Section (1) : Fill in the circle corresponding to the appropriate answer (20 marks)

1. By this model we can make a direct link between data and some graphic or image output.
   - o Interactive demonstration
   - o Conceptual Model
   - o Mathematical Model
   - o Visualization model
2. The qualitative models that help highlight important connections in real world systems and processes.
   - o Interactive demonstrations
   - o Conceptual Models
   - o Mathematical Models
   - o Visualization models
3. Visualizations for multidimensional data can:
   - o View data from different orientations.
   - o Create 2D and contour plots.
   - o Create and view animations of data at the same rates.
   - o Create 3D creatures.
4. A visualization model:
   - o Gives indirect link between data and some graphic.
   - o Help highlights important connections in real world systems
   - o Link in series with some other type of model.
   - o Shows important connections in virtual systems
5. The intensity of scattered light from the atmosphere has..... relationship with wavelength.
   - o Direct.
   - o Constant
   - o Even.
   - o Indirect.
6. Mathematical and Statistical Models are:
   - o Obviously related
   - o Totally differ.
   - o Fully match.
   - o No difference between them.
7. Numerical solutions are..... than analytic solutions:
   - o More complicated.
   - o More difficult.
   - o More intuitive.
   - o Extra tricky.
8. ..... activate the models to allow us to see and understand the world in its dynamic form.
   - o Abstraction
   - o Simulations
   - o Categories
   - o Non of above
9. The physical models of systems that can be easily observed and manipulated are …….
   - o Interactive demonstrations
   - o Conceptual Models
   - o Mathematical Models
   - o Visualization models
10. Examples of conceptual models are:
    - o Red sun-sets and blue skies.
    - o Significant misleading.
    - o Differences in shoulder joint structure.
    - o Major abstraction.
11. Examples of Visualization models include the following except:
    - o Animations.
    - o Image manipulation.
    - o Stella II.
12. Interactive demonstrations can be used in classes of
    - o small size
    - o large size

- o all sizes

13. Interactive demonstrations strengthen students' abilities to
    - o observe
    - o stimulate questions
    - o stimulate discussions
    - o all of the above
14. Interactive Demonstrations are ……. that replicates part of a system of interest.
    - o physical or conceptual models
    - o Physical model
    - o Conceptual mode
    - o Intangible mode
15. .....are used as a first step in the development of more complex models.
    - o Conceptual Models
    - o Interactive Demonstrations
    - o Direct expression
    - o Visualizations
16. Interactive Demonstrations are physical models that ……. Part of a system of interest.
    - o replicates
    - o Displays
    - o Protest against
    - o rely on
17. Object modeling is be divided into ……
    - o physical and behavioral.
    - o mental and conceptual
    - o visual and behavioral
    - o Cultural and ethical
18. Object interactions, which are often viewed as……, characterize the physical models.
    - o physics based
    - o Mental based
    - o scientific based
    - o Visual based
19. One of the first real needs for representing the human in the model was to create…….. for each group, unit, or individual.
    - o a unique perception of the design
    - o A global perception of the design
    - o A detailed perception
    - o A systematic insight
20. Interactive Demonstrations have proven to be very useful in all the following except……..
    - o addressing student's misconceptions
    - o Providing stimulating hands-on inquiry into simple parts of complex systems.
    - o Provide solution to the equations
21. The major fields of modeling application are all the following except……..
    - o Behavioral modeling
    - o Environmental modeling
    - o Multi-resolution modeling
    - o Conceptual modeling
22. The modern design area is characterized as much by……
    - o communication and information exchange
    - o movement and engagement
    - o Attrition
23. Activities on the design situation are ……
    - o Very poor
    - o Extremely rich
    - o varied in many cases
    - o Very rare
24. Behavioral Modeling includes…….
    - o Engagement
    - o Communication
    - o Planning
    - o Attrition
25. Behavioral Modeling includes all the following except …….
    - o Learning
    - o Reaction
    - o Object interaction
    - o Perception
26. Models can be one of two categories:
    - o Physical and nonphysical.
    - o Physiological and no physiological.
    - o Promotional and no promotional.

- Psychological and nonPsychological.

27. Physical model, a physical ……..of an object.
    - Interpretation.
    - Version.
    - Description.
    - Representation.
28. Scale model, ……..of an object.
    - A replica.
    - Prototype.
    - Both of them.
    - none of them.
29. 3D modeling, a 3D polygonal representation of an object, usually displayed with a ……..
    - Machine.
    - Design.
    - Computer.
    - System.
30. Physical model includes all the following except……..
    - Model aircraft.
    - Car model.
    - Model organism.
    - Conceptual model.
31. Model…... a hobby centered around construction of material replicas.
    - Building.
    - Solid.
    - Organism.
    - Product.
32. Solid modeling, study of …….representations of the solid parts of an object, also called in vitro models.
    - Unclear.
    - Equivocal.
    - Indefinite.
    - Unambiguous.
33. Model organism, a…….. Organism used as model in biology.
    - simple.
    - Complex.
    - Large.
    - Small.
34. Model……., an identifier of a product given by its manufacturer (also called model number).
    - Building.
    - Solid.
    - Organism.
    - Product.
35. Model…... a person who poses to be depicted in painting.
    - Art.
    - Fetish.
    - Person.
    - Product.
36. Model ……. a person employed to display his or her looks or something such as a commercial product.
    - Art.
    - Fetish.
    - Person.
    - Product.
37. ……model, a model who wears the clothing and/or devices of sexual things.
    - Art.
    - Fetish.
    - Person.
    - Product.
38. ……model, a person who interacts with consumers to draw attention to and often inform them about a product.
    - Conceptual.
    - Person.
    - Promotional.
39. ……model, a person who serves as a behavioral or moral example to others.
    - Role.
    - Person.
    - Pseudo.
    - Promotional.
40. Conceptual model, a ……model.
    - Nonphysical, Abstract.

- Physical, Abstract.
- Physical Applied.
- Nonphysical, Applied.

41. ……model, an abstract model that uses mathematical language.
    - Mathematical.
    - Structure.
    - Applied.
    - Physical.
42. ……., in model theory often called just a model or semantic model.
    - Mathematical.
    - Structure.
    - Applied.
    - Physical.
43. ……., an abstract model that uses cause and effect logic.
    - Business model.
    - Causal model.
    - Computer model.
    - Conceptual model.
44. Graphical model, a……..model for which a graph denotes the conditional independence structure between random variables.
    - Mental.
    - Probabilistic.
    - Toy.
    - Standard.
45. ……. model, a neural process that simulates the response of the motor system in order to estimate the outcome of a motor command.
    - Mental.
    - Internal.
    - Physical.
    - Standard.
46. ……. Model, an economic model representing a national or regional economy.
    - Microeconomic.
    - Macroscopic.
    - Economic.
    - Macroeconomic.
47. Mental model, a person's cognitive …… of an idea or thought process.
    - Interpretation.
    - Version.
    - Description.
    - Representation
48. Modeling ……., learning by imitating or observing a person's behavior.
    - Psychology.
    - Physiology.
    - Pathology.
    - Physically.
49. Model…….controller, an architectural pattern in software engineering.
    - Vision.
    - Observation.
    - Outlook.
    - View.
50. ……. development model of a biological process, used in biological or medical research.
    - Pre- clinical.
    - Post-clinical.
    - Clinical-pre.
    - Clinical- post.
51. …….. Model, the theory in particle physics which describes certain fundamental forces and particles.
    - Statistical.
    - System.
    - Mechanistic.
    - Standard.
52. Physical models allow……., from examining the model, of information about the thing the model represents.
    - Visualization.
    - Revelation.
    - Hallucination.
    - Apparition.
53. Uses of an architectural model include

visualization of internal relationships within the structure or external relationships of the structure to the……..

- Setting.
- Atmosphere.
- Situation.
- Environment.

54. Advantages of wireframe 3D modeling over exclusively 2D methods include……..
    - Flexibility.
    - Complex rendering.
    - Inaccurate photorealism.
    - None of the above.
55. ..... Activates the models to allow us to see and understand the world in its dynamic form.
    - Abstraction
    - Simulations
    - Categories
    - Non of above
56. Generating a model as ……of some phenomenon.
    - Mathematical representation
    - Statistical representation
    - Mathematical resolution
    - conceptual representation
57. Simulation activate the models to allow us to see and understand the world in it's ……. form.
    - dynamic
    - Static
    - steady
    - Non of above
58. ……. play in the development of the model.
    - simulation
    - validation
    - assumptions
    - rationale
59. Modeling refers to the process of generating a model as ……of some phenomenon.
    - Mathematical representation
    - Statistical representation
    - Mathematical resolution
    - conceptual representation
60. The most important step in creating a model is …….
    - Defining a problem.
    - Solving a problem.
    - Forming a problem.
    - Causing a problem.
61. ……..is any technique for creating images, diagrams, or animations to communicate a message.
    - Visualization
    - Simulation
    - Adaptation
    - All of the above
62. The first step in rendering requires the user to
    - provides the computer with detailed information about the source and angle of the lighting
    - fill the surfaces of the geometric shapes with colors, textures, and patterns
    - provide the computer with a detailed description of an object
    - All of the above
63. The main advantages of hardware rendering are the following except:
    - draws up to 60 images per second
    - make immediate changes to the image
    - cheap
    - Non of the above
64. People receive information, process this information, and respond
    - Interactive demonstrations
    - Conceptual Models
    - Mathematical Models
    - Visualization models
65. The intensity of scattered light is…….

- Inversely proportional to the 4th power of wavelength.
- Directly proportional to the 4th power of wavelength
- Inversely proportional to the 2nd power of wavelength.
- Directly proportional to the 2nd power of wavelength

66. Statistical Models include
    - Extrapolation or interpolation of data based on some best-fit.
    - Error estimates of observations.
    - Spectral analysis of data or model generated output.
    - All of the above.
67. Numerical solutions have several advantages over analytical solutions.
    - The equations are much more intuitive.
    - The equations are less intuitive.
    - Less realistic models of low complexity can be investigated
    - The equations are much more vague
68. The simulator is normally cheaper to operate than……
    - Trainer aircraft.
    - real accident implementation
    - Life representation
    - Airplane flight
69. ……..are being developed to teach therapeutic and diagnostic procedures.
    - Medical simulators
    - Architecture simulator
    - City simulators
    - Modern simulators
70. The most important step in creating a model is …….
    - Defining a problem.
    - Solving a problem.
    - Forming a problem
    - All of the above.
71. Medical simulators are being developed to teach ……..procedures.
    - therapeutic and diagnostic
    - engineering
    - architecture
    - none of the above
72. The simulator is normally…….. to operate than Life representation
    - more cheaper
    - more expensive
    - more difficult
    - None of the above
73. ……..is a computer program, that attempts to simulate an abstract model of a particular system.
    - Computer simulation
    - Software Engineering
    - All of the above
    - None of the above
74. Modeling refers to the process of generating a model as ……..of some phenomenon.
    - Mathematical representation
    - Statistical representation
    - Mathematical resolution
    - All of the above
75. …….. play a role in the development of the model.
    - simulation
    - validation
    - assumptions
    - rationale
76. The ……..step in creating a model is defining a problem.
    - Only step
    - difficult
    - most important
    - None of the above
77. The most important step in creating a model is defining ……..problem
    - Statement.
    - Clear
    - manufacturing
    - vague
78. All models have a …….

- O Information input
- O Information processing
- O Data output
- O All of above

79. The most important step in creating a model is defining a ……. problem statement.
    - O Clear
    - O Vague
    - O Difficult
    - O Non of above

80. Mathematical and Statistical Models are:
    - O Obviously related
    - O Completely different.
    - O No difference between them.
    - O None of the above

Section 2 : Mark the following statements as True R or False T (25 marks)

1-	A simulation is a group of models tied together with software and/or hardware that make the model useful for some purpose.	**5**
2-	Instrumented physical models are the most effective way of investigating fluid flows such as around hydraulic structures.	**5**
3-	A physical model of something that can move, like a vehicle or machine, may be completely static, or have parts that can be moved manually, or be powered.	**5**
4-	The purpose of a physical model on a larger scale may be to have a better overview, for testing purposes, as hobby or toy.	**5**
5-	A physical model of something large is usually smaller, and of something very small is larger.	**5**
6-	A physical model of an animal shows the animal's physical composition without it walking or flying away, and without danger, and if the real animal is not available.	**5**
7-	The purpose of a physical model on a smaller scale may be to see the structure of things that are normally too small to see properly or to see at all.	**5**
8-	The vast majority of 3D models today are built as textured polygonal models, because they are flexible and because computers can render them so quickly.	**5**
9-	Curve types include No uniform rational B-spline (NURBS), Splines, Patches and geometric primitives.	**5**
10-	A model is a 2D alternative for a 3D representation such as a drawing or photograph, or in the case of a globe, a 3D, undistorted alternative for a flat world map.	**5**
11-	There are currently 3 types of digital sculpting: Displacement, which is the most widely used among applications at this moment, volumetric and dynamic tessellation.	**5**
12-	Complex materials such as clouds, and liquid sprays are a mass of 3D coordinates which have either points, polygons, texture splats, or sprites assigned to them.	**5**
13-	Polygons are unplanar and can only approximate curved surfaces using many polygons.	**5**
14-	Some graphic art software includes filters that can be applied to 2D vector graphics or 2D raster graphics on transparent layers.	**5**
15-	Dynamic tessellation is similar to Voxel but divides the surface using triangulation to maintain a smooth surface and allow finer details.	**5**
16-	Curve modeling are influenced by weighted control points, decreasing the weight for a point will pull the curve closer to that point.	**5**
17-	The new mesh will usually have the original high resolution mesh information transferred into displacement data.	**5**
18-	The modeling technique consists of shaping individual objects that are later used in the scene.	**5**
19-	Displacement uses a dense model and stores new locations for the vertex positions through use of a 62bit image map that stores the adjusted locations.	**5**
20-	Disadvantages of 3D compare to 2D photorealistic rendering may include a software learning curve and difficulty achieving certain photorealistic effects.	**5**
21-	For the best, artists use a combination of 3D modeling followed by editing the 2D computer-rendered	**5**

	images from the 3D model.	
22-	Volumetric has similar capabilities as displacement and suffer from polygon stretching when there are not enough polygons in a region to achieve a deformation.	**5**
23-	3D printing is a form of additive manufacturing technology where a three dimensional object is created by laying down successive layers of material.	**5**
24-	A theory has only the alternative of being right or wrong. A model has a third possibility; it may be right, but irrelevant.	**5**
25-	There are a number of modeling stages, including: constructive solid geometry, implicit surfaces, and subdivision surfaces.	**5**
26-	Computer modeling is the use of computers to model objects and to simulate processes.	**5**
27-	Computer models allow a person to study the response of a system to conditions that are not easily or safely applied in a real situation	**5**
28-	3D photorealistic effects are often achieved without wireframe modeling and are sometimes distinguishable in the final form.	**5**
29-	Computer simulations have become a useful partof mathematical modeling and represented as the running of the system's model.	**5**
30-	A computer model is usually defined in theoretical terms with a computer program.	**5**
31-	For many systems, graphical or mathematical representations are extremely complex because there are so many factors present.	**5**
32-	A computer model or a conceptual model is a computer program, that attempts to simulate an abstract model of a particular system.	**5**
33-	A mathematical model attempts to find analytical solutions to problems and enable the prediction of the behavior of the system.	**5**
34-	Computer simulations can be used to estimate the performance of systems too simple for analytical solutions.	**5**
35-	The goal of modeling is to come up with a representation that is easy to use in describing systems in a mathematically consistent manner.	**5**
36-	Computer models are valuable because they have fixed speed.	**5**
37-	Computer model can study the real situation.	**5**
38-	Since all models only partially represent the real world, they all have limited application for training and analysis.	**5**
39-	Computer model is usually defined in mathematical term .	**5**
40-	Economic simulations are used to simulate the behavior of flowing air, water and other fluids.	**5**
41-	Hardware rendering, may require from few minutes up to a full day to render a single image.	**5**
42-	The most important step in creating a model is defining a vague problem statement.	**5**
43-	Software rendering draws up to 60 images per second.	**5**
44-	Hardware rendering is slower than Software rendering.	**5**
45-	Computer animation almost always uses hardware rendering.	**5**
46-	Graphics hardware commonly uses Gouraud shading.	**5**
47-	Computer simulations are used in a limited area of practical contexts such as flight simulators to train pilots.	**5**
48-	In the first step of rendering the user provides the computer with detailed information about the source and angle of the lighting.	**5**
49-	The model comes only in one shape, size or style.	**5**
50-	The model is not the real world but merely a human construct to help us better understand real world systems.	**5**

51-	All models have an information input, an information processor, and an output of expected results.	**5**
52-	A simulation is a group of models tied together with software and/or hardware that make the model useful for some purpose.	**5**
53-	Animation is a group of models tied together with software and hardware that make the model useful for some purpose.	**5**
54-	The most important step in creating a model is defining a vague problem statement.	**5**
55-	Computer modeling is the use of computers to model objects and to simulate processes.	**5**
56-	Computer models are not valuable because they can be speed up or slowed down.	**5**
57-	A mathematical model attempts to find analytical solutions to problems and enable the prediction of the behavior of the system.	**5**
58-	Models are typically used when it is possible to create experimental conditions in which scientists can directly measure outcomes.	**5**
59-	The term computer modeling is broader than computer simulation, which implies that all aspects are being modeled in the computer representation.	**5**
60-	The success of computer models is highly dependent on the mathematical representations of systems and on chosen output parameters.	**5**
61-	Computer simulations are used in a limited area of practical contexts such as flight simulators to train pilots.	**5**
62-	The goal of modeling is to come up with a representation that is easy to use in describing systems in a mathematically consistent manner	**5**
63-	In the medical field, models are used to study economic growth, energy and food resources, on a world scale and on a local level.	**5**
64-	In engineering, computer models are used to develop new drugs and to predict their effects on the body.	**5**
65-	The model comes in different shape, size or style.	**5**
66-	Gouraud shading provides a better approximation of the surface but requires more calculation.	**5**
67-	The most common method of mapping is bump mapping.	**5**
68-	The model is not the real world but merely a human construct to help us better understand real world systems.	**5**
69-	All models have a Data input, Data processor, and an output of expected results.	**5**
70-	Economic simulations are used to simulate the behavior of flowing air, water and other fluids.	**5**
71-	A mathematical model attempts to find analytical solutions to problems and enable the prediction of the behavior of the system.	**5**
72-	Success of computer models depends on the proper graphical representations and input parameters.	**5**
73-	The rendering pipeline provides more accurate shadows than other methods.	**5**
74-	The most important step in creating a model is defining a vague problem statement.	**5**
75-	A model is a representation of structure in a system and/or its properties.	**5**
76-	The model is the real world and it is a human construct to help us better understand VAGUE world systems.	**5**
77-	The most important step in creating a model is defining a clear problem statement.	**5**
78-	Ray tracing takes a short time to render a scene.	**5**
79-	We create models so we can understand the behavior of some part of the world around us.	**5**
80-	Mathematical models include Analytical models and Numerical Models.	**5**
81-	Conceptual Models are quantitative models that help highlight important connections in real world systems and processes.	**5**
82-	Graphical Models are qualitative models that help highlight major associations in real situations or	**5**

	processes.	
83-	Interactive demonstrations are physical models of systems that can be difficulty observed and manipulated.	**5**
84-	Visualization models include Analytical models and Numerical Models. mathematical	**5**
85-	Statistical models are useful in helping identify patterns and underlying relationships between data sets	**5**
86-	The numerical and analytical models cannot be compared and contrasted.	**5**
87-	The analytical models are superior to numerical models in which the equations are much more intuitive.	**5**
88-	Visualizations for multidimensional data sets allow the users to Create 2-D and contour plots.	**5**
89-	The cycle of visualization\affirmation comes after extracting the goal of understanding.	**5**
90-	Numerical models are mathematical models that have a closed form solution.	**5**
91-	The intensity of red light is 4 times larger than that of blue light.	**5**
92-	Conceptual Models are mental models while the interactive demonstrations are physical models.	**5**
93-	Numerical solutions are relatively easy to get into mathematics in comparison with complicated analytical solutions.	**5**
94-	In interactive design redesign and refine are coming after test and evaluation.	**5**
95-	One advantage of numerical solutions is that they are often very mathematically challenging to obtain.	**5**
96-	Analytical solution provides a concise preview of a model's behavior that is not as readily available with a numerical solution.	**5**
97-	Business models study employment, population, and housing needs on a world scale and on a local level.	**5**
98-	Analytical models are superior to numerical models as they were more aesthetically pleasing.	**5**
99-	Interactive Demonstrations require planning and setup in order to live up to their potential to improve student learning. .	**5**
100-	Economic models study how changes in levels of sales and prices affect a company's profits.	**5**

Section (3): Choose and put the letter corresponding to the correct answer: (4 marks)

A. Modeling	B. Transformation	C. Ray tracing
D. Lighting and Shading	E. Texture mapping	F. Z buffering
G. Bump mapping	H. Displacement mapping	

§	Study how changes in levels of sales and prices affect a company's profits	**5**
§	The surface of an object is represented either as a series of curved surfaces or as polygons.	**5**
§	Point at which the computer program generally breaks up complex geometric objects into simple primitives.	**5**
§	Shading information is calculated for each vertex based on the location and color of the light in the computer background.	**5**
§	Maps apply an image to an object's surface like a wallpaper.	**5**
§	Provides a more realistic view by creating highlights to make the surface appear more complex.	**5**
§	Physically offsetting the actual surface according to a displacement map.	**5**
§	A technique used to determine which primitive is closest to the viewing location and angle of the scene.	**5**
§	A technique calculates the path that light rays take through the scene, starting with the viewing angle and location and calculating back to the light source.	**5**

§ A technique provides more accurate shadows than other methods and handles multiple reflections correctly **5**

Section (4): - List types of computer models? (2 marks)

1. ……
2. ……
3. ……
4. ……
5. ……

Section (5): Enumerate all 3D model creation stages? (3 marks)

1. ……
2. ……
3. ……
4. ……
5. ……
6. ……

Section (6): From your background experience, write an essay of not more than 15 lines on The applications of models and simulations in your area of interest : (6 marks)

……
……
……
……
……
……
……
……
……
……
……
……
……
……
……
……
……
……

My best wishes

Prof/Ahmed Waheed