(2½ Hours)   **[Total Marks: 75]**

N.B.   1) **All questions are compulsory.**
        2) **Figures to the right indicate marks.**
        3) **Illustrations, in-depth answers and diagrams will be appreciated.**
        4) **Mixing of sub-questions is not allowed.**

Q. 1   **Attempt All (Each of 5Marks)**   **(15)**

(a)   Multiple Choice Questions:

(i)   What type of web services do not keep any memory of what happens to it between requests?
    (A) stateful   (B) stateless
    (C) singleton   (D) none of these

(ii)   Which element is a single root of every SOAP message?
    (A) <Envelope>   (B) <Entity>
    (C) <soap>   (D) <soapEnvelope>

(iii)   Which of the following HTTP method should be used to create resource using RESTful web service?
    (A) GET   (B) DELETE
    (C) PUT   (D) OPTIONS

(iv)   Which of the following is correct about URI in RESTful web services?
    (A) Each resource in REST is identified by its URI
    (B) Purpose of URI is to locate resource on the server hosting the web service
    (C) Both (A) and (B)
    (D) Neither (A) nor (B)

(v)   WCF supports which transport schema?
    (A) HTTP   (B) TCP
    (C) MSMQ   (D) All of these

(b)   Fill in the blanks:
(@QueryParam, SOAP, Reverse State Transfer, WSDL, UDDI, @Param, Representational State Transfer, Named, MSMQ)

(i)   _____ is a de facto standard messaging protocol used by web services.

(ii)   Web services can be published and discovered using _____ .

(iii)   _____ annotation of JAX-RS API binds the parameter passed to method to a query parameter in path.

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(iv)   REST stands for _____.

(v)   In WCF, _____ pipes are used for one-way or duplex communication between different WCF applications on a single computer.

(c)   Answer in 1 – 2 sentences:

(i)   What is SOA?

(ii)   What is JAX-WS?

(iii)   Describe the purpose of @javax.ws.rs.Produces annotation.

(iv)   What is OAUTH protocol used for?

(v)   What is the purpose of FaultContract in WCF?

Q. 2   Attempt the following (Any THREE)   **(15)**

(a)   What are web services? How do web services differ from web-based applications?

(b)   Explain various types of information that can be published in UDDI registry.

(c)   Explain SOAP communication model.

(d)   Explain any 5 key capabilities of ESB.

(e)   Write a note on portfolio analysis in Web Services Development Lifecycle.

(f)   Give example and illustrate the steps for creating a web service using JAX-WS.

Q. 3   Attempt the following (Any THREE)   **(15)**

(a)   Explain how HTTP GET Method is used to perform READ data action in RESTful Web Services.

(b)   Explain various grant types available in OAuth 2.0 protocol.

(c)   Describe the core constraints of RESTful system.

(d)   Explain the concept of HATEOS.

(e)   What are annotations? Explain @Path annotation used for defining RESTful resource.

(f)   How is JSON data processed in RESTful web services? Describe various Java APIs available for processing JSON.

Q. 4   Attempt the following (Any THREE)   **(15)**

(a)   Explain the following terms:

(i) Endpoint   (ii) Binding

(b)   Write a note on WCF Architecture.

(c)   Explain various hosting options available for WCF Web Services.

(d)   What do you understand by a contract in WCF? Explain the purpose and usage of ServiceContract attribute.

(e)   Write the steps involved in creating web service using WCF. Illustrate with a suitable example.

(f)   Describe any five features of WCF.

Q. 5 **Attempt the following (Any THREE)** (15)
(a) Describe various advantages of SOAP.
(b) Explain various message patterns that can be used with WSDL.
(c) Write a note on Web Application Description Language (WADL).
(d) Explain the following core architectural elements of a RESTful system:
  (i) Resource   (ii) Representation of a Resource
(e) Explain the following Business Service Realization options:
  (i) Green-field development   (ii) Meet-in-the-middle development

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