


**VII SEMESTER B.TECH. (INFORMATION TECHNOLOGY/
COMPUTER AND COMMUNICATION ENGINEERING)**
MAKEUP EXAMINATIONS, DEC 2017/JAN 2018
SUBJECT: PROGRAM ELECTIVE VI - SEMANTIC WEB [ICT 4008]
**REVISED CREDIT SYSTEM
(02/ 01/2018)**

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ❖ Answer **ALL** the questions.
- ❖ Missing data and URI's may be suitably assumed.

- 1A.** Represent each of the following sentences in RDF graph. Give RDFS graph for any one of the following sentence. 5
- i) Jack Smith studies at Manipal University
 - ii) Manipal University has a web site at <http://www.manipal.edu/>
 - iii) Jack is a friend of Elisa Ford
 - iv) Elisa Ford studies at Mangalore University of Technology
 - v) MangaloreUniversity of Technology has a website at <http://www.mgllore.edu>
- 1B.** With an example, explain the following. 3
- i) Identity Assertions
 - ii) Negative Assertions
- 1C.** What are the two core properties for Restricting Properties? Explain. 2
- 2A.** Represent following sentences in OWL2 language and state what type of restriction is used while representing it. 5
- i) Reader is somebody who reads Book
 - ii) HarrysBooks is a class with author Harry.
 - iii) Tetralogy is a class with number of volumes 4
 - iv) Good apartments will sell themselves
 - v) Adult is the subclassof Persons that have value for has age that falls within the range of integers ≥ 18
- 2B.** With an example, explain how terminologies in relational database is mapped to RDFS/OWL terms. 3
- 2C.** Explain with an example, the construct that is used in SPARQL to remove the triples that are matched by the specified graph pattern. 2
- 3A.** Explain various steps involved in constructing ontologies manually. 5
- 3B.** Convert the following RDF/XML syntax to its equivalent Turtle syntax and RDF 3

Graph.

```
<?xml version="1.0" encoding="utf-8"?>
<rdf:RDF xmlns:dbpedia-owl="http://dbpedia.org/ontology/"
xmlns:dbpedia="http://dbpedia.org/resource/"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:ex="http://www.example.org/ontology/student.ttl#">
xmlns:ex1="http://www.example.org/ontology/course.ttl#">
<rdf:Description
rdf:about="http://www.example.org/ontology/student.ttl#">
<ex:name_is rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
Jeff
</ex:name_is>
</rdf:Description>
<rdf:Description
rdf:about="http://www.example.org/ontology/student.ttl#">
<ex:studies_in
rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
MIT
</ex:studies_in>
</rdf:Description>
<rdf:Description
rdf:about="http://www.example.org/ontology/student.ttl#">
<ex:taken_course rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
Semantic Web
</ex:taken_course>
</rdf:Description>
<rdf:Description
rdf:about="http://www.example.org/ontology/course.ttl#">
<ex1:course_code rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
ICT 4008
</ex1:course_code>
</rdf:Description>
<rdf:Description
rdf:about="http://www.example.org/ontology/student.ttl#">
<ex:placed_in
rdf:resource="http://www.example.org/ontology/student.ttl#Cerner"/>
</ex:placed_in>
</rdf:Description>
```

- 3C. What is the basic infrastructure required to perform a SPARQL query? 2
- 4A. What are the limitations of current Web? Explain in detail. 5
- 4B. With an example, explain qualified cardinality restriction and cardinality restriction. 3
- 4C. Explain RDF reification with an example. 2
- 5A. Represent the following statement in RDF graph. Build suitable RDFS graph too and express it in turtle syntax 5
"Olivier is a 20 year old Swiss student at EPFL University studying English"

5B. Given the following small ontology:

```
@prefix dc: <http://ntnu.edu/dc/elements/1.1/> .
@prefix stock: <http://ntnu.edu/stock#> .
@prefix inv: <http://ntnu.edu/inventory#> .
stock:book1 dc:title "SPARQL Introduction" .
stock:book1 rdf:type "Computer Science" .
stock:book1 inv:price 10 .
stock:book1 inv:quantity 3 .
stock:book2 dc:title "World War II" .
stock:book2 rdf:type "History" .
stock:book2 inv:price 20 .
stock:book2 inv:quantity 5 .
stock:book3 dc:title "Lost in Space" .
stock:book3 rdf:type "Science Fiction" .
stock:book3 inv:price 5 .
stock:book3 inv:quantity 0 .
stock:book4 dc:title "SpaceX" .
stock:book4 rdf:type "Science Fiction" .
stock:book4 inv:price 20 .
stock:book4 inv:quantity 8 .
stock:book5 dc:title "Novels from Rome" .
stock:book5 rdf:type "Novel collection" .
stock:book5 inv:price 14 .
stock:book5 inv:quantity 2 .
```

What would the following SPARQL-query return?

```
PREFIX dc: <http://ntnu.edu /dc/elements/1.1/>
PREFIX stock: <http://ntnu.edu /stock#>
PREFIX inv: <http://ntnu.edu /inventory#>

SELECT ?book ?title
WHERE {
  ?book dc:title ?title .
  ?book inv:price ?price . FILTER ( ?price < 15 )
  ?book inv:quantity ?num . FILTER ( ?num > 0 ) }
```

3

5C. State requirements for ontology languages.

2