Master of Technology Sample Questions

SECTION A: General

1. A man on tour travelling on the Tour de France initially travels 80 km at 32 km/hr and then the next 160 km at 40 km/hr. The average speed for the first 160 km of the tour is:
   
   A. 25 km/hr  
   B. 34.2 km/hr  
   C. 35.56 km/hr  
   D. 40 km/hr  
   E. 44.2 km/hr

2. NUS organised a special IT careers fair 40% of the local students and 50% of the foreign students participated in the same. What fraction of the total number of students took part in the fair?
   
   A. 40%  
   B. 45%  
   C. 50%  
   D. 55%  
   E. It is not possible to make an estimate

3. Which of the below words is most likely to be the opposite to “passive”

   A. Impassive  
   B. Receptive  
   C. Unresponsive  
   D. Enthusiastic  
   E. Active

4. A fire which breaks out in the floor of a building and then subsequently spreads to all floors of the building is best described as?

   A. An accident  
   B. A disaster  
   C. A conflagration  
   D. A blaze  
   E. An Incident
5. “Agile software development describes a set of values and principles for software development under which requirements and solutions evolve through the collaborative effort of self-organizing cross-functional teams; It advocates adaptive planning, evolutionary development, early delivery, and continuous improvement, and it encourages rapid and flexible response to change”- Wikipedia, the free encyclopedia

Based on the above description; what techniques or approaches are not employed in Agile Software

A. Evolutionary Development
B. Teams with members coming from different business areas
C. Adherence to challenging timescales and detailed plans
D. Early delivery of working software
E. Managing evolving requirements
SECTION B: Software Engineering

1. One of the tasks involved in preparing a project plan is *Precedence Analysis*. Which of the below is a major reason for carrying out precedence analysis

A. Estimating the Effort required to perform the tasks in the project plan  
B. Determining the resources required to carry out the tasks in the project plan  
C. Determine the links between the various tasks in the project plan  
D. Identifying the major requirements for the project  
E. All of the above are major reasons for carrying out precedence analysis

On 1 Dec 2016, the Singapore Government raised the public car park charges for the season parking scheme:

<table>
<thead>
<tr>
<th>Tier 1 – for 1st Car Park Lot (same island-wide, including car parks in RZ/DA)</th>
<th>Before 1 Dec 2016</th>
<th>From 1 Dec 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>$65 / month</td>
<td>$80 / month</td>
</tr>
<tr>
<td>Sheltered</td>
<td>$90 / month</td>
<td>$110 / month</td>
</tr>
<tr>
<td>Equalised (for some car parks with both surface and sheltered lots)</td>
<td>$75 / month</td>
<td>$95 / month</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tier 2 – For Residents’ 2nd and Subsequent Car Park Lots in the Same Household and Non-Residents</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>$65 / month</td>
<td>$90 / month</td>
</tr>
<tr>
<td>Sheltered</td>
<td>$90 / month</td>
<td>$120 / month</td>
</tr>
<tr>
<td>Equalised</td>
<td>$75 / month</td>
<td>$105 / month</td>
</tr>
</tbody>
</table>

*Restricted Zone*

| Surface | $140 / month | $165 / month |
| Sheltered | $160 / month | $190 / month |

*Designated Areas*

| Surface | $125 / month | $150 / month |
| Sheltered | $140 / month | $170 / month |

2. If you are a non-Resident parking your only car in a Restricted Zone Sheltered carpark, how much more money you have to pay from 1 Dec 2016?

A. $15  
B. $20  
C. $25  
D. $30  
E. None of the above
Questions 3 through 4 refers to the following code that implements an algorithm to find the smallest number in a list:

```java
public static void FindMin( int [ ] num )
{
    int i;
    int temp;
    temp = 0;
    for( i=0; i < num.length; i++ )
    {
        if ( temp > num[i] )
        {
            temp = num[ i ];
        }
    }
    System.out.println("The smallest number is " + temp);
}
```

There are basically three types of errors found in computer programs:

- Syntax errors represent grammar errors in the use of the programming language
- Runtime errors occur when a program with no syntax errors asks the computer to do something that the computer is unable to reliably do
- Logic errors occur when there is a design flaw in your program.

3. The above code has an error. The type and result / cause of the error is:
   A. Logic error resulting in an infinite loop.
   B. Logic error resulting in temp sometimes containing a number not found in the list.
   C. Runtime error caused by dividing an integer by zero.
   D. Runtime error caused by trying to access an element that is out of bounds of an array
   E. Runtime error caused by using a negative size in an array.

4. Big O notation is used in Computer Science to describe the performance of an algorithm. The performance of the above algorithm is best approximated by:
   A. O(N) which describes an algorithm whose performance will grow linearly and in direct proportion to the size of the input data set.
   B. O(N^2) which represents an algorithm whose performance is directly proportional to the square of the size of the input data set.
   C. O(2^N) which denotes an algorithm whose growth doubles with each addition to the input data set.
   D. O(log N) which denotes an algorithm taking logarithmic time.
   E. O(N * log N) which denotes an algorithm running in quasilinear time.
5. The International Organization of Standards Open System Interconnection (ISO OSI) model defines a networking conceptual framework to implement protocols in seven layers. Which of the following is an ISO OSI layer?

A. 3G Layer.
B. CDMA Layer.
C. GSM Layer.
D. Internet Layer.
E. **ALL the above are NOT** ISO OSI layers.
SECTION C: Knowledge Engineering

1. Which of the following pseudo code blocks will be executed by the following pseudo code?

```plaintext
noSides := 4
sidesEqual := True
angles90 := True
If noSides = 3 Then
    // I am a triangle
Else noSides = 5 Then
    // I am a pentagon
    Else If sidesEqual = True and angles90 = False Then
        // I am a rhombus
    Else If sidesEqual = False Then
        // I am a rectangle
    Else If angles90 = True Then
        // I am a square
    end If
end If
end If
```

A. I am a triangle.
B. I am a pentagon.
C. I am a rhombus.
D. I am a rectangle.
E. I am a square.
2. The payoff (X) for buying a $1 lottery ticket has the following probability distribution.

<table>
<thead>
<tr>
<th>Payoff</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>X=Win $100</td>
<td>0.1%</td>
</tr>
<tr>
<td>X=Lose $0</td>
<td>99.9%</td>
</tr>
</tbody>
</table>

What is the expected value of X?

A. $50  
B. $10  
C. $1   
D. $0.1 
E. $0.01

3. A private educational advisor has guaranteed that any high school student who is taught by him well have a 90% chance of entering the prestigious National University. Two high school students are currently being taught by the advisor. Assuming each student’s results are independent what is the probability that at least one of them will be successful in entering the National University?

A. 0.5  
B. 0.65 
C. 0.88 
D. 0.9  
E. 0.96

4. Peter walks south for 20 m, turns right and walks another 10 m. He then turns left and walks slowly for 10 m. Then he turns right, and runs 20m and stops. In which direction is he with respect to his initial position?

A. South-East  
B. North-East  
C. North-West  
D. South-West  
E. South

5. What is the next number in the series: 42, 41, 39, 36, 35, 33…?

A. 32  
B. 31  
C. 30  
D. 29  
E. 28
SECTION D: Business Analytics

1. The difference between the largest and the smallest data values is the
   A. Skewness
   B. Interquartile range
   C. Range
   D. Coefficient of variation
   E. Kurtosis

2. What is the Mean, Median and Mode of the following data: 34, 34, 36, 30, 32, 28, 30, 30?
   A. 32.15, 31, 31
   B. 31.55, 30, 30
   C. 32, 30, 31
   D. 31.75, 31 ,30
   E. 31.55, 31 ,30

3. A clothing shop in the USA that specializes in warm outdoor clothing has experienced higher sales during months of October, November and December. Monthly sales patterns for this shop over the year are an example of which component of time series.?
   A. Trend
   B. Seasonal
   C. Cyclical
   D. Irregular
   E. Disruptive

4. Two events, A and B, are mutually exclusive.
   - The probability of A occurring = P(A); (0 < P(A) <1)
   - The probability of B occurring = P(B); (0 < P(B) <1)

   Suppose event A occurs, then the probability of the occurrence of event B is?
   A. 0
   B. 1
   C. P(B)
   D. P(A) * P(B)
   E. P(B)/P(A)
5. The following statements are made:
   - Some Lawyers are fools.
   - Some fools are poor.

Which of the below statements are true?
A. “Some Lawyers are poor”
B. “Some poor people are Lawyers”
C. “Some Lawyers are poor” or “Some poor people are Lawyers”
D. Neither “Some Lawyers are poor” and “Some poor people are Lawyers”
E. Both “Some Lawyers are poor” and “Some poor people are Lawyers”