(2 ½ 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 **5 Marks**) **(15)**

a() 1. Software Requirement Specification (SRS) is also known as specification of _____.
a. White box testing
b. Acceptance testing
c. Integrated testing
d. Black box testing

2. Which is the most desirable form of coupling?
a. Control coupling
b. Data coupling
c. Common coupling
d. Stamp coupling

3. Kind of diagrams which are used to show interactions between series of messages are classified as _____.

a. activity diagrams
b. state chart diagrams
c. collaboration diagrams
d. object lifeline diagrams

4. Six Sigma methodology defines three core steps _____.
a. analyse, improve, control
b. analyse , design , verify
c. define , measure, analyse
d. define , measure, control

5 Diagrams which are used to distribute files, libraries and tables across topology of hardware are called _____.

a. deployment diagrams
b. use case diagrams
c. sequence diagrams
d. collaboration diagrams

(b) 1. HLD stands for .....
2. SDP short for .....
3. KLOC stands for …….....
4. RMMM stands for .....
5. CMP stands for .....

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(c) 1.Define time line charts in Software Engineering?

2.Define Quality assurance?

3.Define validation?

4.Define Software Engineering?

5.Define module cohesion?

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

(a) What is SRS? Write characteristics of SRS.
(b) State advantages and disadvantages of waterfall model.
(c) Differentiate between sequence diagram and collaboration diagram.
(d) What are the attributes of good software?
(e) Explain Agility and write its advantages and disadvantages.
(f) Define Use case diagram? Draw and explain symbols for the same.

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

(a) Define coupling what are the various levels of coupling.
(b) Calculate Cyclomatic complexity for Quadratic equation. Find various paths and design test cases.
(c) Explain Software user interface design.
(d) Define Object-Oriented Programming and features of OOPs.
(e) Write the scope of software metrics.
(f) Explain Halstead's metrics with an example.

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

(a) Explain Capability Maturity Model.
(b) What is Risk management ? Explain Software risk management process.
(c) Explain the purpose of six sigma.
(d) Explain any five software quality attributes.
(e) What is Structural testing? Write its advantages and disadvantages.
(f) Explain McCall's Quality factors.

Q. 5 Attempt the following (Any THREE) (15)

(a) Draw a Sequence diagram for online ordering of food delivery System.
(b) State and Explain the Quality metrics.
(c) State the difference between Black box testing and white-box testing?
(d) State all and write down a short note on any 3 fact finding techniques.
(f) Explain requirement validation.

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(2 ½ 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. Android version 7.0 is also known as _____
   a) Marshmallow b) Nougat
   c) JellyBean d) Oreo

ii. Which of the following is used to input text by the user?
   a) TextView b)EditText
   c) ListView d) Button

iii. Which of the following not a type of menu in Android?
   a) Context menu b) Option menu
   c) Popup menu d) Pickup menu

iv. _____ allows to save and retrieve data of an application from the memory in the form of key-value pair
   a) Shared preferences b) Internal storage
   c) External storage d) Content providers

v. The first callback method that is called when the activity is created for the first time is _____.
   a) OnCreate() b) OnStart()
   c) OnResume() d) OnRestart()

(b) **Fill in the blanks with the help of pool of options** (ListView, SQLite, GridView, Firebase, Intent, Activity, Toast, Dialog, Drawable)

i. _____ is used to display a list of scrollable items from which the user can select one by clicking on it.

ii. _____ is a real-time database that is used to store data with NoSQL cloud database

iii. Android application components can connect to other Android applications using _____.

iv. In Android _____ can be used to display information for the short period of time.

v. A _____ is a graphic that can be drawn to the screen.

(c) **Give description of the following in 1 – 2 lines:**

a) Requesting permissions
b) ImageButton
c) Material design
d) Publish app
e) Alarm managers

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Q. 2 Attempt the following (Any THREE)(Each of 5Marks) (15)

(a) List and Explain various types of layouts in android.
(b) State and explain various stages of Activity Lifecycle.
(c) Explain with suitable example the use of RadioButton, and RadioGroup Views in android.
(d) What is a spinner? Explain with example.
(e) Write the code for accepting user name and password from the user.
(f) Write an android application to implement DatePicker View.

Q. 3 Attempt the following (Any THREE) (Each of 5Marks) (15)

(a) Write a note on Drawables in android.
(b) Explain how Themes and Styles can be used to customize user interface design in android application. Give suitable example.
(c) What are Services in android? Give suitable example where Services can be used.
(d) What is a Broadcast Receiver in android? Explain.
(e) Write a note on Notifications in android.
(f) What is RecyclerView? Give suitable example.

Q. 4 Attempt the following (Any THREE) (Each of 5Marks) (15)

(a) What are the different option to save application data in android? Explain.
(b) What are permissions in android? Write the relevant code to give permission to access camera and contacts to the application.
(c) What are loaders in android? What are its characteristics? Explain.
(d) Identify and list key performance related recommendation for an android application development.
(e) Write a note on using SQLite databases for developing android application.
(f) What is AdMob? Explain in detail.

Q. 5 Attempt the following (Any THREE) (Each of 5Marks) (15)

(a) What is AutoCompleteTextView? Write a relevant code to demonstrate the use of AutoCompleteTextView in android.
(b) How is CheckBox different from RadioButton in android? Write the XML tag for using CheckBox.
(c) Write a note on AsyncTaskLoader.
(d) Write a note on history and evolution of android.
(e) Write a short note on ProgressBarView in android application.

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Q. P. Code: 34331

(2 ½ 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) **(15M)**

(a) Multiple Choice Questions.

i) Which of the following commands will create a list?
a) list l = list() b) list l = [] c) list l = ([1, 2, 3]) d) All of these

ii) The dot product of (1, 2, 3) and (1, –1, 0) is
a) 0 b) 2 c) 1 d) –1

iii) The dot product of (1, 2, 3) and (–1, 1, 0) is
a) 1 b) –1 c) 0 d) 2

iv) A linear equation with right hand side is equal to zero is called
a) A linear System b) Saturated
c) Homogeneous d) Non homogeneous

v) A vector whose norm is 1 is called _____ vector
a) Null b) Besis c) Unit d) none of these

(b) Fill in the blanks for the following questions

i) Two vectors are said to be orthogonal if angle between them is ___
ii) The output when we execute list("Hello") is _____.
iii) Set of all linear combinations of vectors is called _____
iv) If all the elements of a matrix have zero value is called as _____ matrix.
v) To add a new element to a list we use _____ command.

(c) Answer the following questions

i) If u =(1, 2, –1) and v = (3, 2, –1) find norm u and norm v.
ii) Define the term Inner Product Space
iii) Solve (1•1) + (1•0) + (1•1)
iv) Define the term Characteristic equation
v) Find dot product of (1, 5), (4, –2)

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

(a) Find the square root of complex number 8 – 6i

(b) Determine whether v_1=(2, 2, 2), v_2=(0, 0, 3) and v_3=(0, 1, 1) span vector space R^3.

(c) Write a Python program to find conjugate of a complex number.

(d) Are the following vectors are linearly dependent
v_1=(3, 2, 7), v_2=(2, 4, 1) and v_3=(1, –2, 6)

(e) Express in polar and exponential form 1 + i √3

(f) Check whether the set of all pairs of real numbers of the form (1, x) with operation (1, y) + (1, y′) = (1, y + y′) and k (1, y) = (1, ky) is a vector space.

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

(a) Find the angle between the two vectors $a = (2,3,4)$ and b=(1, −4,3) in IR^3.

(b) Let

$$A = \begin{pmatrix} 2 & 2 \\ 1 & 1 \\ 0 & 6 \end{pmatrix} \quad B = \begin{pmatrix} 5 & 4 \\ 2 & 2 \\ 1 & 0 \end{pmatrix} \quad c = \begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix} \quad D = [2 \;\; 4 \;\; 3 \;\; 1]$$

Compute the following if they exists.
a) A +B b) 3A c) B + 2D

(c) Write a python program to enter a matrix and check if it is invertible.
if invertible exists then find inverse.

(d) Check whether the set of functions are Linearly independent?
$2 – x + 4x^2, 3 + 6x + 2x^2, 2 + 10x – 4x^2$.

(e) Consider Subspace $U_1\{(x, y, w, z) : x - y = 0\}$ and
$U_2\{(x, y, w, z) : x = w, y = z\}$ Find a basis and dimension of
i) U_1 ii) U_2 iii) $U_1 \cap U_2$.

(f) If V and W are two subsets of a vector space V such that U is a subset of W then show that W^0 is a subset of U^0 where U^0, W^0 are annihilator of U and W respectively.

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

(a) Solve the following system by Gaussian elimination method.
y –z = 3
-2x + 4y -z = 1
-2x + 5y – 4z = -2

(b) Find the orthonormal basis for subspace IR^4 whose generators are
$v_1 = (1,1,1,1), v_2 = (1,2,4,5), v_3 = (1,-3,-4,-2)$
Using Gram Schmidt orthogonali sation Method.

(c) Let a = (3,0), b = (2,1) find vector in span $\{a\}$ that is closet to b is $b^{||a}$ and distance $||b^{\perp a}||$.

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(d) Verify Pythagorean Theorem for u = (1, 0, 2, –4) and v = (0, 3, 4, 2)

(e) Find inner product, angle, orthogonality for
$P = -5 + 2x - x^2$, $q = 2 + 3x^2$

(f) Write a python program to find orthogonal projection u on v.

Q. 5 Attempt the following (Any THREE) **(15)**

(a) Find eigen Values and eigen vectors of

$$A = \begin{pmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{pmatrix}$$

(b) Express the following as a linear combination of $v_1=(-2, 1, 3)$, $v_2=(3, 1, -1)$ and $v_3=(-1, -2, 1)$ with w= (6, –2, 5)

(c) Let T : $|R^3 \rightarrow |R^2$ be a linear map defined by f (x,y,z) = (x+2y-z, x+y-2z) Verify Rank T + Nullity T = 3.

(d) Let S be a subset of vector space V. Prove that $S^{\perp}$ is a subspace of V.

(e) Fill the table.

Vector space	Basis	Dimension
{0}		
IR^2	{(1,0),(0,1)}	
$P_2(x)$		3
$M_2(IR)$		4
IR	{1}	

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(2 ½ Hours) **[Total Marks: 75**

N.B. 1) **All** questions are **compulsory.**
2) **Figures** to the **right** indicate marks.
3) **Draw** suitable **diagrams** and illustrations **wherever necessary**.
4) **Mixing** of sub-questions is **not allowed.**

Q. 1 Attempt All the Questions

A) Choose the correct alternative **(5M)**

i) Time taken by a known algorithm to solve a problem with worse case input gives us the _____ bound
   a) lower
   b) upper
   c) both lower and upper
   d) None of these

ii) _____ is an unambiguous specification of how to solve a class of problems.
   a) program
   b) instruction
   c) algorithm
   d) none of these

iii) BST is the abbreviation for _____
   a) Binary Search Tree
   b) Binary Search Time
   c) Binary Solution Technique
   d) None of these

iv) The matching algorithm on a sequence of length n runs in _____ time
   a) $O(nlogn)$
   b) $O(n)$
   c) $O(logn)$
   d) $O(2n)$

v) A path that starts and ends on the same vertex is called _____
   a) cycle
   b) tree
   c) spanning tree
   d) none of these

B) Fill in the blanks(rapidly, longest, shortest, slowly, child, parent, tree, linked-list) **(5M)**

i) Leaf nodes represent the nodes that do not have any _____.
ii) Pre-order and Post-order traversals are operations associated with _____ data structure.
iii) Prim's algorithm is an example of _____ path problem.
iv) The sequential search runs in _____ time.
v) The n-log-n function grow a little more ____ than the linear function.

C) Explain the following terms in one or two lines **(5M)**

i) Big-Omega
ii) Depth-first traversal
iii) Linear search
iv) Binary tree
v) Selection algorithms

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

A What is Asymptotic analysis of an algorithm? Explain.

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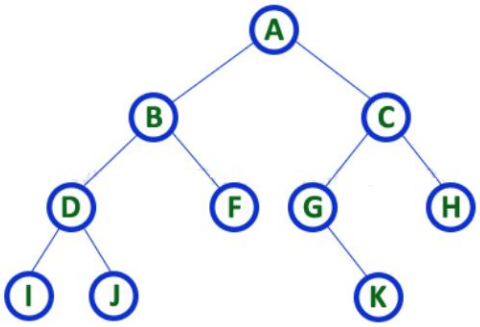
B What is divide-and –conquer method of problem solving? Given an example where this method is used.
C Write a note on method of guessing and confirming.
D Write the algorithm for printing lines of a file in reverse order.
E Write a note on commonly used logarithms and summations in algorithmic analysis.
F Explain how to compare algorithms. Give example.

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

A What is an AVL tree? Explain its characteristics.
B What is a traversal of a tree? Compute any two such traversals for the following tree.



C Briefly describe the concept of topological sorting. Give example.
D Explain with suitable example the adjacency list and adjacency matrix representations of a graph. Give example.
E What is a shortest path problem? Explain any one algorithm for finding shortest path in a graph.
F Define graph. Differentiate between directed and undirected graph. Give examples.

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

A What is breadth-first traversal of a tree? Give the algorithm for performing a breadth-first traversal on a tree.
B Write a note on algorithm design techniques.
C Briefly explain the Longest Common Subsequence problem.
D Explain any two problems that can be solved using dynamic programming.
E What are the elements of greedy algorithm? Explain.
F Explain the concept of Classification by Implementation Method.

Q.5 Attempt the following: (Any THREE) **(15M)**

A Write a note on median-of-median algorithm.
B Explain the structure of threaded binary tree? Give suitable example to illustrate the concept.
C Define algorithm. State its essential characteristics.
D Write a note on Master theorem. Give example.
E Write a note on partition based selection algorithms.
F Write a note on upper and lower bounds of algorithm.

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(2 ½ 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 **(5)**

1) The _____ regular expression represents any whitespace character.
   a. \s b. \S c. \w d. \W

2) What is the last event of the page lifecycle?
   a. Page_Load b. Validate
   c. Page_Unload d. Page_Init

3) Which of the following is not a part of the ConnectionString in the SqlConnection object?
   a. Integrated Security b. Data Source
   c. Connection Status d. Both a and b

4) Identify the underlying html element of LABEL control
   a. b. <p> c. <label> d.

5) The most commonly used State Management technique, that is inserted at the end of URL, is _____
   a. CrossPage Posting b. Session State
   c. QueryString d. Cookies

(b) Fill in the blanks with appropriate keywords by selecting the correct option from the given pool of options. **(5)**

(App_Code, skin, decimal, Bin, Tick, UpdateProgress, Interval, double, ProgressBar)

1) The _____ folder in ASP.NET contains source code files that are dynamically compiled for use in your application.
2) The _____datatype supports 128-bit fixed-point fractional number that supports up to 28 significant digits.
3) The _____ event of a Timer is triggered when the maximum number of milliseconds are elapsed.
4) Atleast one _____ file should be contained in the Themes folder.
5) The ____ control allows you to show a message when an AJAX based page is being updated.

(c) Answer the following in 1-2 lines: **(5)**

1) What is MSIL?
2) Give the syntax of declaring aa one dimensional integer array in C# and initialize its elements to 1,2,3,4,5.
3) Give the significance of GridView Control.
4) State any two LINQ data providers.
5) What is ViewState?

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

(a) State and explain various components of .Net framework.
(b) Explain the working of foreach loop in C# and provide example.
(c) Write a note on assemblies in .NET.
(d) Explain various ASP.NET file types.
(e) Briefly describe the Partial Classes and their syntax with a suitable example.
(f) State and explain the important events of Global.asax file.

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

(a) Write a note on ASP.Net Page Life Cycle.
(b) Explain at least 5 generic properties of web control.
(c) With the help of an example, explain how data can be stored and retrieved from a session variable.
(d) What is AdRotator? Write XML file which is created for the AdRotator Control.
(e) Explain the SiteMapPath control in detail.
(f) What is the use of MasterPages in ASP.NET? How a Content page can be added to a Master Page.

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

(a) Write a brief note on the Data Provider Model? Explain various ADO.NET namespaces.
(b) Write the difference between Single-Value Data Binding and Multi-Value Data Binding in ADO.NET.
(c) Write C# function to create an XML file given below using ASP.net:-

```
<college>
        <student id='123'>
                <name>Madhuri Talekar</name>
                <marks>44</marks>
        </student>
        <student id='123'>
                <name>Juhi Mehta</name>
                <marks>49</marks>
        </student>
</college>
```

(d) Write a short note on Caching.
(e) Explain the concept of Partial Refreshes with respect to AJAX in ASP.NET.
(f) Write a short note on SqlCommand class in ADO.NET.

Q. 5 Attempt the following (Any THREE) **(15)**

(a) Give the structure of web.config file. Also state its advantages.
(b) Differentiate between Value Types and Reference Types.
(c) Explain the following XML classes:
  i. XmlTextWriter
  ii. XmlTextReader
(d) Explain the important properties of the BaseValidator class.
(e) What is LINQ? Explain the syntax of LINQ giving suitable examples.

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(2 ½ 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 the following

(a) Select the correct alternative **(5)**

(i) The process-to-process delivery of the entire message is the responsibility of the _____ layer.
A) Transport B) Application C) Physical D) Network

(ii) _____ is the division of a datagram into smaller units to accommodate the MTU of a data link protocol.
A) Breakup B) Fragmentation C) Decomposition D) Fusion

(iii) _____ signals can have only a limited number of values.
A) Digital B) Analog C) both A & B D) None of these

(iv) _____ is a dynamic mapping method that finds a physical address, given a logical address.
A) ARP B) RARP C) TCP D) UDP

(v) In _____ transmission, bits are transmitted simultaneously, each across its own wire.
A) Asynchronous serial B) Synchronous serial
C) Parallel D) (a) and (b)

(b) Fill in the blanks with help of the options given in the pool below: **(5)**
(phase, coaxial, metric, TCP, Multiplexing, twisted pair, UDP, wavelength)

(i) _____ is the set of techniques that allows the simultaneous transmission of multiple signals across a single data link.
(ii) _____ describes the position of the waveform relative to time 0.
(iii) _____ cable consists of two insulated copper wires twisted together.
(iv) A _____ is the cost assigned for passage of a packet through a network.
(v) _____ provides process-to-process, full-duplex, and connection-oriented service.

(c) Answer the following in one or two lines: **(5)**

(i) Define Latency.
(ii) What is Throughput?
(iii) Express the IP address 01110101 10010101 00011101 00000010 in dotted decimal notation.
(iv) State the different types of noise.
(v) Define Propagation Time.

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

(a) Write a short note on Mesh Topology.

(b) Calculate following:
i) What is the bandwidth of signal that ranges from 40KHz to 4MHz?
ii) Periodic signal completes one cycle in 0.001s. What is the frequency

(c) Briefly explain the layered structure of OSI model.

(d) Explain following terms with respect to Data communication: Half duplex, full duplex, Protocol, Topology

(e) Sate and explain different types of transmission impairments.

(f) What are LAN, MAN, WAN? Explain.

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

(a) Explain with example the major steps involved in block coding.

(b) What is shift keying? Explain ASK.

(c) Discuss in brief wireless transmission with Radio waves.

(d) Write a short note on CRC.

(e) With the help of a diagram explain a Coaxial Cable.

(f) Explain Wavelength Division Multiplexing.

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

(a) Explain concept of classes in classful addressing

(b) Explain CSMA/CD technique in detail

(c) State & briefly write about the phases in TCP connection.

(d) Explain:
i. Unicast Address
ii. Multicast Address
iii. Anycast Address

(e) What is polling? Explain in detail.

(f) Write a short note on Distance-Vector Routing

Q. 5 Attempt the following (Any THREE) (15)

(a) With the help of a diagram explain the components of data communication.

(b) State and explain duties of Data Link layer.

(c) Discuss RZ Scheme and encode the data sequence 1010101100.

(d) Explain the format of user datagram.

(e) Explain the role of the following network devices:
i) Hubs
ii) Switches
iii) Routers

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(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) Which of these events is generated when a button is pressed?
(A) WindowEvent (B) ActionEvent
(C) ButtonEvent (D) KeyEvent

(ii) Which of the following is a method of JDBC batch process?
(A) setBatch( ) (B) deleteBatch( )
(C) addBatch( ) (D) removeBatch( )

(iii) _____ code retrieves name and version of the protocol.
(A) config.getProtocol ( ) (B) request.getProtocol ( )
(C) out.getProtocol ( ) (D) response.getProtocol ( )

(iv) _____ tag is used to execute Java code inside the JSP
(A) <# … #> (B) <$ … $>
(C) <% …. %> (D) <* … *>

(v) JSON stands for _____
(A) Javascript Object Notation (B) JSP Object Notation
(C) Java Object Notation (D) None of these

(b) Fill in the blanks:
(java.awt.event, SQLException, parameterized, java.event, ClassNotFoundException, no argument, struts2, JSON, XML, ServletConfig, ServletContext)

(i) _____ package contains all the classes and methods required for event handling in Java.
(ii) _____ exception is raised when JDBC driver fails to load.
(iii) An object of _____ is created for each servlet, to get configuration information from web.xml file.
(iv) A java bean class should have a _____ constructor.
(v) _____ framework is used to develop MVC based web application

(c) Answer in 1 – 2 sentences:

(i) What is JTextArea used for?
(ii) Write Java code to get ResultSetMetaData object.
(iii) Write JSP code, to display today's date and time using expression tag.
(iv) What is ValueStack in struts2?
(v) Describe how to create an object in JSON.

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

(a) Explain how to use ButtonGroup class.
(b) What is a combobox? Explain various constructors and methods of JCombBox class.
(c) Explain JDBC architecture.
(d) Explain Statement interface and its methods.
(e) Write a swing program to accept temperature of the day in a textfield. Using radio buttons choose conversion: Fahrenheit to Celsius or vice versa. On click of a button, display the converted temperature in a label. [Formula:C = (F – 32)*5/9]
(f) Write a JDBC program to create an Employee table. Insert two records in the table using PreparedStatement.

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

(a) Differentiate between GenericServlet and HttpServlet.
(b) Write a note on Servlet life cycle.
(c) Explain page directive in JSP.
(d) Explain the following:
(i) expression tag (ii) declaration tag
(e) Write a servlet program to accept name and aggregate marks from index.html. if the aggregate marks is larger than 55, then print "You are selected", else print "You are not selected".
(f) Write JSP program to accept a number from the user and find its factorial. If the number is negative, show error message and accept the number again.

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

(a) Explain <jsp:setProperty> and <jsp:getProperty> action tags.
(b) Explain the significance and structure of struts.xml file used in struts2.
(c) Write a note on Struts2 interceptors.
(d) Write the similarities and differences between JSON and XML.
(e) What is JSON schema? Give example and illustrate.
(f) Explain various Result Types available in Struts2.

Q. 5 Attempt the following (Any THREE) **(15)**

(a) Describe various constructors and methods of JCheckBox class.
(b) Explain various methods of Connection interface.
(c) Write a note on JSP application implicit object.
(d) Explain session tracking mechanism in servlets.
(e) Write a note on Struts2 Action class.

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