
	<b>TANTA UNIVERSITY</b> <b>FACULTY OF SCIENCE</b> <b>(Computer Science Division)</b> <b>Final Exam</b>		
	<b>EXAMINATION FOR PROSPECTIVE STUDENTS (4<sup>ND</sup> YEAR)</b>		
	<b>COURSE TITLE: EXPERT SYSTEM</b>	<b>COURSE CODE: CS4111</b>	
<b>DATE: 9 /1/2021</b>	<b>TIME ALLOWED: 2 HOURS</b>	<b>TERM: FIRST</b>	

**Answer the following questions:**

**Question 1: (60Marks)**

(a) Consider the following production rule, Translation of this rule into first-order logic?

**(30Marks)**

```

if      greaterthan(blood,systolic-pressure,140) and
        greaterthan(blood,pulse-pressure,50) and
        same(patient,auscultation,diastolic-murmur) or
        same(patient,percussion,enlarged-heart)

```

then

```

add(patient,disorder,aortic-regurgitation)

```

fi

(b) Consider the following domain declaration: (30Marks)

$D = \{disorder^m : 2\{aortic-regurgitation,atherosclerosis\}, ages : int\}$   
 and the fact set  $F = \{disorder^m = \{atherosclerosis\}, ages = 70\}$ .  
**Find the translation into first order logic.**

**Question2: Choose the correct answer: (30 Marks: 6 for each point)**

1. Which of the following statements are the disadvantages of Expert System?

i) They cannot handle inconsistent knowledge

ii) They cannot apply judgement and intuition recognized as important ingredients of problem solving.

a- Only i

b- Only ii

c- Both i and ii

d- None of these

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2. The expert system uses a(n) ..... to select the most appropriate response.
  - a- inference engine
  - b- decision support system
  - c- knowledge base
  - d- data source
  
3. Which of the following is a component of an expert system?
  - a- explanation module
  - b- knowledge base
  - c- natural language interface for the user
  - d- All of the above
  
4. Which of the following is not true about expert systems?
  - a- Expert systems are collections of human knowledge
  - b- Expert systems are expensive to design.
  - c- expert systems are usually designed to run on small general-purpose computers
  - d- Maintenance support may be difficult to obtain for an expert system.
  
5. Which of the following is an advantage of using an expert system development tool?
  - a- imposed structure
  - b- knowledge engineering assistance
  - c- rapid prototyping
  - d- all of the mentioned.

**Question3: Complete the following sentences: (30 Marks: 6 for each point)**

1. .... is a collection of concepts and ideas that are related to the development of intelligent systems.
  2. The accumulation, transfer, and transformation of problem-solving expertise from experts or documented knowledge sources to a computer program for constructing or expanding the knowledge base is known as....
  3. .... (or reasoning) is the process of using the rules in the knowledge base along with the known facts to draw conclusions.
  4. ....chaining is a goal-driven approach in which you start from an expectation of what is going to happen (i.e., hypothesis) and then seek evidence that supports (or contradicts) your expectation.
  5. An ....shell is a type of development tool that has built-in inference capabilities and a user interface, and is specifically designed for ES development.
-

**Question4: Mark true or false, justify your answer: (30 Marks: 5 for each point)**

1. Expert systems (ES) are computer-based information systems that use expert knowledge to attain high-level decision performance in a narrowly defined problem domain.( )
2. While most first-generation Expert Systems (ES) use if-then rules to represent and store their knowledge, second-generation ES are more flexible in adopting multiple knowledge representation and reasoning methods.( )
3. The knowledge base in an expert system must correspond exactly to the format of the knowledge base in the organization where it will be utilized.( )
4. Inference rules and knowledge rules are both used to solve problems in a rule-based expert system.( )
5. Data Driven Reasoning an inference technique which uses IF-THEN rules to deduce a problem solution from initial data.( )
6. Backward chaining, is an efficient way to solve problems that can be modeled as "structured selection" problems.( )

*Dr. fatma shabaan*

*With my best wishes*

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TANTA UNIVERSITY  
FACULTY OF SCIENCE  
DEPARTMENT OF MATHEMATICS

EXAMINATION FOR SENIORS (LEVEL FOUR) STUDENTS OF COMPUTER SCIENCE

COURSE TITLE: COMPUTER GRAPHICS

COURSE CODE: CS4105

DATE: 1-3-2021

TERM: FIRST

TOTAL ASSESSMENT MARKS: 150

TIME ALLOWED: 2 HOURS

Answer the Following Questions:

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These figures are required for Question 3

```
for (each pixel in image) {  
    Statements;  
    for (each triangle in scene) {  
        Statements; } }  
}
```

Figure 1

```
for (each triangle in scene) {  
    Statements;  
    for (each pixel in image) {  
        Statements; } }  
}
```

Figure 2

**QUESTION 1: [Total marks: 40]**

1. Use digital differential analyzer algorithm to draw the line segment between (2,2) and (6,6). (20 marks)
2. Use Bresenham's line generation to draw the line segment between (2,2) and (8,5). (20 marks)

**QUESTION 2: [Total marks: 36]**

1. Use Cohen-Sutherland algorithm to clip the line between (-2, -1) and (6, 7). Assume that, the clipping window has the coordinates  $(x_{min}, y_{min}) = (0, 0)$  and  $(x_{max}, y_{max}) = (10, 5)$ . (20 marks)
2. Given the point (7,10) in XY coordinate system. Assume that:
  - Horizontal limits for XY coordinate system are 0 and 100, and vertical limits are 0 and 80,
  - Horizontal limits for pixel coordinate system are 0 and 1000, and the vertical limits are 0 and 800.

Find the corresponding pixel coordinates for the given point. (16 marks)

**QUESTION 3: [Total marks: 60]**

Choose the best answer for each of the following points: (2 marks for each point)

1. In graphic pipeline, performing the transformation and computing the lighting for each vertex is the task of:
  - a. Rasterization
  - b. Blending
  - c. Vertex processing
  - d. Fragment processing
2. Consider a triangle with vertices (4, 3), (4, 7), and (9, 5), then the four corners of the triangle bounded box are:
  - a. (4, 3), (9, 7), (4, 7), and (9, 3)
  - b. (4, 3), (9, 7), (4, 7), and (9, 5)
  - c. (4, 3), (9, 7), (5, 7), and (9, 3)
  - d. (4, 3), (9, 7), (3, 7), and (9, 5)

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3. The graphics area that deals with the mathematical specification of shape and appearance properties in a way that can be stored on the computer:
  - a. Rendering
  - b. Modeling
  - c. Animation
  - d. User interaction
4. The line would have a gap if:
  - a. Each column between endpoints has exactly one pixel
  - b. At least one column between endpoints has two or more pixels
  - c. At least one column between endpoints has no pixels
  - d. None of the above
5. Computer graphics refers to:
  - a. Sub-field of computer science which studies methods for digitally creating and manipulating visual content
  - b. Various technologies used to create and manipulate sound
  - c. Representation and manipulation of text by computer
  - d. All the above
6. In raster graphics:
  - a. Images are composed as pixels
  - b. Flicker when the number of primitives in the image become too large
  - c. Images are composed as shapes
  - d. Scan conversion is not required
7. Which of the following is true about pixel?
  - a. It is a single point in a vector image
  - b. It is identified by a triple of coordinates  $(x, y, z)$
  - c. It can be represented in RGB color system by the triple  $(r, g, b)$
  - d. All the above
8. In computer graphics the sampling process is called:
  - a. Ray tracing
  - b. Shading
  - c. Rasterization
  - d. Clipping
9. Real-time rendering category is used in:
  - a. Interactive graphics and gaming
  - b. Animation and visual effects
  - c. Environments where the speed is not important
  - d. All the above

10. To produce very realistic pictures, we need some challenges such as:
- I. Basic principles of light
  - II. Efficient data structures for representing the surfaces, camera, and lights in a scene
  - III. Efficient algorithms for evaluating all the light bounces and integration
- a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
11. Computer graphic:
- I. Is the science and art of communicating visually via a computer's display and its interaction devices
  - II. Describes any use of computers to create and manipulate images
  - III. Has been used to describe almost everything on computers
- a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
12. Which of the following is true about GPU and CPU?
- I. GPU uses thousands of more efficient cores for a massively parallel architecture
  - II. GPU is designed to maximize the performance of a single task within a job
  - III. GPUs aimed at handling multiple functions at the same time
- a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
13. Which of the following is satisfied in Lambertian model?
- I. Surface facing away from the light receives constant illumination.
  - II. Surface facing away from the light receives no illumination.
  - III. Surface facing directly towards the light receives maximum illumination
- a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
14. The pseudo code of Figure 1 represents the structure of:
- a. Rasterization algorithm
  - b. Lambertian shading model
  - c. Ray tracing algorithm
  - d. Blinn-Phong shading model

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15. The line would be thin if:
- Each column between endpoints has exactly one pixel
  - At least one column between endpoints has two or more pixels
  - At least one column between endpoints has no pixels
  - None of the above
16. The main difference between simplified version and extended version of graphics pipeline:
- Application program
  - Feedbacks
  - Graphical processing unit
  - Display
17. Rasterization is an approach to rendering by:
- Tracing the light rays from the viewpoint through the image plane to object
  - Drawing objects one by one onto the screen
  - Discretizing the image plane into fragments
  - Processing the primitives
18. The main task involved in object-order rendering is:
- Clipping
  - Line drawing
  - Rasterization
  - Ray tracing
19. The main problem of pseudo code of Figure 2 is:
- Outer loop iterates over all pixels in the image for each triangle, this leads to very large number of tested pixels
  - Inner loop iterates over all pixels in the image for each triangle, this leads to very large number of tested pixels.
  - Inner loop iterates over all triangles in the scene for each pixel, this leads to very large number of tested triangles
  - Outer loop iterates over all triangles in the scene for each pixel, this leads to very large number of tested triangles
20. .... is the process of removing the points, lines, objects, or text that are outside the viewing volume:
- Line drawing
  - Clipping
  - Hidden surface removal
  - Rasterization

21. The line would be heavy if:
- Each column between endpoints has exactly one pixel
  - At least one column between endpoints has two or more pixels
  - At least one column between endpoints has no pixels
  - None of the above
22. To optimize the rasterization algorithm with respect to checked pixels, we use:
- Line drawing
  - Projection
  - Triangle bounding box
  - Camera
23. In rasterization, to solve the hidden surface problem the depth is stored in:
- Frame buffer
  - RAM
  - Image buffer
  - Z-buffer
24. The pseudo code of Figure 2 represents the structure of:
- Rasterization algorithm
  - Lambertian shading model
  - Ray tracing algorithm
  - Blinn-Phong shading model
25. The four components of a graphic system are:
- Interaction devices, OS, GPU, and display devices
  - Interaction devices, CPU, GPU, and display devices
  - Interaction devices, CPU, BIOS, and display devices
  - Interaction devices, BIOS, GPU, and display devices
26. The lights scatter in all directions when hits:
- Diffuse surfaces
  - Specular surface
  - Shiny surface
  - All surfaces
27. The appearance of objects depends on:
- Lighting that illuminates the scene
  - Interaction of light with the objects in the scene
  - Surface normal
  - All the above



28. Ambient shading is used to:
- Produce specular highlights
  - Produce black shadow
  - Produce diffuse reflection
  - Avoid black shadow
29. The graphics area that deals with the creation of shaded images from 3D computer models:
- Rendering
  - Modeling
  - Animation
  - User interaction
30. In vector graphics:
- Refresh process is independent of the complexity of the image
  - Graphic primitives must be converted into corresponding pixels
  - Scan conversion is not required
  - Images are composed as pixels

**QUESTION 4: [Total marks: 14]**

Put (√) or (×) in end of each of the following sentences: (2 marks for each point)

- Graphic pipeline is an image-order rendering.
- Raster display shows images as rectangular arrays of pixels while vector display represents an image as a list of the geometric shapes.
- Pre-rendering category is used in environments where the speed is important.
- In Cohen–Sutherland algorithm the region around the window is divided into 4 regions.
- Cohen–Sutherland algorithm can be used only on a rectangular clip window.
- Digital differential analyzer uses two expensive operations: integer addition and round function.
- Modern GPUs have highly parallel structure makes them more efficient than general-purpose CPUs.

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End of examination

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*With best wishes*



TANTA UNIVERSITY  
FACULTY OF SCIENCE  
DEPARTMENT OF MATHEMATICS

EXAMINATION FOR SENIORS (LEVEL FOUR) STUDENTS OF COMPUTER SCIENCE

COURSE TITLE: SELECTED TOPICS IN COMPUTER

COURSE CODE: CS4109

DATE: 13-3-2021

TERM: FIRST

TOTAL ASSESSMENT MARKS: 150

TIME ALLOWED: 2 HOURS

Answer all Questions:

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These figures are required for Questions 1, 2, and 3

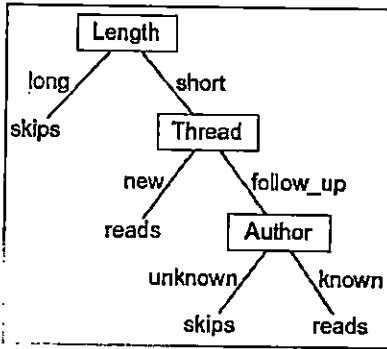


Figure 1

Day	Outlook	Temp.	Humidity	Wind	Enjoy sport
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	Yes
5	Rain	Cool	Normal	Weak	Yes
6	Rain	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rain	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rain	Mild	High	Strong	No

Figure 2

**QUESTION 1: [Total marks: 40]**

1. Use ID3 algorithm to create the decision tree that represents the training examples of Figure2, where the concept you learn is: "playing the enjoy sport". (25 marks)
2. Represent your decision tree as rules. (7 marks)
3. Give the hypothesis that match the examples. (5 marks)
4. Then test the following unseen examples: (3 marks)

Day	Outlook	Temp.	Humidity	Wind	Enjoy sport
15	sunny	Mild	normal	weak	?
16	Overcast	Hot	high	strong	?
17	Rain	hot	normal	Strong	?

**QUESTION 2: [Total marks: 36]**

1. Use candidate elimination algorithm to learn the concept of "playing the enjoy sport" from training data in Figure2. (20 marks)
2. Classify the metaheuristic algorithms into the main two classes, then classify each class into its types. (10 marks)
3. Define the two components of metaheuristic algorithms. (6 marks)

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**QUESTION 3: [Total marks: 60]**

Choose the best answer for each of the following points: (2 marks for each point)

1. Which of the following is true about stochastic optimization algorithm?
  - I. Its solutions will be different each time you run it
  - II. It always has some randomness
  - III. Its path and values of both variables and functions are repeatable
  - a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
2. Stigmergy:
  - I. Is defined as stimulation of workers by the performance they have achieved
  - II. Means stimulation by work
  - III. Occurs when one agent changes the environment and others respond to the new environment
  - a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
3. Swarm Intelligence can be defined as useful behavior that emerges from the cooperative efforts of a group of individual agents, in which:
  - I. The individual agents are not homogeneous
  - II. The individual agents act asynchronously in parallel
  - III. Communication between agents is largely affected by some form of stigmergy
  - a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
4. Candidate elimination will converge toward the hypothesis that correctly describes the target concept provided that:
  - a. There are no errors in the training examples
  - b. There is some hypothesis that correctly describes the target concept
  - c. Correct description of hypothesis is a conjunction of some of the attributes with values
  - d. All the above
5. In learning, the objective of using training data is to create ..... that will ..... for unseen examples to classify them correctly.
  - a. prediction function, specialize
  - b. error function, generalize
  - c. prediction function, generalize
  - d. error function, specialize

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6. Swarm in nature:
  - a. Is simple
  - b. Has no central control
  - c. Self-organized
  - d. All the above
7. The main two components of metaheuristic algorithms are:
  - a. Exploitation and intensification
  - b. Exploration and diversification
  - c. Exploitation and exploration
  - d. Population and trajectory
8. The machine attempts to learn from the training data:
  - I. How to classify the same data
  - II. How to classify new data that it has not seen
  - III. How to compute the difference between the data
  - a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
9. Generalization rule is a rule that:
  - I. Transforms an expression into a more general expression
  - II. Replaces constants with variables
  - III. Substitutes variables with constants
  - a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
10. The four bases of self-organization in swarm are:
  - a. Proximity, quality, stability, and diverse of response
  - b. Adaptability, stability, amplification, and multiple interaction
  - c. Simplicity, intelligence, centralized control, and direct interaction
  - d. Multiple interaction, amplification of changes, positive feedback, and negative feedback
11. Framework that used to move from natural phenomenon to nature-inspired algorithm:
  - a. First, starts from the observed natural phenomenon, second, make a nature-inspired model of it, finally, design an artificial system
  - b. First, make a nature-inspired model of natural phenomenon, second, observe the natural phenomenon, finally, design an artificial system
  - c. First, starts from the observed natural phenomenon, second, design an artificial system, finally, make a nature-inspired model of phenomenon
  - d. First, design an artificial system, second, make a nature-inspired model of it, finally, observe the natural phenomenon

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12. Diverse response principle for swarm intelligence is:
- The ability of swarm to response to quality factors such as food and safety
  - The ability of swarm to perform simple computation in its surrounding environment
  - The ability of swarm to distribute its individuals to face the environmental changes
  - The ability of swarm to adapt with environmental changes
13. Swarm-based algorithms should be:
- Flexible to internal and external changes
  - Robust when some individuals fail
  - Decentralized, and self-organized
  - All the above
14. Swarm intelligence advantages:
- Paths to solutions are emergent rather than predefined
  - Emergent behavior is robust with respect to individual failure
  - There is no central global information in the system
  - All the above
15. Algorithms and methods that allow a computer to learn are studied under:
- Machine learning
  - Natural language processing
  - Version space
  - Decision tree
16. The learned machine can:
- Classify only the examples that are included in training data
  - Classify only the new positive examples
  - Classify both examples in the training data and unseen examples
  - Not classify any new examples
17. The main reason for making machine to be learned about a problem is that:
- All possible situations that the machine might face cannot be predicted by human
  - All changes over time cannot be predicted by human
  - Solutions for the problem may not be implemented by human
  - All the above
18. In supervised learning the input data must contain:
- Predictor only
  - Target only
  - Both predictor and target
  - None of the above
19. If we generalize from positive examples only, then ..... occur.
- Convergence
  - Overgeneralizing
  - Generalization
  - Specialization

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20. The role of negative examples in preventing overgeneralization by:
- Forcing the learner to generalize concepts to exclude positive instances
  - Forcing the learner to specialize concepts to exclude positive instances
  - Forcing the learner to generalize concepts to exclude negative instances
  - Forcing the learner to specialize concepts to exclude negative instances
21. In general-to-specific algorithm:
- Both positive and negative examples are used to generalize concepts
  - Positive instances are used to eliminate overly specialized concepts
  - Negative instances lead to the specialization of candidate concepts
- I and II only
  - I and III only
  - II and III only
  - I, II, and III
22. Successful termination for candidate elimination algorithm occurs when:
- Set  $G = \text{set } S$  and both are singletons
  - $G$  and  $S$  become empty
  - Number of hypotheses remaining in  $G$  and  $S$  are greater than one
  - All the above
23. Consider a domain of objects that can be represented by hypothesis: **obj(Author, Thread, Length, Where-read)**. Figure 1 is generated to learn the concept: which books are preferred for reading? The hypothesis that can be extracted from Figure 1 is:
- $(\text{known, followUp, short, X4}) \vee (\text{known, new, short, X4})$
  - $(X1, \text{followUp, short, X4}) \vee (X1, \text{new, short, X4})$
  - $(\text{known, followUp, short, X4}) \vee (X1, \text{new, short, X4})$
  - $(\text{known, X2, long, X4}) \vee (X1, \text{followUp, short, X4})$
24. Is the concept of Figure 1 can be learned by version space?
- Yes, because every concept learned by decision tree can also be learned by version space
  - Yes, because this is conjunction concept which is easy learned by version space
  - No, because this is disjunction concept which is challenges in version space
  - No, because version space cannot learn any concept with even number of attributes
25. Decision tree is a tree in which:
- Each internal node is labeled with a decision
  - Each leaf of the tree is labeled with an attribute
  - Arcs coming from a node are labeled with each of the possible values of the attribute
  - All the above
26. Entropy of a set of training data equals 1 when:
- All examples in training data of the same type
  - Exactly half of examples are positive and half are negative
  - There are no examples in training data
  - The training data is infinity set

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27. Consider a domain of objects that can be represented by hypothesis: **obj(Size, Color, Shape)**. Then the most general hypothesis that matches everything is:
- obj(X, Color, Shape)
  - obj(Size, Y, Shape)
  - obj(Size, Color, Z)
  - obj(X, Y, Z)
28. ID3 algorithm select the attribute that has the ..... Because it specifies the feature most useful for classification.
- Highest probability distribution
  - Highest entropy
  - Highest information gain
  - Smallest information gain
29. The advantages of decision trees:
- Easy to interpret
  - Easy to understand how the classification works
  - Inherently human readable
  - All the above
30. In version space the algorithm that learn the concept in a bi-directional search is called:
- Candidate elimination algorithm
  - General-to-specific algorithm
  - Specific-to-general algorithm
  - ID3 algorithm


**QUESTION 4: [Total marks: 14]**

Put (√) or (×) at end of each of the following sentences: (2 marks for each point)

- In optimization problem, the cost function can be formulated as minimization problem only.
- Swarm intelligence is a type of single-agent system whereby the agent behaves according to complex rules.
- In metaheuristics, randomization provides good way to move away from local search to global search.
- One of the advantages of swarm intelligence is that the direct interaction among agents is not required.
- Population-based metaheuristics use single agent while trajectory-based use multiple agents.
- ID3 algorithm, always, finds the optimal tree that reveal the best separation of features.
- Version space is extracted from concept space.

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*With best wishes*

	<b>TANTA UNIVERSITY</b>		
	<b>FACULTY OF SCIENCE</b>		
<b>DEPARTMENT OF MATHEMATICS</b>			
<b>EXAMINATION FOR LEVEL FOUR STUDENTS OF STATISTICS</b>			
<b>COURSE TITLE: SIMULATION TECHNIQUES</b>		<b>COURSE CODE: CS4121</b>	
<b>DATE: 17-3-2021</b>	<b>TERM: FIRST</b>	<b>TOTAL ASSESSMENT MARKS: 100</b>	<b>TIME ALLOWED: 2 HOURS</b>

**Answer all the following questions:**

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**QUESTION 1: [Total marks: 25]**

1. Explain and draw the flow chart of the 7-step approach for building a successful simulation study. (10 marks)
2. What are the types of system? (6 marks)
3. Define simulation and explain simulation types. (7 marks)
4. Compare between model and simulation. (2 marks)

**QUESTION 2: [Total marks: 25]**

Consider a grocery store problem with single-channel model. Assume that:

- The service times vary from 1 to 6 minutes with the probabilities 0.10, 0.20, 0.30, 0.25, 0.10, and 0.05 respectively.
- Customers arrive at this checkout counter at random from 1 to 8 minutes and each possible value of inter-arrival time has the same probability of occurrence.

Analyze the system by simulating the arrival and service of 10 customers. Then find:

1. The average waiting time for a customer.
2. The probability that a customer must wait in the queue.
3. The average service time.
4. The probability of the server being busy.

**QUESTION 3: [Total marks: 40]**

Choose the best answer for each of the following point.

1. In a single-channel queue:
  - a. The calling population is infinite
  - b. Arrivals for service occur one at a time in a random fashion
  - c. Once they join the waiting line, they are eventually served
  - d. All the above
2. Which of the following is common difficulty with the collected data?
  - I. Data are not representative of what one really wants to model.
  - II. Data are not of the appropriate type or format.
  - III. Data may contain measuring, recording, or rounding errors.
  - a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
3. The different ways in which a system might be studied are:
  - I. Experiment with only one component of the system
  - II. Experiment with the actual system
  - III. Experiment with a model of the System
  - a. I or II only
  - b. I or III only
  - c. II or III only
  - d. I, II, or III

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4. To build a successful simulation study you should formulate the problem this include:
  - a. Define the overall objectives of model.
  - b. Determine the appropriate level of model detail.
  - c. Define the system configurations to be modeled.
  - d. All the above.
5. Stochastic simulation models:
  - a. Contains at least some random input components and produces random output.
  - b. Does not contain any probabilistic components and produce deterministic output.
  - c. Contains some random input components but produces certain output.
  - d. All the above.
6. Experiment with the actual system has some challenges:
  - a. Experiment may be too costly
  - b. Experiment may be too dangerous
  - c. System itself may be not exists
  - d. All the above
7. When experiment with the actual system is too dangerous, it is usually necessary to:
  - a. Build a model to represent the system and study it
  - b. Continue with studying the system itself
  - c. Leave this system without study
  - d. None of the above
8. In a single-channel queue, the system to be stable:
  - a. Arrival rate must be greater than service rate
  - b. Arrival rate must be less than service rate
  - c. Arrival rate and service rate must be independently considered
  - d. None of the above
9. Systems entities can be:
  - a. People only
  - b. Machines only
  - c. People or machines
  - d. None of the above
10. When the model of the system is simple mathematical model:
  - a. It is possible to get exact analytical solution
  - b. It is impossible to get exact analytical solution
  - c. It is impossible to study the system
  - d. None of the above
11. When the model of the system is not simple mathematical model:
  - I. Sometimes analytical solutions are highly complex
  - II. It must be studied by simulation
  - III. It must be studied by experiment with the actual system
  - a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
12. .... is the reproduction of the behavior of a system using a computer to simulate the outcomes of a mathematical model of the system.
  - a. Physical simulation
  - b. Interactive simulation
  - c. Computer simulation
  - d. Modeling

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13. A model of the system is only valid for a particular application if:
- I. It uses appropriate data
  - II. It uses general data
  - III. Its logic is correct
- a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
14. Which of the following is true about the effective discrete-event simulation process?
- I. It should have starting and ending points.
  - II. It should have starting point only.
  - III. It should have a graphical, statistical, or tabular record of the activity for which discrete-event simulation is currently performed.
- a. I and II only
  - b. I and III only
  - c. II and III only
  - d. I, II, and III
15. The common difficulties with data that the model uses include:
- a. Data may be biased because of self-interest
  - b. Data were collected under certain conditions
  - c. Data does not contain measuring, recording, or rounding errors
  - d. All the above
16. .... models the operation of a system as a discrete sequence of events in time
- a. Discrete-event simulation
  - b. Continuous-event simulation
  - c. Hybrid-event simulation
  - d. All the above
17. In discrete-event simulation:
- a. System cannot change at any points in time
  - b. System can change only at continuous points in time
  - c. System can change only at countable number of points in time
  - d. None of the above
18. A queuing system is described by five components:
- a. Inputs, outputs, rendering process, display, and processing
  - b. Modeling, animation, visual effects, visualization, and output
  - c. Population, service mechanism, visualization, queuing discipline, and output
  - d. Its calling population, nature of arrivals, service mechanism, system capacity, and queuing discipline
19. In a single-channel queue, the system to be unstable:
- a. Arrival rate must be greater than service rate
  - b. Arrival rate must be less than service rate
  - c. Arrival rate must be equal service rate
  - d. None of the above
20. The simulation that models the operation of a system as a discrete sequence of events in time is called:
- a. Continuous event
  - b. Discrete event
  - c. Hybrid-event
  - d. None of the above.

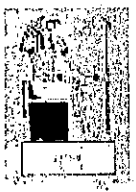
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**QUESTION 4: [Total marks: 10]**

Put (√) or (×) for each of the following sentences.

1. We use simulation techniques when other models are not applicable.
2. We can use the simulations to help us in understanding of how the present system operates and what would happen if we changed it.
3. Adaptive System responds to the change in the environment in a way to improve their performance.
4. In discrete-event simulation, the system can change continuously at all of points in time.
5. Arrival event occurs when a unit complete its service.

<b>Examiners:</b>	<b>1- Prof. Dr. Ahmad Reda El Nammory</b>	<b>2- Dr. Mosaad Wageh Hassan</b>
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	<b>TANTA UNIVERSITY</b> <b>FACULTY OF SCIENCE</b> <b>DEPARTMENT OF CHEMISTRY</b>			
	<b>FINAL EXAMINATION FOR THIRD YEAR BIOCHEMISTRY STUDENTS</b>			
	<b>COURSE TITLE:</b>	<b>Vitamins and inorganic metabolism</b>		<b>COURSE CODE: BC3107</b>
<b>DATE: 5-1-2020</b>	<b>TERM: FIRST TERM</b>	<b>TOTAL ASSESSMENT MARKS: 100</b>	<b>TIME ALLOWED: 2 HOURS</b>	

● **Section (A) Vitamins (50 marks)**

**Answer the following questions:-**

**Clarify each of the following questions: (20 marks, 5 for each point)**

1. The role of vitamin A in visual cycle.    2. Physiological role of vitamin B12.
3. Functions of vitamin B6.                    4. Mechanism of pyruvate dehydrogenase complex.

**Show by structural only the following vitamins: (10 marks, 2 for each point)**

1. Thiamin pyrophosphate.                    2. Folic acid.
3. Biotin.    4. Menadione.
5. Vitamin C.

**Multiple choice questions, Please choose one correct answer (20 marks, 2 for each point)**

**1- Scurvy is caused due to the deficiency of**

- (A) Vitamin A                                    (B) Vitamin D  
(C) Vitamin K                                    (D) Vitamin C

**2-  $\beta$ -Carotene, precursor of vitamin A, is oxidatively cleaved by**

- (A)  $\beta$ -Carotene dioxygenase                (B) Oxygenase  
(C) Hydroxylase                                (D) Transferase

**3- Which of the following is a component of the coenzyme A?**

- (A) Retinol                                        (B) Pyridoxine  
(C) Retinoic acid                                (D) Pantothenic acid

**4- Consumption of raw egg white can produce neurological abnormalities by blocking the absorption of:**

- (A) Pyridoxine                                    (B) Thiamin  
(C) Biotin    (D) None of These

**5- The Haemorrhagic disease of new born is caused to the deficiency of**

- (A) Vitamin K                                    (B) Vitamin B12  
(C) Vitamin A                                    (D) Vitamin B6

**6- The cofactor or its derivative required for the conversion of acetyl CoA to malonyl-CoA is**

- (A) FAD    (B) ACP  
(C) NAD<sup>+</sup>    (D) Biotin

**7- Which of the following co-factor is required for the synthesis of gamma amino butyric acid (GABA), serotonin, epinephrine, dopamine and histamine from their respective amino acid precursors**

- (A) Tetrahydrobiopterin                      (B) Tetrahydrofolate  
(C) Pyridoxal phosphate                      (D) Thiamine pyrophosphate

**8- Which one of these vitamins is required for DNA synthesis?**

- (A) Biotin    (B) Folate  
(C) Pantothenic acid                            (D) Vitamin B6

- 9- Name the Vitamin that protects us from Pellagra disease?  
 (A) Vitamin B5 (B) Vitamin B7  
 (C) Vitamin B3 (D) None of the above
- 10- Pernicious anemia is caused due to deficiency of \_\_\_\_\_  
 (A) Cobalamin (B) Pyridoxine  
 (C) Niacin (D) Folic acid

### Minerals (50 marks)

(20marks, 2 marks for each one)

- I) Choose the correct answer
- 1- It is required for the formation of bile salts.  
 a- Calcium      b- sodium      c- Magnesium      d- Selenium
  - 2- It is required for the secretion of HCl by parietal cells.  
 a- Calcium      b- Iron      c- Magnesium      d- Chloride
  - 3- Human body contain about ..... gm of sodium  
 a- 150-200      b- 50      c- 500      d- None of them
  - 4- Cushing syndrome is a disorder that occurs when your body has a high level of  
 a- Sodium      b- iron      c- Cortisol      d- a and c
  - 5- The maximum ratio that allow calcium absorption  
 a- 1:2      b- 1:3      c- 1:5      d- 1:4
  - 6- Major anion of extracellular fluid  
 a. Chloride      b- Potassium      c- Iron      d- Phosphorus
  - 7- The metabolically active form of calcium is  
 a- Ionized (diffusible)      b- Protein bound (non diffusible)  
 c- Compete with citrate      d- All of the above
  - 8- Calcium is controlled by .....  
 a. Vitamin D and PTH      b- Potassium      c- Magnesium      d- Phosphorus
  - 9- Deficiency of ..... leads to tetany  
 a- Selenium      b- calcium      c- iodine      d- sodium
  - 10- Its deficiency causes hypochromic and microcytic anemia  
 a- Iron      b- Phosphorus      c- a and b      d- Potassium

II) With full labeled diagram explains the following (10 marks)

- o Exchange of carbon dioxide and oxygen from red blood cells and tissue

III) Explain the following: (20 marks, 10 for each one)

- 1) The role of calciferol and PTH in regulation of calcium and Phosphorus level in the plasma.

2) Importance of intracellular carrier molecule (ICM) in regulation of iron metabolism in the body.

<b>EXAMINERS</b>	<b>DR. DOAA ELGAMAL</b> <b>DR. AMAR ELSHRBINY</b>
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TANTA UNIVERSITY  
FACULTY OF SCIENCE  
DEPARTMENT OF CHEMISTRY

EXAMINATION FOR THIRD YEAR CHEMISTRY/ BIOCHEMISTRY STUDENTS

COURSE TITLE:	VITAMINS AND INORGANIC METABOLISM	COURSE CODE: BC3111
DATE: 5-1-2021	TERM: FIRST	TOTAL ASSESSMENT MARKS: 50
		TIME ALLOWED: 2 HOURS

**I) Choose the correct answer** (10 marks)

- In intestinal mucosal cells riboflavin is converted to FMN by the action of...  
a. FAD synthase                      b. NADH dehydrogenase                      c. Flavokinase
- Pellagra preventive vitamin excreted in urine as..... derivatives  
a. Acylated                              b. Methylated                              c. Ethylated
- .....is the aldehyde form of vitamin B6 and found in animal foods  
a. Pyridoxal                              b. Pyridoxine                              c. Pyridoxamine
- Anti-egg white injury vitamin participated as coenzyme in the..... reactions  
a. Oxidation reduction                      b. Carboxylation                              c. Hydroxylation
- Transport form of iron inside the body called.....  
a. Hemosiderin                              b. Ferritin                              c. Transferrin

**II) Complete the sentences** (10 marks)

- Soft, weak bones in children describe a disease called .....
- Niacin deficiency cannot occur if the diet is rich in its precursor, which is.....
- A high intake of antibiotics will kill the bacteria living in the gut which synthesize.....
- Bleeding gums, joint pain and anemia are symptoms of ..... disease.
- The transport form of vitamin B12 is.....and its storage form is.....

**III) Write the structure of the following vitamins** (10 marks)

- a. Menaquinone.                      b- NIACIN (in plant and animal).                      C-  $\beta$ -Carotene

**IV) Give an account of the following** (20 marks)

- Absorption and transport of folic acid.
- Role of vitamin B12 and folate in DNA synthesis (Diagrammatically).
- Biochemical functions of ascorbic acid.
- Role of vitamin A in vision with drawing.
- Excess of iron siderosis.

Best Wishes

Examiners: Ass.prof. Mai El-Keiy , Dr. Maha Salem

Q # (4).

- a. Prove that correlation coefficient  $r$  obeys the inequality  $-1 \leq r \leq +1$ .  
(10 marks)
- b. For the regression lines  $Y$  on  $X$  and  $X$  on  $Y$ , prove show that the correlation coefficient between  $X$  and  $Y$  is the geometric mean of their slopes.  
(10 marks)
- c. The correlation coefficient  $\rho$  between the final grades in physics and mathematics for a group of 21 students was computed to be 0.8 find 95 % confidence interval for  $\rho$ .  
(15 marks)

Best wishes

Examiners	Dr. <i>Hassan S. Bakouch</i>
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