**Excel Technologies Ltd.**

**Competency Assessment**

Position: Software Engineer

Total Marks: 30

*Ensure you are indicating accurately what question you are answering. Make sure your script is clean and easily readable. Do not forget to fill up the box below with your information. Attach the question paper with you script. During competency assessment, you are not allowed to use internet through any means.*

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| Name | M | D. |  | A | B | D | U | L |  | H | A | K | I | M |  |  |  |  |  |  |
| Cellphone | 0 | 1 | 7 | 4 | 0 | 1 | 2 | 4 | 6 | 5 | 6 |  |  |  |  |  |  |  |  |  |
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|  |  | Marks |
| 1 | Consider the following register. Holy Family Red Cross Hospital is using this register to manage doctors’ list, their contact number, and the departments where the doctors are belongs to. With this register, the hospital is also managing doctor’s service points within the hospital.   1. Apply normalization rule to normalize this register up to 3rd normal form. 2. After normalization, draw Entity Relationship Diagram and show the degree of cardinality among entities using crow’s foot notation.  |  |  |  |  | | --- | --- | --- | --- | | **Doctor** | **Contact Number** | **Service Points** | **Department** | | Dr. Lissa Mwenda | +260766219936 | Antenatal Care, Family Planning, Postnatal Care | Gynecology | | Dr. Yvonne Sishuwa | +260766219937 | Family Planning, Postnatal Care | Pediatrics | | Dr. Machalo Mbale | +260766219938 | Antenatal Care | Radiology and Imaging |   **Answer a:**  create table Departments(  Id int identity primary key,  Name nvarchar(40) not null,  )  create table Doctors(  Id int identity primary key,  DoctorName nvarchar(40) not null,  ContactNumber nvarchar(40) not null,  DepartmentId int unique not null  )  create table ServicePoints(  Id int identity primary key,  ServicePoint nvarchar(40) not null,  )  create table ServicePointWithDoctor(  Id int identity primary key,  ServicePointId int not null references ServicePoints(Id),  DoctorId int not null references Doctors(Id)  )  insert into Departments(Name) values ('Gynecology'),('Pediatrics'),('Radiology and Imaging')  insert into Doctors(DoctorName,ContactNumber,DepartmentId) values  ('Dr. Lissa Mwenda','+260766219936',1),  ('Dr. Yvonne Sishuwa','+260766219937',2),  ('Dr. Machalo Mbale','+260766219938',3)  insert into ServicePoints(ServicePoint) values  ('Antenatal'),('Family Planning'),('Postnatal Care')  insert into ServicePointWithDoctor(ServicePointId,DoctorId) values  (1,1),(2,1),(3,1),(2,2),(2,3),(3,3)  **Answer b:** | 5 X 2 = 10 |
| 2 | Consider the following loop. Trace the value of “n” in every iteration of the loop.  int n = 30;  for (int i = 0; i <= 5; i++)  {  n += i;  }  print(n); | 5 |

**Answer: 30, 31, 33, 36, 40, 45.**

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| 4 | Explain method overloading and method overriding with example. Write your code in C# programming language.  **Answer:**  **Method Overloading:** Overloading means multiple method have same name but different signature. Example:   public void Add(int a, int b){  return a+b;  }  public void Add(int a, int b,int c){  return a+b+c;  }  **Method Override:** Override means derived class method override or modified.  Example:  public class BaseClass(){  public virtual void methodBase(){  Console.WriteLine(“base class”);  }  }  public class DerivedClass: BaseClass{  public override void methodBase(){  Console.WriteLine(“derived class”);  }  } |  |
| 5 | Translate the following UML Class Diagram into program code. Write your code in C# programming language. | 5 |
| **Answer:**  public class Clinician  {  public string Name { get; set; }  public string HospitalName { get; set; }  public bool Login(string userName, string password)  {  return true;  }  private bool IsSessionExists(string userName)  {  return true;  }  }  public class Doctor: Clinician  {  public string PracticeNumber { get; set; }  public void CreatePrescription(int patientNumber)  {  }  }  public class Pharmacist: Clinician  {  public string PharmacistNumber { get; set; }  public void DispenseMedications(int prescriptionNumber)  {  }  } | | |
| 6 | Translate the UML Activity diagram into program code. Write your code either in C# programming language. | 5 |
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