TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS
EXAMINATION FOR SENIORS (LEVEL FOUR) STUDENTS OF COMPUTER SCIENSE

COURSE TITLE: DATABASE MANAGEMENT SYSTEMS		COURSE CODE: CS4101	
DATE: 25-1-2023	TERM: FIRST	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOURS

Answer the Following Questions:

الاختبار من ٥ ورقات

QUESTION 1: [Total marks: 36]

1. Consider the universal relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies F = { {A, B}→{C}, {A}→{D, E}, {B}→{F}, {F}→{G, H}, {D}→{I, J} }. (12 marks)
   a. What is the key for R?
   b. Decompose R into 2NF and then 3NF relations.

2. Discuss each of the following statement: (16 marks)
   a. Functional dependency cannot be inferred automatically from a particular relation state.
   b. The various reasons that lead to the occurrence of NULL values in relations. Why should NULLs in a relation be avoided as much as possible?
   c. The problem of spurious tuples and how we may prevent it.
   d. The characteristics of relations that make them different from ordinary tables and files.

3. Define the following terms: database, attribute, functional dependency, and transitive dependency. (8 marks)

==

QUESTION 2: [Total marks: 40]

1. Consider the following relational database, where the primary keys are underlined: (25 marks)

   Instructor(ID, name, dept_name, salary)

   Section(course_id, sec_id, semester, year, building, room_number, time_slot_id)

   Teach(ID, course_id, sec_id, semester, year)

   I. Draw the schema diagram for this relational database.

   II. Give an expression in the relational algebra to express each of the following queries:
   a. Find the instructors (ID and name) in Math with a salary greater than 4000.
   b. Find all instructors (ID, name, and salary) whose ID greater than their salaries.
   c. Find the set of all courses taught in the Fall 2009 semester, the Spring 2010 semester, or both.
   d. Find all the courses taught in the Fall 2009 semester but not in Spring 2010 semester.
   e. Find the names of all instructors in the Math department together with the course_id of all courses they taught.

2. Discuss the main categories of data models. What are the basic differences between the relational model, the object model, and the XML model? (10 marks)

3. Describe the three main techniques used to achieve 1NF for a relation R that is not in 1NF? (5 marks)

==

QUESTION 3: [Total marks: 60]

Choose the best answer for each of the following points:

1. In designing the relational schema, when we discuss how the tuples in a base relation are stored and updated. This phase is called:
   A. Implementation.   B. Logical.   C. Conceptual.   D. None of the above.

2. The undesirable dependencies that must be avoided when a relation is in 2NF:
   A. Full functional dependency.   B. Partial functional dependency.
   C. Transitive functional dependency.   D. Multivalued dependency.

3. For the set-difference operation $r - s$ to be valid, the following condition must be hold:
   A. The relations r and s must be of different arity.
   B. The domains of the corresponding attributes of r and s must be the same for all attributes.
   C. Both r and s must be base relations.
   D. All the above.

4. The undesirable dependencies that must be avoided when a relation is in 3NF:
   A. Full functional dependency.   B. Partial functional dependency.
   C. Transitive functional dependency.   D. Multivalued dependency.

5. First normal form was defined to:
   A. Satisfy both atomicity and single domain value for all attributes in a relation.
   B. Allow multivalued attributes, composite attributes, and their combinations.
   C. Avoid the partial functional dependencies.
   D. Enhance the transitive functional dependencies.

6. If the primary key, for relation R, contains a single attribute, then:
   A. R is surely in 3NF.   B. R is in 1NF.   C. R is in 2NF.   D. R is in 1NF, 2NF, 3NF.

7. Several informal guidelines may be used as measures to determine the quality of relation schema design. These include:
   A. Ensuring that the semantics of the attributes is clear in the schema.
   B. Reducing the NULL values and redundant information in tuples.
   C. Avoiding spurious tuples.   D. All the above.

8. In designing a database schema, we must ensure that we avoid:
   A. Redundancy.   B. Incompleteness.   C. Inconsistency.   D. All the above.

9. Which of the following is true?
   I.   The fundamental operations of the relational algebra are sufficient to express any relational algebra query.
   II.   Additional operations do not add any power to the algebra but simplify common queries.
   III. The fundamental operations include both unary and binary operations.
   A. I and II only   B. I and III only   C. II and III only   D. I, II, and III

10. For the union operation $r \cup s$ to be valid, the following condition must be hold:
   A. The relations r and s must be of the same arity.
   B. The domains of the corresponding attributes of r and s must be differ at least in one attribute.
   C. Both r and s must be base relations.
   D. All the above.

11. In designing the relational schema, when we discuss how users interpret the relation schemas and the meaning of their attributes. This phase is called:
   A. Implementation.   B. Logical.   C. Physical storage.   D. None of the above.

12. The binary operation that allows us to combine certain selections and a Cartesian product into one operation is called:
   A. Rename.   B. Set-difference.   C. Set-intersection.   D. Natural join.

13. Any functional dependency $X \rightarrow Y$ on relation R with primary key K, can has problem, when:
   I. $X \subset K$.
   II.   X is non-key attribute.
   III. $X = K$.
   A. I and II only   B. I and III only   C. II and III only   D. I, II, and III

14. With Cartesian product r × s there may be problem. This problem can arise when:
   A. Both r and s contain attributes has the same name in each.
   B. Both r and s of the same arity.
   C. Both r and s are base relations.
   D. All the above.

15. In data abstraction, the logical level describe:
   I.   How the data are stored.
   II.   What data are stored in the database.
   III. What relationships exist among the data.
   A. I and II only   B. I and III only   C. II and III only   D. I, II, and III

16. Keeping organizational information in file-processing system has several disadvantages such as:
   A. Data redundancy and inconsistency.   B. Difficulty in accessing data.
   C. Integrity problems.   D. All the above

17. Which of the following is true?
   A. The primary key should be chosen such that its attribute values are never or very rarely changed.
   B. It is customary to list the primary key attributes of a relation schema before the other attributes.
   C. Primary key attributes are underlined.
   D. All the above.

18. In data abstraction, the view level describe:
   A. How the data are stored. B. What data are stored in the database.
   C. What relationships exist among the data. D. Only part of the entire database.

19. The Extensible Markup Language (XML) is widely used to represent:
   A. Object-based model. B. Semi-structured data. C. Relational model. D. All the above.

20. .... is a collection of conceptual tools for describing data, data relationships, data semantics, and consistency constraints.
   A. Data dependency. B. Data model. D. Data abstraction. D. Normalization.

21. .... corresponds to the variable declarations in a program, while .... corresponds to the value of the variables in a program at a point in time.
   A. Instance, schema. B. Schema, instance. C. Attribute, domain. D. None of the above.

22. The three-tier architecture is superior to the two-tier in emergence of:
   A. Web. B. Client. C. Server. D. All the above.

23. Database systems are designed to manage large bodies of information. Management of data involves:
   A. Ensure the safety of the information stored.
   B. providing mechanisms for the manipulation of information.
   C. Defining structures for storage of information. D. All the above.

24. In file-processing system, because data are scattered in various files, and files may be in different formats, writing new application programs to retrieve the appropriate data is difficult. This problem is called:
   A. Integrity problem. B. Security problem. C. Data isolation. D. Atomicity problem.

25. When we use collection of tables to represent both data and the relationships among those data, this model is called:
   A. Object-oriented. B. Entity-relationship. C. Relational. D. Semi-structured.

26. The front end of a database system consists of tools such as:
   A. SQL user interface. B. Report generation. C. Data mining and analysis. D. All the above.

27. To define any database, we must specify the:
   A. Structure of records. B. Data type for each attribute within a record.
   C. Both A and B. D. None of the above.

28. Database systems can be .... according to the computer system run them.
   A. Centralized. B. Distributed. C. Paralyzed. D. All the above.

29. A superkey may contain inessential attributes. The minimal superkeys are called:
   A. Candidate key. B. Foreign keys. C. Alternative keys. D. None of the above.

30. The binary operation that allows us to combine certain selections and a Cartesian product into one operation is called:
   A. Rename. B. Set-difference. C. Set-intersection. D. Natural join.

QUESTION 4: [Total marks: 14]

For each of the following sentences, determine whether it is true or false:

1. In instructor relation it is good idea to choose the name of instructors as primary key.

2. The comparisons such as $=, \neq, <, \leq, >,$ and $\geq$ are not allowed in the selection predicate.

3. The relation than contain this tuple

Research	5	333445555	{Bellaire, Sugarland, Houston}

   is in 1NF.

4. The normalization process takes a relation schema through a series of tests to certify whether it satisfies a certain normal form.

5. Normalization is carried out make the data base design in high quality and meet the desirable properties.

6. A primary, candidate, or super key is a property of the entire relation, rather than of the individual tuples.

7. The architecture of database management systems affected by the architecture of computer system on which they run.

===

End of examination

EXAMINERS	DR. MOUSAAD WAGEH HASSAN	DR/
	DR.	DR/

With best wishes

Answer the following questions

QUESTION 1: (30 marks)

1- Design regular grammars (RG) for the following regular expressions over $\Sigma = \{a, b, c\}$:

a. $(ab)^*c$

b. $(a \cup b)^* \, bcb \, (a \cup b)^*$

QUESTION 2: (50 marks)

1- Consider the following NFAs.

a. Draw regular expressions corresponding to these.

b. Write the corresponding regular grammars (RG).
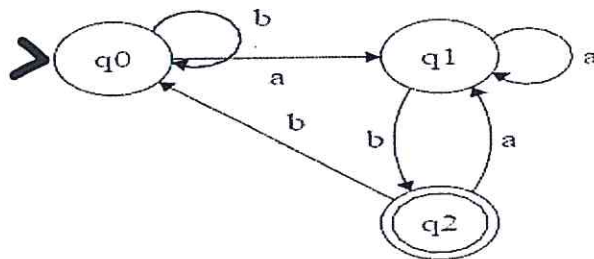
QUESTION 3: (40 marks)

1) Find the regular grammars for the following languages on $\{a, b, c, d\}$

a. $L = \{ w : n_a(w) \text{ and } n_b(w) \text{ are both even} \}$

b. $L = \{ wcw^R : w \in \{a, b\}^* \}$

c. $L = \{ a^m b^n c^p d^q : m + n = p + q \}$

d. $L = \{ a^n b^n : n \leq m + 3 \}$

QUESTION 4: (30 marks)

1) Consider the regular expression

$$R = (aa)^* \cup b^*$$

- Draw an NFA, and DFA of the above regular expression.
- Find the regular grammar for R.
- Find R' which recognizes the complement of language recognized by R.

Examiners: *Dr/ Ibrahim Gad*   *With my best wishes*

TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS
EXAMINATION FOR SENIORS (LEVEL FOUR) STUDENTS OF COMPUTER SCIENSE

COURSE TITLE: COMPUTER GRAPHICS		COURSE CODE: CS4105	
DATE: 11-1-2023	TERM: FIRST	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOURS

Answer the Following Questions:

الاختبار من ٥ ورقات

QUESTION 1: [Total marks: 40]

1. Give at least one reason for each of the following statement: (10 marks)
   a. The triangle-bounded box is not required with ray tracing algorithm.
   b. Rendering process must be preceding by modeling process.
   c. The four stages of rasterization cannot be performed together simultaneously.
   d. Rasterization must be preceding by clipping operation.
   e. Linear transformations (such as: scaling, shearing) are part of every graphic system.

2. Use Bresenham algorithm to draw the line segment L with two end points (4,3) and (7,5). (15 marks)

3. For the following object, describe the resulting object after performing each of the following transformations: (15 marks)
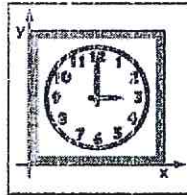
   a. Scale (0.5, 1.5). What is the type of scaling here?
   b. Scale (0.5,0.5). What is the type of scaling here?
   c. Shear-y (1).
   d. Shear-x (1).

==

QUESTION 2: [Total marks: 36]

1. State your opinion on each of the following with interpretation: (12 marks)
   a. With interactive graphics and gaming, do you think that the pre-rendering is better than the real-time rendering in creating images?
   b. To produce more realistic graphic, do you think that the ray tracing is better than rasterization in execution time?
   c. To draw line, do you think that the midpoint algorithm is better than the digital differential analyzer algorithm in computation time?

2. Consider the clipping window determined by the two corners $(x_{min}, y_{min}) = (0,0)$ and $(x_{max}, y_{max}) = (10,5)$. Use Cohen-Sutherland algorithm to clip the line with the two endpoints (-2, -1) and (6, 7). (15 marks)

3. What are .....? (9 marks)
   a. The three main processes in computer graphics?
   b. The three things that the computer graphics refers to?
   c. The three kinds of surfaces?

انظر خلفه

1

QUESTION 3: [Total marks: 60]

Choose the best answer for each of the following points:

1. Computer graphics is the science and art of .... via a computer's display and its interaction devices.
   - A. Communicating visually.
   - B. Speech communication.
   - C. Designing smart algorithms.
   - D. Communicating textually.

2. Applying the transformation $scale\ (0.5, 1)$ on the point $(2,3)$ produce the point:
   - A. $(2,3)$
   - B. $(3,2)$
   - C. $(1,3)$
   - D. $(2,1.5)$

3. Computer graphic needs the mathematics field for:
   - A. Describing shape and other things
   - B. Understanding the visual system and other receptive systems so that we can wisely allocate resources
   - C. Modeling the light interaction ways with the world
   - D. Meeting the aims of graphics of communication

4. The graphics area that deals with the creation of an illusion of motion through sequences of images:
   - A. Rendering.
   - B. Modeling
   - C. Animation
   - D. User interaction

5. Which of the following is true about pixel?
   - A. It is a single point in a raster image.
   - B. It is identified by a pair of coordinates (x, y)
   - C. It can be represented in RGB color system by the triple (r, g, b).
   - D. All the above

6. In graphic systems the CPU perform two types of processing:
   - I. Picture formation processing
   - II. Processing concerning with the display of the image
   - III. Processing at manipulating computer graphics and image processing
   - A. I and II
   - B. I and III
   - C. II and III
   - D. None of the above

7. The key assumptions of line drawing by Bresenham algorithm:
   - A. Line must be thin as possible as and has no gaps.
   - B. Each column between endpoints has exactly one pixel.
   - C. Row may contain two or more pixels, when the slope of line $m \in [0, 1]$.
   - D. All the above

8. The midpoint drawing line algorithm likes Bresenham algorithm in all, except:
   - A. Floating point calculation.
   - B. Round function.
   - C. Decision parameter.
   - D. Condition on the slope of line.

9. 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

انظر خلفه

2

10. We use the *max* function in shading models to:

    A. Avoid the positive light when $\theta < 90$.   B. Avoid black shadow.

    C. Avoid the negative light when $\theta > 90$ D. None of the above.

11. If the polygon lies completely outside the clipping window, then the number of vertices displayed in the window is:

    A. 1   B. The same number of polygon vertices.

    C. 0.   D. N where N < the number of polygon vertices.

12. Applying the transformation $shear - x(1)$ on the point (2,3) produce the point:

    A. (5,3)   B. (3,5)   C. (2,3)   D. (3,2)

13. The main difference between simplified version and extended version of graphics pipeline:

    A. Application program.   B. Feedbacks.   C. Graphical processing unit   D. Display

14. In computer graphics the sampling process is called:

    A. Ray tracing   B. Shading   C. Rasterization   D. Clipping

15. 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

16. 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)

17. Key assumptions of line drawing:

    A. Line must be thin as possible as and has no gaps

    B. Each column between endpoints has exactly one pixel

    C. Row may contain two or more pixels, when the slope of line $m \in (0, 1]$

    D. All the above

18. Which of the following is true about GPU and CPU?

    I. CPU has few cores optimized for sequential serial processing

    II. CPU is designed to maximize the performance of a single task within a job

    III. Modern CPUs have highly parallel structure

    A. I and II only   B. I and III only   C. II and III only   D. I, II, and III

19. Rasterization is an approach to rendering by:

    A. Tracing the light rays from the viewpoint through the image plane to object

    B. Drawing objects one by one onto the screen

    C. Discretizing the image plane into fragments

    D. Processing the primitives

20. The appearance of objects depends on:

    A. Lighting that illuminates the scene   B. Surface normal

    C. Interaction of light with the objects in the scene   D. All the above

21. In Cohen–Sutherland algorithm the region around the window is divided into 8 regions, each region is codded with 4-bit code to:
    A. Enable us to represent 16 cases for line
    B. Enable algorithm to consider 16 end points at a time
    C. Represent the position of endpoint in the four sides (left, right, top, bottom)
    D. None of the above

22. The four components of a graphic system are:
    A. Interaction devices, OS, GPU, and display devices
    B. Interaction devices, CPU, GPU, and display devices
    C. Interaction devices, CPU, BIOS, and display devices
    D. Interaction devices, BIOS, GPU, and display devices

23. Computer graphic needs the engineering field for:
    A. Describing shape and other things
    B. Understanding and applying the constraints of bandwidth, memory, processor speed.
    C. Modeling the light interaction ways with the world
    D. Meeting the aims of graphics of communication

24. A GPU may be found:
    A. On a separate graphics card
    B. On the motherboard of a personal computer or server
    C. Integrated with a CPU on the same circuit
    D. All the above

25. The graphics area that deals with the creation of shaded images from 3D computer models:
    A. Rendering   B. Modeling   C. Animation   D. User interaction

26. In vector graphics:
    A. Refresh process is independent of the complexity of the image
    B. Graphic primitives must be converted into corresponding pixels
    C. Images are composed as pixels
    D. Draw continuous and smooth lines

27. Sutherland-Hodgeman algorithm uses .... strategy to clip the polygon:
    A. Divide-and-conquer.   B. Increment.   C. Random.   D. None of the above

28. Which of the following is true about image-order and object-order rendering?
    I.   Image-order is simpler than object-order to get working
    II.   Image-order is more flexible than object-order in the produced effects
    III. Image-order takes less execution time than object-order to produce comparable image
    A. I and II only   B. I and III only   C. II and III only   D. I, II, and III

29. In ray tracing algorithm the computation of finding the closest object intersecting the viewing ray is the task of:
    A. Ray generation part.   B. Ray-object intersection part.   C. Shader.   D. None of the above.

30. Consider a ray $p(t) = e + td$ and triangle with vertices $a, b,$ and c. Which of the following conditions are true?

I. The intersection is inside the triangle if and only if $\beta > 0, \gamma > 0$, and $\beta + \gamma < 1$.

II. The ray misses the triangle if $\beta < 0, \gamma > 0$, and $\beta + \gamma < 1$.

III. The intersection is inside the triangle if and only if $\beta > 0, \gamma > 0$, and $\beta + \gamma < t$.

    A. I and II only   B. I and III only   C. II and III only   D. I, II, and III

QUESTION 4: [Total marks 14]
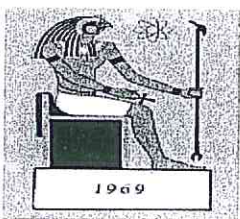
For each of the following sentences, determine whether it is true or false:

1. The clipped polygon always has more vertices than the original one.
2. Renderers may be available stand-alone, free open-source projects, or integrated into larger modeling and animation packages.
3. Lambertian shading model is the combination of diffuse, ambient, and specular terms.
4. Visualization is the graphics area that deals with the attempting to give users insight into complex information via visual display.
5. Ambient shading is used to Produce specular highlights.
6. Cohen–Sutherland algorithm can be used only on a rectangular clip window.
7. Raster display shows images as rectangular arrays of pixels while vector display represents an image as a list of the geometric shapes.

End of examination

| EXAMINERS | DR. MOUSAAD WAGEH HASSAN | DR/ |
| | DR. | DR/ |

With best wishes

TANTA UNIVERSITY
FACULTY OF SCIENCE
(Computer Science Division)

EXAMINATION FOR PROSPECTIVE STUDENTS (4 YEAR)
FINAL EXAM

COURSE TITLE: JAVA	COURSE CODE: CS4107

| DATE: 14/1/2023 | | TOTAL ASSESSMENT MARKS: 100 | TIME ALLOWED: 2H |

QUESTION 1: answer the following (50 marks: 5 for each point)

1. What Are The Differences Between Swing And Awt?

2. What Method Is Used To Specify A Container's Layout?

3. Give Us the Name of the List Layout managers In Java?

4. How Are the Elements of a Border layout Organized?

5. State the three constructors of the Label class and the three constants for specifying the alignment of the Label's text?

6. Define the three top-level containers in Swing?

7. Discusses the Three steps that necessary to create and place a GUI component?

8. State the three kinds of objects which involved in the event-handling?

9. Define the Nested (Inner) Classes? And State the properties and the usages of nested class?

10. Discusses the main features of Swing?

QUESTION 2: MCQ (25 marks: 2.5 for each point)

1) Where are the following four methods commonly used?

1) public void add(Component c)
2) public void setSize(int width, int height)
3) public void setLayout(LayoutManager m)
4) public void setVisible(boolean)
a. Graphics class
b. Component class
c. Both A & B
d. None of the above

2) Which is the container that doesn't contain title bar and MenuBars but it can have other components like button, textfield etc?
a. Window
b. Frame
c. Panel
d. Container

Answer the following questions:

Question1: (30 Marks 10 for each)

1. Translate **the following production rule** into the first-order logic*?*

<div align="center">

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

</div>

2. Define the semantic net *and the* Inheritance*?*

3. **Translate the following heuristic rule in to the production rule and first order logic.**   *if*

<div align="center">

the patient experiences a pain in the calf when walking,
which disappears gradually in rest
then
a stenosis of one of the arteries in the leg, possibly
due to atherosclerosis, is conceivable

</div>

Question2: Mark true or false, justify your answer: (50 Marks 5 for each)

1. The knowledge acquisition component of an expert system stores the rules.( )
2. The design phase of decision making focuses on determining how software will work.( )
3. Expert systems (ES) are computer-based information systems that use expert knowledge to attain high-level decision performance in a narrowly defined problem domain.( )
4. 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.( )
5. Inference rules and knowledge rules are both used to solve problems in a rule-based expert system.( )
6. Rule-based systems have their roots in artificial intelligence.( )

7. Knowledge engineer is the code at the core of the system which derives recommendations from the knowledge base and problem specific data in working storage.( )
8. Data Driven Reasoning an inference technique which uses IF-THEN rules to deduce a problem solution from initial data.( )
9. Backward chaining, is an efficient way to solve problems that can be modeled as "structured selection" problems.( )
10. The knowledge base of an expert system stores rules.( )

Question3: Choose the correct answer: (50 Marks 5 for each)

1. Which of the following is Capabilities of Expert Systems?

a. Possessing human capabilities

b. Suggesting alternative options to a problem

c. Refining their own knowledge

d. Substituting human decision makers

2. Which of the following strategies used by Inference Engine?

a. Forward Chaining

b. Block Chaining

c. Stable Chaining

d. both a and b

3. Data, information, and past experience combined together are termed as _____

a. Inference

b. Acquisition

c. Vision

d. Knowledge

4. If there is a solution, breadth first search is _____ to find it.

a. Difficult

b. Guaranteed

c. not able to find

d. none of the above

5. Which of the following is incorrect application of Expert System?

a. Design Domain

b. Monitoring Systems

c.   Knowledge Domain

d.   Systems domain

6. What is the form of Knowledge representation?

a.   IF-THEN

b.   IF-THEN-ELSE

c.   IF-ELSE

d.   All of the above

7. What do expert systems combine?
a.   Information, people, and IT components
b.   Information, people, and IT specialists
c.   Artificial intelligence, people, and IT components
d.   Artificial intelligence, IT components, and IT specialists

8. Who provides the domain expertise in the form of problem-solving strategies?
a.   Domain expert
b.   Knowledge engineer
c.   IT specialist
d.   None of the above

9. Which decision making phase is also called the diagnostic phase?
a.   Intelligence
b.   Design
c.   Choice
d.   Implementation

10. 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

Question 4: (20 Marks 4 for each)

1. Stat and explain the Personnel Involved in the expert system?
2. Compare between Inference Engine Control Strategies?
3. What are the main components of a rule–based system?
4. Describe the phases of designing an expert system? What term is used to call the whole process?
5. Explain Knowledge representation in a production system?

Dr. fatma shabaan

With my best wishes