Question 1
When selecting a sequence of views for an orthographic drawing, you should choose:
1. The sequence with the least number of hidden features.
2. The standard views every time (Top, Front, Right Side).
3. The easiest to visualize.
4. The sequence is arbitrary
5. None of the above

Question 2
In what types of drawings can true length measurements be made on the front plane?
1. Perspective
2**. Oblique**
3. Orthographic Projections
4. Both answers 1 and 2
5. Both answers 2 and 3
6. None of the above

Question 5
How are layers suppressed in IntelliCAD viewports?
1. By activating the erase feature
2. By activating a "hide" command
3. By activating a "freeze" command in the Explorer window
4. Both answers 1 and 2 above
5. Both answers 1 and 3 above
6. None of the above

Question 6
The magnitude of the cross product of two vectors is:
1. Equal to 1/2 the area of the parallelogram spanned by the two vectors
2. **Equal to the area of the parallelogram spanned by the two vectors**
3. Equal to twice the area of the parallelogram spanned by the two vectors
4. Not a valid vector operation

Question 7
Which of the following statements is false? A system of linear equations can have:
1. No finite solution
2. A finite number of distinct solutions
3. Infinitely many solutions
4. Exactly one solution
5. None of the above is false

Question 8
What is the Euclidean norm of the vector
v = (2,-1,-2)
1.**√(9**)
2. √(5)
3. √(-1)
4. √(6)
5. √(-8)
6. √(12)
7. None of the above.

Question 9
Let a = (1,3,1) and b = (1,1,1). What does the vector equation(a · b) - (b · a)
evaluate to?
1. 5
2.-5
3. 3
4.-3
5. 6
6. -4
7.None of the above.

Question 10

In the Maple software system the operator := does what?
1. **The variable on the left-hand-side (LHS) of the := is assigned to whatever is evaluated on the right-hand-side (RHS)**
2. The variable on the LHS of the := is reset to its initial value
3. Evaluates the RHS of an _expression using double precision floating point numbers
4. Evaluates the RHS of an _expression using either single, or double precision floating point numbers
5. None of the above is a correct answer

Question 11
Given the following four matrices, which of the 5 matrix-matrix multiplications listed below are valid?
a=[1,2;3,4] b=[1,2;3,4;5,6]c=[7,8,9;4,5,6;1,2,3] d=[-1,5,0;2,-5,6]
1) a*b
2) b*d
3) a*c
4) c*b
5) d*a

1. Operations 1,3,5
2. **Operations 2,4**
3. all of the above are valid operations
4. Operations 1,2,4
5. Operations 2,3,4,5
6. Operations 3,5
7. None of the above

Question 12
What does MATLAB stand for?
1. Mathematics Laboratory
2. **Matrix Laboratory.**
3. Matrix Linear Algebra Basic.
4. Matrix Algebra Theory Laboratory.

Question 13
Let A and B be matrices defined in MATLAB such that
A = [1,2,3;4,5,6;7,8,9] and
B = [0,1,1;1,0,1;1,1,0]
Given the matrix product P = AB, what is element P(3,2)?
1. 9
2. 4
3. **16**
4. 17
5. 11
6. 12
7. None of the above.

Question 14
Let A and B be matrices defined in MATLAB such that
A = [1,2;3,4;5,6;7,8] and
B = [0,1;0,1;1,0;0,1]
Given the matrix product P = AB, what is element P(1,2)?
1. 3
2. 6
3. 14
4. 10
5. 9
6. 2
7. **None of the above**

Question 15
Which of the following is not a requirement to become registered in PEO (Professional Engineers of Ontario)
1. Must be 18 years old
2. Must be sponsored by an organization doing engineering work
3. Must be a Canadian citizen or permenant resident
4. Must meet the educational standards
5. Must have four years experience in an engineering capacity
6. Must pass a professional practice examination

7. **All of the above are requirements for registration**

Question 16
What is the first priority of the Legislative mandate of PEO (Professional Engineers of Ontario)?
1. Service for its members
2. **Public safety**
3. Advisory to the government with regard to engineering matters
4. None of the above

Question 17
What is the axonometric projection of an object?
1. A special case of oblique projection.
2. A single-view orthogonal projection showing more than one face of the object.
3. A single-view orthogonal projection showing more than one face of the object, with one face in true shape.
4. A single-view orthogonal projection showing more than one face of the object in true shape.
5. A single-view orthogonal projection showing all faces of the object in true shape.
6. A single-view orthogonal projection showing more than one face of the object, with one face perspectively distorted.
7. **None of the above.**

Question 18
Which of the following statements best describes a ***three-point*** perspective projection?
1. The projection plane is parallel to two principal axes of the reference coordinate system.
2. The projection plane is perpendicular to two principal axes of the reference coordinate system.
3. **The projection plane is defined by three vanishing points**.
4. The projection plane intersects exactly two principal axes of the reference coordinate system.
5. The projection is not parallel to any principal axis of the reference coordinate system.
6. All but one of the projectors are orthogonal to the projection plane.
7. None of the above.

Question 19
What is a detail drawing?
1. A drawing which includes a list of materials.
2. A drawing where all parts of an assembly are identified
3**. A working drawing of a single part**
4. A drawing detailing how parts fit together

Question 20
In Descriptive Geometry, a line is seen in true length if, and only if it is viewed in a projection plane that is:
1. Perpendicular to the line
2**. Parallel to the line**
3. Inclined to the line
4.Oblique to the line
5. None of the above will serve to show the line in true length

Question 21
Which of the following does not belong in a final engineering report?
1. Letter of transmittal
2. **Progress section**
3. Acknowledgements
4. Recommendations
5. All of the above may be part of a final engineering report
6. None of the above belongs in a final engineering report

Question 22
Three planes which intersect in a unique point at infinity, but in no finite points, must have which of the following properties?
1. All three are parallel, but distinct.
2. All three are mutually orthogonal.
3. The planar intersections form a pair of distinct parallel lines.
4. Two intersect in a line that is contained in the third.
5. Two intersect in a point that is contained in the third.
6. All of the above.
7. None of the above.

Question 23

Let vector u = (5,5) and vector v = (3,1). What is the magnitude of the orthogonal projection of u in the direction of v?
1. 4
2. **2√(10)**
3. 0.8
4. 2√(2)
5. 4√(5)
6. 25
7. None of the above

Question 24
Let w = (1,-1,1), x = (-2,2,-2), a = (1,0,1). What is the magnitude of the cross product of w and x (indicated by ||w × x||) in thedirection of a?
1. √(2)
2. 2√(2)
3. ½√(2)
4. √(3)
5. ½√(3)
6. 0
7. None of the above.

Question 25
Consider the following MATLAB m-file code:

```
index = 0;
M = [1,2,3;4,5,6;7,8,9];
m = M(:,index)
```

When the m-file is run, what will appear in the command window?
1. m =
   1
   4
   7
2. m = 1 2 3
3. m = 1
4. m = 0
5. **An error message.**
6. None of the above.

Question 26
Which of the following areas of study is not an area of responsibility that belongs to the disciplines of Civil or EnvironmentalEngineering?
1. Building and bridge design
2. Air pollution
3. Airport design
4. Public transportation problems
5. Waste water treatment
6. Geotechnical problems
7. **All of the above are Civil or Environmental Engineering areas of responsibility**

Question 27
In the system of equations shown below the coefficients may be thought of as amn in matrix form. Calculate a23 times a32 in the
coefficient matrix A.
x + 2y + 3z = 4
5x + 6y + 7z = 8
9x +10y + 11z = 12
1. 66
2. 67
3. 22
4. 45
5. **70**
6. None of the above

Question 28
Given the voltage V and the resistances R1, R2, and R3 in the circuit shown below what is the size of the coefficient matrix required to solve for all currents.
1. 6 by 6
2. 1 by 6
3. 6 by 1

4. **3 by 3**
5. 1 by 3
6. 3 by 1
7. None of the above

Question 29
In MATLAB the number 10 is assigned to the variable a. What is the output from the MATLAB command 2a^2?
1. 400
2. 200
3. 4a^2
4. **None of the above**

Question 30
In the third angle projection, "glass box" coordinate system, the profile projection is
1. the x/y plane
2. the x/z plane
3. **the y/z plane**
4. the y/minus z plane
5. the x/minus z plane
6. none of the above

5 Which statement below *best* describes an Engineering Code as discussed in class?

1. A set of rules defining a minimum level of performance
2. A set of specifications
3. A set of working drawings
4. A set of design criteria
5. All of the above
6. None of the above

6 What is the transpose of an m-by-n matrix?

1. An m-by-n matrix.
2. An m-by-m matrix.
3. An n-by-n matrix.
4. **An n-by-m matrix**
5. None of the above

8 Let **a** = (1,0) and **b** = (1,1). What is the *cosine* of the angle between the two vectors?

1. **½√(2)**
2. √(2)
3. ½√(3)
4. 2√(2)
5. ¾√(3)
6. ¼√(3)
7. None of the above.

9 What is the area of the parallelogram spanned by the two vectors **u** and **v**, where **u** = (1,2,3) and **v** = (1,1,1)

1. √(2)

2. √(3)

3. 2√(2)

4. 2√(6)

5. 2√(3)

6. 4√(2)

7. None of the above

10 Which of the following Maple commands must be used to force the axes of a plot to have the same scale?

1. scaling=scaled

2. **scaling=constrained**

3. scaling=unconstrained

4. scaling=common

5. None of the above

11 Choose the appropriate Matlab command for assigning 5 to the variable ECOR1000 in the list below.

1. ECOR1000 := 5

2. **ECOR1000 = 5**

3. ecor1000 := 5

4. ecor1000 = 5

5. Both answers 1 and 3

6. Both answers 2 and 4

7. None of the above

12 What does MATLAB stand for?

1. Mathematics Laboratory

2. **Matrix Laboratory.**

3. Matrix Linear Algebra Basic.

4. Matrix Algebra Theory Laboratory.

13 Let **A** and **B** be matrices defined in MATLAB such that
A = [1,2;3,4;5,6;7,8] and
B = [0,1;0,1;1,0;0,1]
Given the matrix product **P** = **AB**, what is element **P**(1,2)?

1. 3

2. 6

3. 14

4. 10

5. 9

6. 2

7. **None of the above**

14 Let **A** and **B** be matrices defined in MATLAB such that
A = [1,2,3,4;5,6,7,8] and
B = [0,1;0,0;1,0;1,0]
Given the matrix product **P** = **AB**, what is element **P**(2,1)?

1. 15

2. 7

3. 5

4. 4

5. 11

6. 17

7. None of the above

15 What is the general defense for an engineer charged under the Occupational Health and Safety Act of Ontario for an alleged safety violation?

1. A financial settlement

2. Confirmation that the engineer is a registered member of the profession

3. **Due diligence**

4. Demonstration that the engineer was under a great deal of employer pressure during the time of the violation

5. None of the above

16 Professions are governed by:

1. An act of the Federal Government

2. An act of the Provincial Government

3. **A code of ethics**

4. Provincially appointed authorities

5. None of the above

17 Consider a three-view drawing done in *first-angle* projection. Where does the *top* view appear relative to the *front* view?

1. To the left.

2. To the right.

3. Below.

4. On top.

5. In front.

6. Behind.

7. None of the above.

18 Which of the following statements *best* describes a *two-point* perspective projection?

1. The projection plane is parallel to two principal axes of the reference coordinate system.

2. **The projection plane is perpendicular to two principal axes of the reference coordinate system.**

3. The projection plane is defined by three vanishing points.

4. The projection plane intersects exactly two principal axes of the reference coordinate system.

5. The projection is not parallel to any principal axis of the reference coordinate system.

6. All but one of the projectors are orthogonal to the projection plane.

7. None of the above.

19 An oblique projection presents the true shape of:

1. **One face of a projected object**

2. Two faces of a projected object

3. All visible faces of a projected object

4. No visible faces of a projected object are in true vie

20 What is a detail drawing?

1. A drawing which includes a list of materials.

2. A drawing where all parts of an assembly are identified

3. **A working drawing of a single part**

4. A drawing detailing how parts fit together