

**GANPAT UNIVERSITY****M. Tech. Semester: III Computer Engineering/ Information Technology****3CE301/3IT301: Semantic Web (Elective III)****Time: 3 Hours**

DEC 2013

**Total Marks: 70**

- Instructions:**
1. Attempt all questions.
  2. Figures to the right indicate full marks.
  3. Each section should be written in a separate answer book.

**SECTION - I**

- Que.1** [A] Explain layered approach of the Semantic Web. [6]  
 [B] Give the DTD and its XML which include following information: [6]
- [1] The root element is "orderform".
  - [2] The content of "orderform" is a "customer" element and a "product" element in that order. "customer" occurs once, and "product" may occur zero or more times.
  - [3] The content of "customer" is the "name", "address" and "tel" elements, each occurring once in order.
  - [4] The content of "name" and "address" is a text string.
  - [5] The content of "tel" is the "portable" and "home" elements, with either one or the other occurring.
  - [6] The content of "portable" and "home" is a text string.
  - [7] The content of "product" is the "product\_name" and "num" elements, each occurring once in order.
  - [8] The content of "product\_name" is a text string.
  - [9] The content of "num" is a numeric value.

**OR**

- Que.1** [A] Explain Alternative Semantic Web Stack. How it is differ from layered stack of Semantic Web. [6]  
 [B] Do following using XML-Schema: [6]
- [1] Create a "priceType" type that is an integer greater than or equal to 2,000 and less than or equal to 5,000.
  - [2] Extend the "priceType" type, by creating a product price "goodsPriceType" type that is a string type having a "Currency" attribute.

- Que.2** [A] Define XML. Explain advantages and disadvantages of XML over HTML. [3]  
 [B] Represent following statements as a single RDF Graph. [2]
- [1] <http://www.example.org/index.html> has a creation-date whose value is August 16, 1999.
  - [2] <http://www.example.org/index.html> has a language whose value is English.
- [C] List out core classes and core properties of RDF. Describe the utility properties of RDF with example. [6]

**OR**

- Que.2** [A] Explain Container element of RDF with example. What do you mean by Reification? Give example. [5]

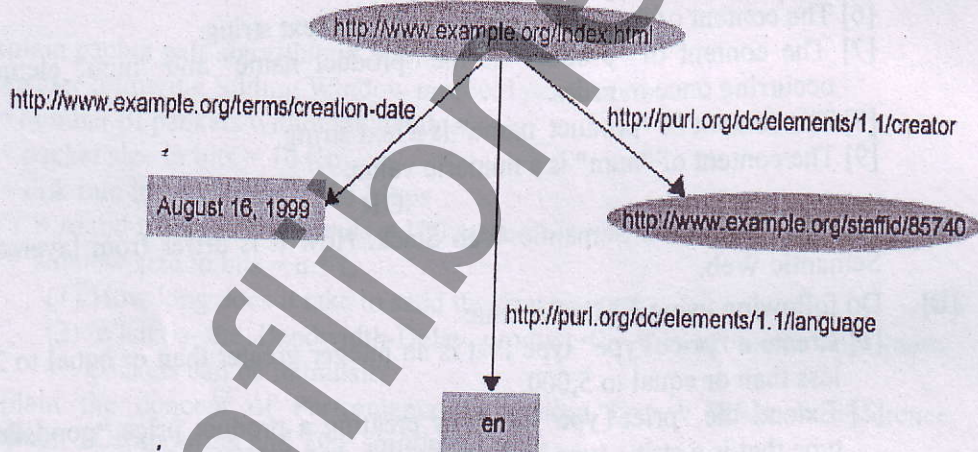
- [B] A travel agency offers the following flights: Write an XSLT that lists all flights to Rom. And give output like below: [6]

### Flight List

From	To	Start	Arrival	Price
Frankfurt	Rom	2004-09-07 09:30	2004-09-07 10:30	70
Frankfurt	Rom	2004-09-07 09:00	2004-09-07 10:05	70

```
<? xml version="1.1"?>
<flights>
<flight from="Frankfurt" to="Rom" start="2004-09-07 09:30"
arrival="2004-09-07 10:30" price="70"/>
<flight from="Frankfurt" to="Rom" start="2004-09-07 09:00"
arrival="2004-09-07 10:05" price="70"/>
<flight from="Frankfurt" to="Helsinki" start="2004-09-07 09:50"
arrival="2004-09-07 11:45" price="90"/>
<flight from="Basel" to="Prag" start="2004-09-07 10:15"
arrival="2004-09-07 11:30" price="60"/>
<flight from="Baden-Baden" to="Frankfurt" start="2004-09-07 08:30"
arrival="2004-09-07 09:05" price="55"/>
</flights>
```

- Que. 3 [A] Write RDF/XML Describing following graph. [4]



- [B] Write down OWL specifications to represent the following knowledge involving people: [8]
- [1] Each person is either Male or Female.
  - [2] Parent is Person with a Child.
  - [3] Every big family person is someone with at least 4 children.
  - [4] An adult is someone who is at least 18 years old.

SECTION – II

Que.4 [A] What are the limitations of the expressive power of RDF Schema? How ontology can overcome the limitations of RDF Schema? [4]

[B] Given the following RDF triples: [8]

```
@prefix foaf: <http://xmlns.com/foaf/0.1/>.
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>.
@prefix f: http://www.cems.uwe.ac.uk/empdept/concept/.
<http://www.cems.uwe.ac.uk/empdept/emp/#121> rdf:type f:emp
<http://www.cems.uwe.ac.uk/empdept/emp/#121> foaf:surname "Smith"
<http://www.cems.uwe.ac.uk/empdept/emp/#113> rdf:type f:emp
<http://www.cems.uwe.ac.uk/empdept/emp/#113> foaf:surname "Brown"
<http://www.cems.uwe.ac.uk/empdept/emp/#107> rdf:type f:emp
<http://www.cems.uwe.ac.uk/empdept/emp/#107> foaf:surname "Jones"
<http://www.cems.uwe.ac.uk/empdept/emp/#107> f:sal 1420
<http://www.cems.uwe.ac.uk/empdept/emp/#121> f:sal 2570
<http://www.cems.uwe.ac.uk/empdept/emp/#113> f:sal 730
```

[1] Write a SPARQL query that returns the name and the salary of the employee that earns more than 2000.

[2] Write a SPARQL query that returns the name and the salary of the employee that earns between 1000 and 3000 inclusive.

[3] Write also the result of the queries in form of a table.

OR

Que.4 [A] Explain Monotonic and Non-monotonic rules with examples. [4]

[B] Write the following knowledge in OWL: [8]

[1] A bank has customers.

[2] Customers can be retail customers or business customers.

[3] A retail customer cannot be a business customer; a business customer can never be a retail customer.

[4] A customer can have a bank account; a bank account belongs to a specific bank.

Que.5 [A] Write OWL document to define some named pizzas: [5]

[1] Create a subclass of "pizza", called "NamedPizza", and a subclass of "NamedPizza" called "MargheritaPizza".

[2] Create a "CheesyPizza" Class and add a restriction: "Every CheesyPizza must have at least one CheeseTopping".

[3] Create a "hasSpiciness" object property.

[B] How semantic web technology is applied to Elsevier for Horizontal Information Products. Give problem, contribution of Semantic Web and the result. [6]

OR

Que.5 [A] Write the following statements in OWL for university domain: [5]

[1] First-year courses to be taught by Professors only.

[2] All academic staff members must teach at least one undergraduate course.

(Use the terms 'isTaughtBy' and 'Teaches' as Property elements)

[B] How semantic web technology is applied to Audi for Data Integration Problem. Give problem, contribution of Semantic Web and the result. [6]

Que.6 [A] Explain each stages of ontology development process. [5]

[B] What is DLP? What is SWRL? [2]

[C] What is OWL? Explain the sublanguages of OWL. [5]

END OF PAPER