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**ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)**

ORGANISATION OF ISLAMIC COOPERATION (OIC)

**Department of Computer Science and Engineering (CSE)**

MID SEMESTER EXAMINATION

SUMMER SEMESTER, 2021-2022

DURATION: 1 HOUR 30 MINUTES

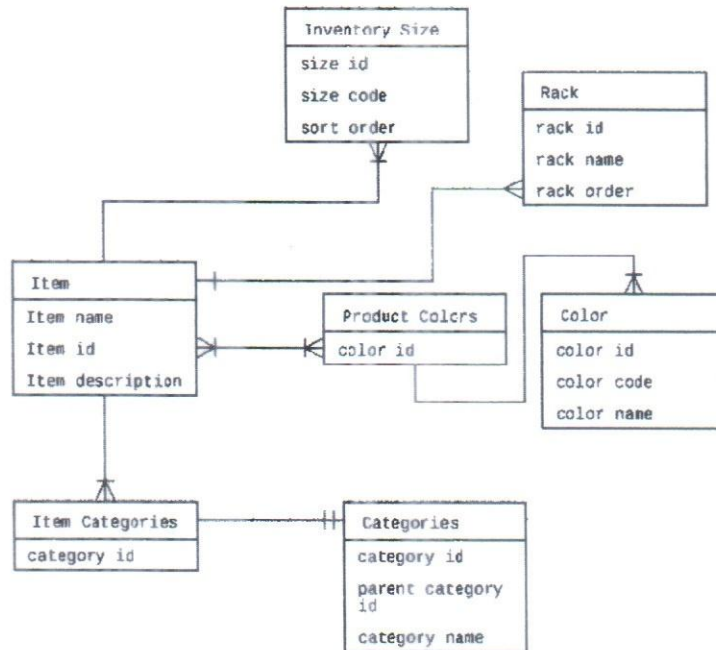
FULL MARKS: 75

**SWE 4801: Software Maintenance****Programmable calculators are not allowed. Do not write anything on the question paper.**Answer **all 3 (three)** questions. Figures in the right margin indicate full marks of questions whereas corresponding CO and PO are written within parentheses.

1. A software company of Capability Maturity Model (CMM) level 4 has delivered “abc” software to “XYZ” company. Later on, “XYZ” company requested some feature extensions and bug fixes. The cost for proposed maintenance activities was a burden for “XYZ” company as they don’t have enough resources now. So, the management team prioritized important features and bug fixes.
  - a) What do you understand by software maintenance? Why software maintenance is needed? 1+4  
(CO1)  
(PO1)
  - b) What is software evolution? Using Lehman’s laws, explain what properties of evolution will affect the “abc” software through gradual maintenance works. 2+5  
(CO2)  
(PO2)
  - c) What model of software maintenance was adopted in the above mentioned scenario? If you replace this model with Osborne’s model, what would have changed? Briefly explain. 2+6  
(CO2)  
(PO2)
  - d) According to the maintenance framework, briefly explain how the maintenance process will be conducted for the mentioned case in the scenario. 5  
(CO1)  
(PO1)
  
2.
  - a) Redocumentation and design recovery are two forms of reverse engineering. Redocumentation is the representation of a program in a semantically equivalent form but at the same relative level of abstraction. Design recovery is the extraction of higher-level abstractions of the program. Briefly explain how different level of abstractions could be achieved by “Redocumentation” and “Design Recovery”. 8  
(CO3)  
(PO2)
  - b) Reverse Engineering simply enables an understanding of a system by representing it at an equivalent or higher abstraction level. To implement the understanding, you can take help of different supporting techniques. Briefly discuss the techniques. 8  
(CO3)  
(PO2)
  - c) Company “XYZ” is involved to manage an inventory system having more than 1700 data centers totaling over 1.4 billion lines of code. The main problem faced by the company are costly database operations due to the lack of standardized data and data structures. As a maintenance engineer what kind of solution you will provide to solve the mentioned problem. 9  
(CO3)  
(PO2)

3. a) Consider the ER diagram of the Departmental Shop Management System shown in Figure 1. A maintenance team want to edit this data model diagram by renaming the 'Item' module to the 'Product' module. From Figure 1 you can see that the 'Item' module is in relation to many other modules. So, if the 'Item' module is renamed, it will inevitably affect other modules. 5×3  
(CO3)  
(PO2)

So, before making such changes, the team need to analyze well about the data model and the impact of the changes. In cases where the concerned people don't think carefully about the consequences of changes they are going to commit in the modules, it can affect the proper working of the application itself. This is why impact analysis is very important.



**Figure 1:** ER Diagram for Question no 3.a)

Answer the following question according to the scenario above.

- i. What is Impact Analysis?
  - ii. How to conduct an Effective Impact Analysis?
  - iii. How is Impact Analysis method useful to developers and testers?
  - iv. How to prepare Impact Analysis document?
  - v. What are some of the risks of not doing an impact analysis before effecting a change?
- b) List the different types of program understanding strategies and distinguish between them. Which of these strategies do you use and under what circumstances? 10  
(CO3)  
(PO2)