept that is given by a certain theory.
c) Machine learning
d) Reinforcement learning

17. Which of the following attributes we compute mode only for it?

a) Ordinal attribute
b) Interval attribute
c) Nominal attribute
d) Ratio attribute

18. Binary attribute is a special case of …

a) Ordinal attribute
b) Interval attribute
c) Nominal attribute
d) Ratio attribute

19. The middle value in a set of ordered data values is …

a) mean
b) standard deviation
c) median
d) mode

20. Which of the following not measure of data dispersion?

a) Standard deviation
b) Range
c) Interquartile range
d) mode

---

***End of Exam, with my best wishes:***

***Dr- Abdel-Rahiem Ahmed Hashem Mohammed***

***د. عبدالرحيم أحمد هاشم محمد***

| Q1 | True | False |
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| Q2 | a | b | c | d |
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*Good Luck*

*Dr/Abdel-Rahiem A. Hashem*

**Exam in three pages**

**Mark T or F for each true of false sentence, respectively. (60 Marks)**

1- From browser, we can run a C++ program in the server side.

2- The function *document.querySelector(s)* returns the object of HTML element which has ID *s*.

3- Node.JS is a JavaScript framework that runs in browsers.

4- We can use JavaScript to add new HTML elements, such as images.

5- In CSS, we use # to define class.

6- We can use JavaScript to change CSS format for any HTML elements.

7- It is recommended to use var in JavaScript.

8- *console.log( 'Hello AUN')* prints Hello AUN in the HTML page.

9- We can use DOM object to links between HTML and JavaScript.

10- In JavaScript, we must define the function before calling this function.

11- It is recommended to write the event function without arguments.

12- We use only one statement to add a new HTML element <h1> as

*element = document.createElement('h1');*

13- To change the text content of this element in the previous question, we write this sentence:

*element.src='Hello AUN';*

14- In JavaScript, *!(3<=3) == false*

15- In JavaScript, *6%2==0*

16- In JavaScript, to generate a random number between 1 and 3, we use the function *Math.random(1,3)*

17- In CSS, the property *display* has **only three** values: inline, block, and inline-block.

18- It is not recommended to query UI for state.

19- We can do all JQuery functions with native JavaScript codes.

20- ES6 is an extended version of JavaScript.

21- In JavaScript, the class definition contains private member functions.

**See the next pages**

22- In JavaScript, the definition of *this* differs from the constructor function to member functions.

23- The keyword *bind* is not commonly used in JavaScript.

24- In JavaScript classes, the constructor function has the name *self*.

25- It is recommended that the website code should be implemented with classes, so all event functions should be in classes.

26- In JavaScript, the callback function is a function that can be taken as the argument or input for other function.

27- We can use callback functions solve the communication between the parent and the child classes.

28- The current websites on the internet uses RESTful URLs to handle requests to its servers.

29- It is recommended that the current websites use GraphQL and Falcor frameworks as alternatives to REST.

30- The fetch() API can retrieve only JSON files.

31- In JavaScript, we can create a new costume event.

32- In JavaScript, the JSON can be imported to the memory with small preprocessing steps.

33- The function curing is a good way to validate the data.

34- We can read the file 'file.json' likes this fetch('file.json').
.then(onResponse).then(onTextReady);

35- In the previous question, the OnResponse is a function that contains many sentences.

36- The function onResponse, the JavaScript goes the next sentence directly.

37- We can run many threads in JavaScript.

38- It is recommended that website contains many micro tasks.

39- We should learn more about data structures to increase the speed of the web site performance.

40- Many websites expose REST APIs to outside developers.

**See the next page**

الشفوى عشر دراجات

**Mark T or F for each true of false sentence, respectively. (6 Marks)**

1- JavaScript is currently the only language that can be used in browsers.

2- JavaScript has no relation with Java.

3- JavaScript is a high-level language.

4- We use float to define a new real number variable in JavaScript.

5- Be default, browsers run JavaScript codes after the DOM object is loaded.

6- D3 is a JavaScript framework that draws a good user-interface.

**Choose the best answer (4 marks)**
Assume we have this link

https://docs.google.com/**presentation/d**/1Rim3-IXt6y
N7yny_SBv7B5NMBiYbaQEiRMUD5s66uN8

1-This link is called
a) URL b) website c) API Endpoint
2- the **presentation** is called
a) folder b) directory c) a file with type presentation

3- The **d** is called
a) folder b) directory c) file type

4- The **1Rim3-IXt6yN7yny_SBv7B5NMBiYbaQEiRMUD5s66uN8** is called
a) file b) id c) directory

End of questions
Dr. Ibrahim Elsemman

Faculty of science

Department of Mathematics

Final Term Exam (2nd Term)

Fourth year student (Math)

Course: Complex Analysis

Code: 412 M

Time : 3 Hours

Points : 100 Points

Date: 8 /7 / 2020

Assiut University

الامتحان مكون من ((ستين سؤال (درجة ونصف لكل سوال)) و سؤال شفوى مكون من (اربع فقرات (درجتان ونصف لكل فقرة)))- تقع الأسئلة فى (ست صفحات)- مطلوب الاجابة عنها جميعاً

**True-False Questions. Classify the following statements as true or false (1-30):**

1) The imaginary part of $\cosh z$ is $\sinh x \sin y$. (True - False)

2) $\text{Log } z^2 = 2 \text{ Log } z \quad \forall z \neq 0$. (True - False)

3) $|\cos z| \leq 1 \quad \forall z \in \mathbb{C}$. (True - False)

4) $e^z \neq 0 \quad \forall z \in \mathbb{C}$. (True - False)

5) $\left(\sqrt{2}\cos\frac{\pi}{6} + i\sqrt{2}\sin\frac{\pi}{6}\right)^4 = -2 + i2\sqrt{3}$. (True - False)

6) $z^4 + 1 = \left(z - e^{\frac{\pi}{4}i}\right)\left(z - e^{\frac{3\pi}{4}i}\right)\left(z - e^{\frac{5\pi}{4}i}\right)\left(z - e^{\frac{7\pi}{4}i}\right)$. (True - False)

7) $Arg(z_1 z_2) = Arg(z_1) + Arg(z_2) \quad \forall z_1, z_2 \in \mathbb{C}$. (True - False)

8) If $\sin(x + iy) = u + iv$, then $u^2 \operatorname{cosec}^2 x - v^2 \sec^2 x = 1$. (True - False)

9) The function $f(z) = e^{iz}$ is periodic and of period $2\pi$. (True - False)

10) The function $f(z) = \cosh z$ is continuous and periodic, of period $2\pi i$. (True - False)

11) The transformation $w = z^2$ maps the hyperbola $x^2 - y^2 = 4$ to a straight line parallel to the $v$-axis. (True - False)

**Please turn the page**

12) The image of the circle $|z| = 2$ under the transformation $w = iz + 1$ is a circle with center $(0, 1)$ and radius $4$. (True - False)

13) The image of the circle $|z + 2i| = 2$ under the transformation $w = \frac{1}{z}$ is a straight line parallel to the $u$-axis. (True - False)

14) The image of $y$-axis under the transformation $w = e^z$ is a unit circle. (True - False)

15) $\lim_{z\to(-3i)} z^2e^z = -9\cos 3 + i9\sin 3.$ (True - False)

16) $\lim_{z\to\infty} \left(\frac{2z^3+1}{z^2+1}\right) = \infty.$ (True - False)

17) $\lim_{z\to i} \frac{z^2+1}{z-i} = 0.$ (True - False)

18) $\lim_{z\to\pi i} \frac{e^z+1}{z-\pi i} = i^2.$ (True - False)

19) The function $f(z) = \sqrt{z}$ is continuous at $z_0 = -1.$ (True - False)

20) The function $f(z) = \frac{1}{z}$ is uniformly continuous in $|z| < 1.$ (True - False)

21) $f(z) = \bar{z}$ is continuous everywhere but nowhere differentiable. (True - False)

22) If $f(z) = \cos x - i\sinh y, y \neq 0$ then $f'(z)$ $\nexists$ anywhere. (True - False)

23) The function $f(z) = \begin{cases} \frac{(\bar{z})^2}{z}, & z \neq 0 \\ 0, & z = 0 \end{cases}$ is differentiable at $z = 0.$ (True - False)

24) The sequence $\left(\frac{n+2i}{n+1}\right)$ is not a Cauchy sequence. (True - False)

25) $\sum_{k=0}^{\infty} \frac{(1-i)^k}{2^k}$ is divergent (True - False)

26) The series $\sum_{k=0}^{\infty} \frac{(\sqrt{3}+i)^k}{(\sqrt{5})^k}$ converges on the disk $|z| < 1.$ (True - False)

27) $\oint_{|z-1|=3} \frac{dz}{z-1} = 0.$ (True - False)

28) $\int_C |z|^2 dz = \frac{2}{3}(1 + i)$ where $C$ is the line segment from $-1$ to $i.$ (True - False)

29) $\left|\int_{|z|=3} \frac{\log z}{z-4i}\, dz\right| \leq (6\pi^2 + 6\pi \ln 3).$ (True - False)

30) $\int_{|z-i|=1} \frac{2z}{z^2+2}\, dz = 0.$ (True - False)

**Please turn the page**

**Multiple Choice Questions. Choose the correct answer from the given four options (31-60):**

31) If $z \neq 0$, the value of $arg(z) + arg(\bar{z})$ is

(a) $0$ (b) $\pi$ (c) $\frac{\pi}{2}$ (d) $-\frac{\pi}{2}$

32) $z\bar{z} = 0$ if and only if

(a) $\Re e(z) = 0$ (b) $Im(z) = 0$ (c) $z = 0$ (d) none of these

33) If $z \neq 0 \in \mathbb{C}$, then $\frac{\bar{z}}{|z|^2}$ is equal to

(a) $\frac{1}{z}$ (b) $\frac{1}{\bar{z}}$ (c) $\frac{1}{|z|}$ (d) $-\frac{1}{z}$

34) If $|z| = 4$ and $arg(z) = -\frac{\pi}{4}$, then $z$ is equal to

(a) $2\sqrt{2} + i2\sqrt{2}$ (b) $-2\sqrt{2} + i2\sqrt{2}$ (c) $2\sqrt{2} - i2\sqrt{2}$ (d) none of these

35) The maximum distance from the origin to the point $z$ satisfying $\left|z + \frac{1}{z}\right| = 2$ is

(a) $\frac{1}{2}(2 + \sqrt{2})$ (b) $1 + \sqrt{2}$ (c) $\sqrt{2} - 1$ (d) none of these

36) $\Re e\,(1 - \cos\theta + 2i\sin\theta)^{-1}$ is equal to

(a) $\frac{1}{3+5\cos\theta}$ (b) $\frac{1}{5-3\cos\theta}$ (c) $\frac{1}{3-5\cos\theta}$ (d) $\frac{1}{5+3\cos\theta}$

37) The square roots of $3i$ is equal to

(a) $\pm\frac{1}{2}(1 + i)$ (b) $\pm\sqrt{\frac{3}{2}}(1 + i)$ (c) $\pm\frac{\sqrt{3}}{2}(1 - i)$ (d) none of these

38) The region of $z$-plane for which $\left|\frac{z-a}{z+a}\right| = 1,\ a \neq 0$ is

(a) $x$-axis (b) $y$-axis (c) The straight line $x = |a|$ (d) none of these

39) Which region is represented by the inequality $|z - 4| < |z - 2|$

(a) $\Re e(z) > 0$ (b) $\Re e(z) < 0$ (c) $\Re e(z) > 2$ (d) none of these

**Please turn the page**

40) $\tanh^{-1} z$ is equal to

(a) $\frac{1}{2}\log\frac{1+z}{1-z}$ (b) $\log\left(z+\sqrt{z^2+1}\right)$ (c) $\log\left(z+\sqrt{z^2-1}\right)$ (d) $\log\frac{z^2+1}{z^2-1}$

41) $\Re e(\log(1+i\tan\alpha))$ is equal to

(a) $\sec\alpha$ (b) $\tan\alpha$ (c) $0$ (d) $\log(\sec\alpha)$

42) The principle value of $\log(1+i)$ is equal to

(a) $\log(2)+i\frac{\pi}{2}$ (b) $i\frac{\pi}{4}$ (c) $\log\left(\sqrt{2}\right)+i\frac{\pi}{2}$ (d) $\frac{1}{2}\log 2+i\frac{\pi}{4}$

43) $\overline{\cos(\imath z)}=\cos(i\bar{z})$

(a) if $z=(2n+1)\pi$ only (b) if $z=(2n+1)\pi i$ only

(c) if $z=\left(n+\frac{\pi}{4}\right)$ only (d) for all $z$

44) The image of the line $y=a$ under the transformation $w=\cos z$ is

(a) an ellipse (b) a hyperbola (c) a circle (d) a straight line

45) The image of the real axis under the transformation $w=e^z$ is

(a) $u=0$ (b) $v=0$ (c) $u=e$ (d) $|w|=1$

46) Under the transformation $w=\frac{1}{z}$, the image of the line $y=\frac{1}{4}$ in $z$-plane is

(a) circle $u^2+v^2+4v=0$ (b) circle $u^2+v^2=4$ (c) circle $u^2+v^2=2$

(d) none of these

47) Under the transformation $w=(1+i)z+2-i$, the line $x=0$ is mapped into the

(a) line $u+v=1$ (b) line $v-u=1$ (c) line $u+2v=1$ (d) none of these

48) $\lim_{z\to\infty}\frac{iz^2}{(z-1)^2}$ is

(a) $0$ (b) $\infty$ (c) $1$ (d) $i$

**Please turn the page**

49) $\lim_{z\to 0}\frac{\bar{z}}{z}$ is

(a) $1$ (b) $-1$ (c) $\nexists$ (d) $0$

50) If $f(z)=\begin{cases}\frac{xy}{x^2+y^2}, & (x,y)\neq(0,0)\\ 0, & (x,y)=(0,0)\end{cases}$ then $f(z)$ is

(a) continuous but non differentiable at $z=0$ (b) differentiable at $z=0$

(c) analytic everywhere except at $z=0$ (d) non differentiable at $z=0$

51) The function $f(z)=e^z$ is analytic

(a) only at $z=0$ (b) only at $z=i$ (c) nowhere (d) everywhere

52) The points at which $f(z)=\frac{z^2-z}{z^2-3z+2}$ is not analytic are

(a) $0$ and $1$ (b) $-1$ and $1$ (c) $i$ and $2$ (d) $1$ and $2$

53) If $f(z)=u+iv$ in polar form is analytic, then $u_r$ is equal to

(a) $v_\theta$ (b) $rv_\theta$ (c) $\frac{1}{r}v_\theta$ (d) $-v_\theta$

54) The function $f(z)=\bar{z}$ is analytic

(a) everywhere (b) nowhere (c) only at $z=0$ (d) only at $z=1$

55) The function $f(z)=|z|^2$ is

(a) differentiable and analytic everywhere (b) non differentiable at $z=0$ but analytic at $z=0$ (c) differentiable at $z=1$ and not analytic at $z=1$ only

(d) differentiable at $z=0$ but not analytic at $z=0$

56) If the real part of an analytic function $f(z)$ is $x^2-y^2-y$, then the imaginary part is

(a) $2xy$ (b) $x^2+2xy$ (c) $2xy-y$ (d) $2xy+x$

57) If $f(z)=u(r,\theta)+i\frac{\cos\theta}{r}$ is an analytic function, then $u(r,\theta)$ is equal to

(a) $r\sin\theta$ (b) $-r\cos\theta$ (c) $-r\sin\theta$ (d) $\frac{\sin\theta}{r}$

**Please turn the page**

58) The harmonic conjugate of $\cos x \cosh y - y$ is

(a) $\cos x \sinh y + x + c$ (b) $-\sin x \sinh y - x + c$ (c) $\sin x \sinh y - x + c$

(d) $-\sin x \sinh y + x + c$

59) The harmonic conjugate of $e^y \cos x$ is

(a) $e^x \cos y + c$ (b) $e^x \sin y + c$ (c) $e^y \sin x + c$ (d) $-e^y \sin x + c$

60) If $e^{ax} \cos y$ is harmonic, then $a$ is equal to

(a) $\pm 1$ (b) $0$ (c) $1$ and $2$ (d) $i$ and $1$

**Oral Question. Prove or disprove the following statements ( 2.5 points each):**

(i) $Im(z_1 z_2) = Im(z_1)\, Im(z_2) \quad \forall z_1, z_2 \in \mathbb{C}$.

(ii) If $z_1 z_2 = 0$, $z_1 \neq 0$, then $z_2 = 0$.

(iii) $\Re e(\cos z) = \cos x \cosh y$.

(iv) If $f(z)$ and $\overline{f(z)}$ are analytic in a region $D$, then $f(z)$ is constant in $D$.

*Prof. Dr. A.M. Saddeek ,,, With best wishes ,,, Signature : Saddeek*

| | | |
|---|---|---|
| Department of Mathematics<br>Faculty of science |  | قسم الرياضيات<br>كلية العلوم |
| امتحان مادة الطرق الرياضيه الفصل الدراسي الثاني 2020/2019 | | |
| كود المقرر:334ر<br>الزمن : ساعتان | الدرجه الكلية 100 درجه | الفرقة: الرابعه كليه العلوم<br>شعبة : الرياضيات |

السؤال الأول :اختر الإجابة الصحيحه مما بين الأقواس

1- تحويل لابلاس للدالة $e^{3t}\cos 4t$ يعطى من

أ- $\frac{(s-3)}{(s-3)^2+16}$ ب- $\frac{1}{\pm(s-3)^2+16}$ ج- $\frac{(s+3)}{(s+3)^2+16}$ ء- لاتوجد اجابة صحيحه

2- الشروط الواجب توافرها في الداله ليمكن إيجاد تحويل لابلاس لها

أ- متصله ب- ذات رتبه اسيه ج – متصلة جزئيا ء- ب و ج معا

3- اذا كان $L\{F(t)\}=\frac{a}{(s^2+a^2)}$ فتكون قيمه ..... $\lim_{t\to\infty} F(t)=$

أ- مساويه للصفر ب- مساوية للواحد الصحيح ج- لا نهائية ء- لا نستطيع تحديدها

4- اذا كان $L\{F(t)\}=\frac{a}{(s^2+a^2)}$ فتكون قيمه ..... $\lim_{t\to 0} F(t)=$

أ- مساويه للصفر ب- مساوية للواحد الصحيح ج- لا نهائية ء- لا توجد اجابة صحيحه

5- إذا كان $L\{F(t)\}=f(s)$ فإن ..... $L\{\int_0^t F(u)du\}=$

أ- $\frac{1}{s}f(\frac{1}{s})$ ب- $f(u)$ ج- $sf(s)$ ء- $\frac{1}{s}f(s)$

6- إذا كان $L^{-1}\{f(s)\}=F(t)$ فإن ..... $L^{-1}\{f(s-a)\}=$

أ- $e^{at}F(t)$ ب- $F(at)$ ج- $F(t-a)$ ء- لا توجد اجابة صحيحه

7- إذا كان $L^{-1}\{f(s)\}=F(t)$ فإن تحويل لابلاس العكسي للدالة $\int_s^\infty f(u)du$ يكون .....

أ- $\frac{t}{F(t)}$ ب- $\frac{F(t)}{t}$ ج- $tF(t)$ ء- لا توجد اجا به صحيحه

8- تحويل لابلاس للداله $\frac{\sin t}{t}$ يكون مساوياً .....

أ- $\tan^{-1}s$ ب- $\frac{s}{s^2+1}$ ج- $\tan^{-1}\frac{1}{s}$ ء- $\frac{1}{s(s^2+1)}$

9- تحويل لابلاس للداله $t^2e^{2t}$ يكون مساوياً .....

أ- $\frac{2}{(s-2)^3}$ ب- $\frac{1}{(s-2)^2}$ ج- $\frac{2}{(s-2)^2}$ ء- لا توجد اجابه صحيحه

10- إذا علمت أن $L\{F(t)\}=\frac{s+2}{s^2+1}$ و $L\{G(t)\}=\frac{s^2+1}{(s+3)(s+2)}$ وكان $H(t)=\int_0^t F(t)G(t-\tau)d\tau$ فإن

$L\{H(t)\}=$ .....

| | | | |
|---|---|---|---|
| أ- $\frac{s^2+1}{s+3}$ | ب- $\frac{1}{s+3}$ | ج- $\frac{s^2+1}{(s+3)(s+2)}+\frac{s+2}{s^2+1}$ | ء- لا توجد اجابة صحيحه |

11- تكون قيمه تحويل لابلاس لدالة دلتا $\delta(t)$

| | | | |
|---|---|---|---|
| أ- الواحد الصحيح | ب- صفر | ج- مالانهايه | ء- لا توجد إجابه صحيحه |

12- إذا علمت أن $L\{F(t)\}=\frac{1}{s^2+s+1}$ فتكون قيمه $L\{tF(t)\}=$ .....

| | |
|---|---|
| أ- $\frac{s}{(s^2+s+1)^2}$ | ب- $-\frac{2s+1}{(s^2+s+1)^2}$ |
| ج- $\frac{2s+1}{(s^2+s+1)^2}$ | ء- لا توجد اجابه صحيحه |

13- تكون قيمة تحويل لابلاس لدالة الوحدة السلميه u(t) مساويه .....

| | | | |
|---|---|---|---|
| أ- $\frac{1}{s-1}$ | ب- $\frac{1}{s}$ | ج- $\frac{1}{s+1}$ | ء- لا توجد اجابة صحيحه |

14- اعتبر المعادلة التفاضليه $\frac{dx}{dt}=10-0.2x$ بحيث كانت $x(0)=1$ فتكون قيمه $x(t)$ لكل $t>0$ مساويه

| | | | |
|---|---|---|---|
| أ- $2-e^{-0.2t}$ | ب- $2-e^{0.2t}$ | ج- $50-49e^{-0.2t}$ | ء- $50-49e^{0.2t}$ |

15- تكون قيمة تحويل لابلاس لدالة الوحدة السلميه u(t-a) مساويه .....

| | | | |
|---|---|---|---|
| أ- $\frac{e^{-as}}{s}$ | ب- $\frac{e^{as}}{s}$ | ج- $\frac{1}{s}$ | ء- لا توجد اجابه صحيحه |

16- تكون قيمه تحويل لابلاس لدالة بسل على الصورة $J_0(at)$

| | | | |
|---|---|---|---|
| أ- $\frac{1}{s^2+a^2}$ | ب- $\frac{1}{\sqrt{s^2+a^2}}$ | ج- $\frac{1}{\sqrt{s+a}}$ | ء- لا توجد اجابة صحيحه |

17- تكون قيمه تحويل لابلاس العكسي للدالة $\frac{s+5}{(s+1)(s+3)}$

| | | | |
|---|---|---|---|
| أ- $e^{-t}+2e^{-3t}$ | ب- $2e^{-t}+e^{-3t}$ | ج- $e^{-t}-2e^{-3t}$ | ء- $2e^{-t}-e^{-3t}$ |

18- إذا كان $L\{F(t)\}=\frac{2(s+1)}{s^2+2s+5}$ فتكون قيمه $\lim_{t\to 0}F(t)=$ .....

| | | | |
|---|---|---|---|
| أ- 0 | ب- 2 | ج- 1 | ء- 5/2 |

19- إذا كان $L\{F(t)\}=\frac{2(s+1)}{s^2+2s+5}$ فتكون قيمه $\lim_{t\to \infty}F(t)=$ .....

| | | | |
|---|---|---|---|
| أ- 0 | ب- 2 | ج- 1 | ء- 5/2 |

20- إذا كان $\frac{dy}{dt} + 5y(t) = u(t)$ بحيث كانت $y(0)=1$ و $u(t)$ هى دالة الوحدة السلمية فأوجد قيمه $y(t)$

| | | | |
|---|---|---|---|
| أ- $0.2+0.8e^{-5t}$ | ب- $0.2-0.2e^{-5t}$ | ج- $0.8+0.2e^{-5t}$ | ء- $0.8-0.8e^{-5t}$ |

21- تحويل لابلاس للدالة $e^{\alpha t}\sin bt$ يعطى من

| | | | |
|---|---|---|---|
| أ- $\frac{b}{(s-b)^2}$ | ب- $\frac{b}{(s-\alpha)^2+b^2}$ | ج- $\frac{(s+\alpha)}{(s+\alpha)^2+b^2}$ | ء- $\frac{(s-\alpha)}{(s-\alpha)^2+b^2}$ |

22- تعتبر الداله الأسيه التي على الصورة $e^{\alpha t}$ .....

| | | | |
|---|---|---|---|
| ت- متصله | ب- ذات رتبه اسيه | ج – متصلة جزئياً | ء- ب و ج معاً |

23- اذا كان $L\{F(t)\}=\frac{s}{(s^2+9)}$ فتكون قيمه ..... $\lim_{t\to 0} F(t) =$

| | | | |
|---|---|---|---|
| أ- مساويه للصفر | ب- مساوية للواحد الصحيح | ج- لا نهائية | ء- لا نستطيع تحديدها |

24- اذا كان $L\{F(t)\}=\frac{s}{(s^2+4)}$ فتكون قيمه ..... $\lim_{t\to \infty} F(t) =$

| | | | |
|---|---|---|---|
| أ- مساويه للصفر | ب- مساوية للواحد الصحيح | ج- لا نهائية | ء- لا توجد اجابة صحيحه |

25- إذا كان $L\{F(t)\} = f(s)$ فإن ..... $= L\{F(at)\}$

| | | | |
|---|---|---|---|
| أ- $\frac{1}{a}f(\frac{s}{a})$ | ب- $af(as)$ | ج- $f(as)$ | ء- $\frac{1}{a}f(as)$ |

26- إذا كان $L\{F(t)\} = f(s)$ فإن ..... $= L\{F'(t)\}$

| | | | |
|---|---|---|---|
| أ- $sL\{F(t)\}+F(0)$ | ب- $sL\{F(t)\}-f(0)$ | ج- $sL\{F(t)\}-F(0)$ | ء- لا توجد اجابة صحيحه |

27- تحويل لابلاس للدالة $\int_0^t \sin 2u\,du$ يعطى من .....

| | | | |
|---|---|---|---|
| أ- $\frac{2}{s(s^2+4)}$ | ب- $\frac{2s}{(s^2+4)}$ | ج- $\frac{s}{2(s^2+4)}$ | ء- $\frac{2}{(s^2+4)}$ |

28- تحويل لابلاس للداله $G(t)=\begin{cases}(t-2)^3 & t>2\\ 0 & t<2\end{cases}$ يكون مساوياً .....

| | | | |
|---|---|---|---|
| أ- $\frac{2e^{-2s}}{s^3}$ | ب- $\frac{6e^{-2s}}{s^4}$ | ج- $\frac{6e^{2s}}{s^4}$ | ء- لا توجد اجابه صحيحه |

29- تحويل لابلاس العكسي للداله $\frac{1}{(s-1)(s-2)}$ يكون مساوياً .....

| | | | |
|---|---|---|---|
| أ- $e^{2t}+e^{t}$ | ب- $e^{-2t}-e^{t}$ | ج- $e^{2t}-e^{t}$ | ء- لا توجد اجابه صحيحه |

30- إذا علمت أن $L\{F(t)\}=\frac{s+4}{s^2+1}$ و $L\{G(t)\}=\frac{s^2+1}{(s+3)(s+4)}$ وكان $H(t)=\int_0^t F(t)G(t-\tau)d\tau$ فإن

$L\{H(t)\} =$ .....

| | | | |
|---|---|---|---|
| أ- $\frac{s^2+1}{s+3}$ | ب- $\frac{1}{s+3}$ | ج- $\frac{s^2+1}{(s+3)(s+4)}+\frac{s+4}{s^2+1}$ | ء- لا توجد اجابة صحيحه |

31- تكون قيمه تحويل لابلاس لدالة دلتا $\delta(t-a)$

| | | | |
|---|---|---|---|
| أ- $e^{-as}$ | ب- $e^{as}$ | ج- $\frac{e^{-as}}{s}$ | ء- لا توجد إجابه صحيحه |

32- إذا علمت أن $L\{F(t)\}=\frac{1}{s^2+s+1}$ فتكون قيمه ..... $L\{\int_0^t F(u)du\}=$

| | | | |
|---|---|---|---|
| أ- $\frac{s}{s^2+s+1}$ | ب- $-\frac{2s+1}{(s^2+s+1)^2}$ | ج- $\frac{1}{s(s^2+s+1)}$ | ء- لا توجد اجابه صحيحه |

33- تكون قيمة تحويل لابلاس للدالة $F(t)=e^{-2t}(\cos\sqrt{3}t-t^2)$

| | | | |
|---|---|---|---|
| أ- $\frac{2}{(s+2)^3}$ | ب- $\frac{s-2}{(s-2)^2+3}-\frac{2}{(s-2)^3}$ | ج- $\frac{s+2}{(s+2)^2+3}-\frac{2}{(s+2)^3}$ | ء- لا توجد اجابة صحيحه |

34- اعتبر المعادلة التفاضليه $\frac{dx}{dt}=10-0.3x$ بحيث كانت $x(0)=1$ فتكون قيمه $x(t)$ لكل $t>0$ مساويه

| | | | |
|---|---|---|---|
| أ- $2-e^{-0.2t}$ | ب- $2-e^{0.2t}$ | ج- $50-49e^{-0.2t}$ | ء- لا توجد اجابه صحيحه |

35- تكون قيمة تحويل لابلاس لدالة الوحدة السلميه u(t-5) مساويه .....

| | | | |
|---|---|---|---|
| أ- $\frac{e^{-5s}}{s}$ | ب- $\frac{e^{5s}}{s}$ | ج- $5/s$ | ء- لا توجد اجابه صحيحه |

36- تكون قيمه تحويل لابلاس العكسي للدالة $\frac{1}{\sqrt{s^2+9}}$ هو

| | | | |
|---|---|---|---|
| أ- $\frac{1}{9}\sin 3t$ | ب- $\frac{1}{t^2+9}$ | ج- $J_0(3t)$ | ء- لا توجد اجابة صحيحه |

37- إذا كان $L^{-1}\{f(s)\}=F(t)$ فإن ..... $L^{-1}\{sf(s)\}=$

| | | | |
|---|---|---|---|
| أ- $F'(0)+F(0)\delta(t)$ | ب- $F'(t)+F(t)\delta(0)$ | ج- $F'(t)+tF(0)$ | ء- $F'(t)+F(0)\delta(t)$ |

38- إذا كان $L\{F(t)\}=\frac{3}{(2s+5)^3}$ فتكون قيمه ..... $F(t)=$

| | | | |
|---|---|---|---|
| أ- $\frac{3}{16}t^2e^{-5t/2}$ | ب- $\frac{16}{3}t^2e^{-5t/2}$ | ج- $\frac{3}{15}t^2e^{-5t/2}$ | ء- $\frac{3}{16}t^2e^{5t/2}$ |

39- إذا كان $L\{F(t)\}=\frac{3s+7}{s^2-2s-3}$ فتكون قيمه ..... $\lim_{t\to 0}F(t)=$

| | | | |
|---|---|---|---|
| أ- 0 | ب-3 | ج-4 | ء-5 |

40- اعتبر المعادلة التفاضليه $\frac{d^2y}{dt^2}+y(t)=t$ بحيث كانت $y(0)=1$ و $y'(0)=-2$ فأوجد قيمه $y(t)$

| | | | |
|---|---|---|---|
| أ- $t-\cos t-3\sin t$ | ب- $t-\cos t+3\sin t$ | ج- $t+\cos t-3\sin t$ | ء- $t+\cos t+3\sin t$ |

السؤال الثاني :ضع علامة صح أمام العبارة الصحيحه وعلامة خطأ أمام العبارة الخاطئه :

1- الدالة $\sin t$ تعتبر داله ذات رتبه اسيه .

2- الدالة $e^{t^2}$ تعبر دالة ليست ذات رتبة اسيه.

3- كل الدوال نستطيع ايجاد تحويل لابلاس لها .

4- تكون قيمه تحويل لابلاس للداله $(1+e^{-u})^2$ هى $\frac{1}{s}+\frac{2}{s+1}+\frac{1}{s+2}$ .

5- يمكن ايجاد تحويل لابلاس للدالة $e^{t^2}$.

6- إذا كان $L\{F(t)\}=f(s)$ فإن خاصية الازاحه الأولى تنص على $L[e^{at}F(t)]=f(s+a)$

7- إذا كان $L\{F(t)\}=f(s)$ فيعطى تحويل لابلاس للمشتقة الثانية من

$$L\{F''(t)\}=s^2L\{F(t)\}-sF(0)-F'(0)$$

8- إذا كان $L^{-1}\{f(s)\}=F(t)$ فإن $L^{-1}\{\frac{f(s)}{s}\}=\int_0^t F(u)du$

9- تحويل لابلاس العكسي للدالة $\frac{s}{(s^2+b^2)^2}$ هو $\frac{1}{2b}t\sin bt$

10- تنص نظرية الطي على أنه إذا كان و $L^{-1}\{g(s)\}=G(t)$ فإن

$$L^{-1}\{f(s)g(s)\}=\int_0^t F(u)G(t-u)du$$

مع أطيب التمنيات بالنجاح والتوفيق ،،،،، د/ إسراء جمال سيد