

**Indian Statistical Institute
Documentation Research and Training Center**

**MS in Library and Information Science
Semester Exam (IV semester) (2021-2023)
Paper –20 : SEMANTIC WEB**

Date: 28.04.2023

Max Marks: 100
Time: 3 Hours

Answer the question number 1 plus any four questions from the rest five questions. All questions carry equal marks.

1. Answer all the questions. [2*10 = 20]
- (i) What is taxonomy?
 - (ii) What is 'open world assumption'?
 - (iii) Define property chain with an example.
 - (iv) Define object property characteristic 'reflexive' with an example.
 - (v) Define an axiom with an example.
 - (vi) Define owl:disjointWith with an example.
 - (vii) Define knowledge graph.
 - (viii) What is top-level ontology?
 - (ix) Define the purpose of an ontology editor.
 - (x) Define rdf:type with an example.
2. What is domain ontology? Discuss with examples, the steps of designing a domain ontology. [20]
3. (a) Briefly, explain the notion of TBox, RBox and ABox. [10]
(b) Describe the key linked data technologies. [10]
4. (a) Illustrate the merits and demerits of ontology language OWL over RDFS. [10]
(b) Draw a RDF diagram for the following RDF/XML data. [10]

```
<?xml version="1.0"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:mvoc="http://purl.org/voc/1.1/">
<rdf:Description rdf:about="http://www.example.com/article/2014/fd01">
  <rdf:type rdf:resource="http://www.example.com/Article"/>
  <mvoc:title>Standing Gravity Waves on the Surface of a Viscous Liquid</mvoc:title>
  <mvoc:publisher rdf:resource="https://www.springer.com/">
  <mvoc:publishedIn rdf:resource="https://www.springer.com/journal/10697"/>
```

```
<mvoc:creator rdf:nodeID="x"/>
</rdf:Description>
<rdf:Description rdf:nodeID="x">
  <rdf:type rdf:resource="http://www.example.com/Author"/>
  <mvoc:firstAuthor rdf:resource="http://linkedin.org/SVKalinichenko"/>
  <mvoc:secondAuthor rdf:resource="http://linkedin.org/NVNestorov"/>
</rdf:Description>
<rdf:Description rdf:about="http://linkedin.org/SVKalinichenko">
  <mvoc:name>S. V. Kalinichenko</mvoc:name>
</rdf:Description>
<rdf:Description rdf:about="http://linkedin.org/NVNestorov">
  <mvoc:name>N. V. Nestorov</mvoc:name>
</rdf:Description>
</rdf:RDF>
```

5. (a) What is Description Logics (DL)? Describe *concept, roles and individuals* of DL. [2+8]
- (b) Briefly, describe the various tasks of a reasoner. Briefly, describe the Hermit reasoner. [5+5]
6. Answer *all four* questions [4*5=20]
- (a) Discuss the SPARQL Select query form with an example.
- (b) What are the primary differences between a traditional classification schema and an ontology?
- (c) Define and explain the difference between 'owl:FunctionalProperty' and 'owl:InverseFunctionalProperty'.
- (d) Briefly, discuss the advantages and disadvantages of logic in knowledge representation.