APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

Q. P. Code: CSE0820321B-II **(Pages: 4)** **Name:** .....

Reg. No:.....

THIRD SEMESTER M.TECH. DEGREE EXAMINATION FEBRUARY 2021

Branch: Computer Science and Engineering **Specialization: Computer Science and Engineering**

08 CS 7021(B) SEMANTIC WEB

(Common to CSE)

Time: 2 hour 15 minutes **Max. Marks: 60**

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
1.a	Explain the limitations of XML and describe how the vision of semantic web tries to overcome these limitations.	3
	Answer b or c	
b	The semantic web layer cake is made up of several components and follows a certain hierarchy. Explain and illustrate with the help of a figure.	6
c	How can we build a semantic web search engine? Explain in detail.	6

Q.no.	Module 2	Marks
2.a	Draw an RDF graph corresponding to the following document:	3

```
<?xml version="1.0"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:ex="http://example.org/stuff/1.0/">
<rdf:Description rdf:about="http://www.cs.le.ac.uk/films/starwars7"
      dc :title="Star Wars: The Force Awakens">
  <ex:author rdf:nodeID="sw"/>
</rdf:Description>
<rdf:Description rdf:nodeID="sw" ex:name="J.J.Abrams">
  <ex:homePage rdf:resource="http://www.imdb.com/name/nm0009190/"/>
</rdf:Description>
</rdf:RDF>
```

Answer b or c

b Model the following education ontology in RDFS using RDF-XML/Turtle. You can skip namespaces. **6**

School, College and University are places of education. International university is a type of university. A School has a school bus. Buses have numbers. University has buildings. Each building has a code number. Cafeteria and library are types of building.

Assume XSD properties take values of type integer.

c Explain the following RDF(S) core classes or properties: **6**

i. rdfs:Resource
ii. rdfs:domain
iii. rdfs:range
iv. rdf:Property
v. rdf:type
vi. rdfs:label

Q.no.	Module 3	Marks

3.a Enumerate the various semantic web languages in the order of expressiveness. A figure may be used. **3**

Answer b or c

b Consider the following domain of "Restaurants". **6**

A restaurant is managed by a management team. It employs a head chef, several chefs and a busser (cleaner). The restaurant provides takeaway as well as eat-in services. The menu provides an option of several courses including appetisers, main courses, desserts and wines. It serves both vegetarian and non-vegetarian food items. Customers have the option to have their meals as Ala carte or set meals. The restaurant has a policy of serving only a specific wine with specific food items. It arranges theme evenings such as "Italian Feast", "Indian Festival" and "Chinese celebration". The restaurant uses a check cover to present checks (bills) to the customers. A check cover can contain only one bill.

Define classes using your ontology for the questions (i) to (iii) below. Use the OWL syntax or OWL abstract syntax (or a reasonable approximation). Carefully distinguish "someValuesFrom" from "allValuesFrom".

i. Chefs in charge of cooking vegetarian main course.

ii. FoodItem (Signature dish) cooked only by the head chef.

iii. IndianFestivalThemeMenu which is a type of Menu.

c Consider the above restaurant scenario . 6

(i) Identify six concepts and six properties relevant to the domain. You can write your answer as
Concepts: Concept1, Concept2, ...
Properties: Property1, Property2, ...

(ii) Give three examples of properties specific to the domain. Property type may chosen from inverse, unique (functional), transitive, or symmetric property respectively. Do not give more than one example of each property type. In case of inverse, note the property for which this is an inverse. Define domain and range restrictions for the properties. You may choose properties identified for answering questions 3b(i) to 3b(iii).

Q.no.	Module 4	Marks
4.a	Briefly explain about *categoryBag* and *identifierBag* used in UDDI.	3

Answer b or c

b	Enumerate and briefly explain the basic elements of WSDL.	6
c	Explain the basic UDDI data types.	6

Q.no.	Module 5	Marks
5.a	OWL-S provides an upper level ontology for services. Enumerate and briefly explain the components of the upper level ontology.	4

Answer b or c

b *Consider an online card making and delivering service which allows registered users to make cards online and delivers them for a fee. Users can search for cards for different occasions, customise them and finally get them printed and delivered. The service provides facilities to view or change different attributes of the cards such as fonts, background colour and images. Someof the atomic processes supported by the service are:* 8

- *Change card attributes: allows users to change various features of the card such as images, text, paper quality.*
- *View orders: allows users to view their order information such as number of cards ordered, existing orders, delivery address and billing address.*
- *Edit user account information: allows users to edit their account information such as address, email and phone number.*
- *Search card gallery: allows users to search for card templates.*
- *Add to basket: allows users to add customised cards to the basket.*
- *Check out: allows users to pay for the cards they have ordered.*

With reference to the OWL-S model:

Describe informally (OWL-S syntax not required) the functional properties of the online card delivery service.

c	Consider the above online card making and delivering service Explain informally (defining the model is not required) how the Process model for such a service would be designed. A figure may be used.	8

Q.no.	Module 6	Marks
6.a	Give three examples of popular ontologies on the web along with their purpose.	4
	Answer b or c	
b	Discuss the procedure for creating and publishing your own FOAF document with an example.	8
c	Explain Horizontal Indexation procedure with an example.	8