Year - April 2024

TYBSC - CS

SEM - V

No. of pages - 20

TYBSC semV CS

(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 ANY FOUR from the following: **(20M)**

(a) What in an evidence custody form? What information does it contain?
(b) Explain the various storage Formats for Digital Evidence?
(c) Differentiate between public sector and Private sector investigations?
(d) Explain the necessary requirements for data recovery workstations and software?
(e) Write short note on Contingency Planning for Image acquisition?
(f) How will you analyse memory dump of a running computer system using FTK tool?

Q. 2 Attempt ANY FOUR from the following: **(20M)**

(a) What is the best way to determine the tools which you need for the digital investigation?
(b) Explain the necessary guidelines of seizing digital evidence at the scene?
(c) Describe how to collect evidence at private sector from incident scenes?
(d) Write a short note on recovering graphics files?
(e) Briefly explain copyright with graphics?
(f) How to detect hidden information or files within digital images using steganhide steganography tool and examine hidden content?

Q. 3 Attempt ANY FOUR from the following: **(20M)**

(a) Write short note on the network forensic?
(b) What is the general procedure for given live acquisition?
(c) Write a note on SIM card?
(d) Explain email header analysis?
(e) Explain the guidelines for report writing?
(f) How will you use the wireshark tool for identifying the live network, capture packets, analyse capture packets?

Q. 5 Attempt ANY FIVE from the following: **(15M)**

(a) Explain in detail advance forensic format?
(b) Explain short note on bitstream copies
(c) Explain types of data acquisition in detail?
(d) Explain the importance of investigation report?
(e) Explain acquisition procedures for mobile devices?
(f) Explain the technologies where the 4G networks can be used?

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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) Graph Questions to be solved in answer sheet itself. No separate graph papers will be given.
4) Mixing of sub-questions is not allowed.

Q. 1 Attempt ANY FOUR from the following: **(20M)**

(a) Discuss the features of operation research approach in detail.

(b) Solve graphically following LPP to maximize profit
Max $Z = 40x_1 + 30x_2$
subject to $3x_1 + x_2 \leq 3000$
$x_1 \leq 8000$
$x_2 \leq 1200$
and $x_1, x_2 \geq 0$.

(c) Use simplex method to solve the following LPP
Max $Z = 3x_1 + 7x_2$
Subject to the constraint,
$2x_1 + 5x_2 \leq 20$
$x_1 + 2x_2 \leq 4, \quad x_1, x_2 \geq 0$

(d) A company has two plants, each of which produces and supplies two products: A and B. The plants can each work up to 16 hours a day. In plant 1, it takes three hours to prepare and pack 1,000 gallons of A and one hour to prepare and pack one quintal of B. In plant 2, it takes two hours to prepare and pack 1,000 gallons of A and 1.5 hours to prepare and pack a quintal of B. In plant 1, it costs Rs 15,000 to prepare and pack 1,000 gallons of A and Rs 28,000 to prepare and pack a quintal of B, whereas in plant 2 these costs are Rs 18,000 and Rs 26,000, respectively. The company is obliged to produce daily at least 10 thousand gallons of A and 8 quintals of B.
Formulate this problem as an LP model to find out as to how the company should organize its production so that the required amounts of the two products be obtained at the minimum cost.

(e) Discuss the steps to solve two phase method.

(f) Explain the role of operations research in decision-making.

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Q. 2 Attempt ANY FOUR from the following: (20M)

(a) What is integer programming problem and explain different types of integer programming problems.

(b) Write the dual of the following LP problem

Minimize $Z_x = 3x_1 - 2x_2 + 4x_3$

subject to the constraints

(i) $3x_1 + 5x_2 + 4x_3 \geq 7$, (ii) $6x_1 + x_2 + 3x_3 \geq 4$, (iii) $7x_1 - 2x_2 - x_3 \leq 10$

(iv) $x_1 - 2x_2 + 5x_3 \geq 3$, (v) $4x_1 + 7x_2 - 2x_3 \geq 2$

and $x_1, x_2, x_3 \geq 0$

(c) Explain the rules in constructing dual from primal and hence, convert the following primal to dual

Max Z= $5x_1 + 6x_2 + 3x_3$

Subject to the constraint,

$2x_1 + 5x_2 + 6x_3 \geq 12$

$x_1 + 2x_2 + 4x_3 \geq 4, \quad x_1, x_2, x_3 \geq 0$

(d) Write the advantages of duality.

(e) Explain the steps involved in branch and bound method.

(f) Explain Principle of Complementary Slackness.

Q. 3 Attempt ANY FOUR from the following: (20M)

(a) Differentiate between Linear programming problem and Goal Programming

(b) An automobile dealer wishes to put four repairmen to four different jobs. The repairmen have somewhat different kinds of skills and they exhibit different levels of efficiency from one job to another. The dealer has estimated the number of man-hours that would be required for each job-man combination. This is given in matrix form in the following table:

	JOBS				
		A	B	C	D
	1	5	3	2	8
MEN	2	7	9	2	6
	3	6	4	5	7
	4	5	7	7	8

Find the optimal assignment that will result in minimum manhours needed

(c) Explain Hungarian method to solve assignment problem

(d) Determine an initial basic feasible solution to the following transportation problem by using (a) the least cost method, and (b) Vogel's approximation method.

	D1	D2	D3	D4	Supply
S1	1	2	1	4	30
S2	3	3	2	1	30
S3	4	2	5	9	40
Demand	20	40	30	10	

(e) Write the transportation Algorithm to find the initial basic feasible solution.

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(4)

(f) A company has 4 machines on which 3 jobs are to be executed. Each job can be assigned to one and only one machine. The cost matrix is given below obtain the multiple optimal solution to the problem

		Machines		
Jobs	P	Q	R	S
A	18	24	28	32
B	8	13	17	19
C	10	15	19	22

Q. 4 Attempt ANY FIVE from the following: **(15M)**

(a) Discuss about the computer software in operation research.

(b) Write the economic interpretation of dual constraints and dual variables.

(c) What is Assignment problem and give two applications.

(d) Explain the use of slack, surplus and artificial variables in simplex method and explain what is redundant constraint in graphical solution.

(e) What do you understand by the term 'sensitivity analysis?

(f) A company has three production facilities *S*1, *S*2 and *S*3 with production capacity of 7, 9 and 18 units (in 100s) per week of a product, respectively. These units are to be shipped to four warehouses *D*1, *D*2, *D*3 and *D*4 with requirement of 5, 8, 7 and 14 units (in 100s) per week, respectively. The transportation costs (in rupees) per unit between factories to warehouses are given in the table below. Use Least Cost Method (LCM) to find initial basic feasible solution to the transportation problem

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	34

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(5)

T4BSC sem-2

(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

(a) Multiple Choice Questions **(10M)**

1) _____ is a small data structure reveals several key pieces of information, including the disk's geometry, the amount of available space on disk etc.
i) Bootblock ii) Inodeblock
iii) Superblock iv) Datablock

2) Which of the following statement is wrong for fsck command?
i) FSCK is a short form of File System Check. ii) FSCK is used to diagnose and repair file systems.
iii) FSCK command runs automatically during the boot process. iv) The file system must be mounted in order to run fsck.

3) If a file has permissions that appear as **rwxr-x---**, what is the octal permission mode of the file?
i) 760 ii) 740
iii) 750 iv) 650

4) _____allows a program to be run with permissions from the program's owner, not the user who is running it.
i) SetUID bit ii) sudo
iii) pseudo iv) SetGID bit

5) A _____ exhibits all the properties of a domain, except that it has delegated a subsection of the domain instead of all the hosts at a site.
i) Root domain ii) Subdomain
iii) First domain iv) Third domain

6) FTP utilizes two ports: a control port i.e. port _____and a data port i.e. port _____.
i) 20,21 ii) 22,21
iii) 21,20 iv) 21,22

7) Which of the following is not an advantage of Apache Server Software?
i) It is stable ii) It is Closed source
iii) It is flexible iv) It works on large number of platforms

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8) The _____ permission in the entry of "/etc/exports" file of NFS, prevents remote root users from having super user privileges on remote NFS mounted volumes.

i) root_nosquash
ii) root_squash
iii) no_root_squash
iv) super_squash

9) Exim4 is the _____.

i) Mail Interface Agent
ii) Mail User Agent
iii) Mail Delivery Agent
iv) Mail Transfer Agent

10) _____ is a blog tool, publishing platform and CMS implemented in PHP and licensed under the GNU GPLv2.

i) phpMyAdmin
ii) MyISAM
iii) Wordpress
iv) Moin

(b) Fill in the blanks **(Forward resolution, yum, chatgroup, Date and Time of Group creation, apt, Reverse Resolution, attributes, schema, Mailman, Group members)** (5M)

1) _____ is a highly regarded, sophisticated toolset and a wrapper tool that interacts directly with dpkg.
2) _____ is one of the field of '/etc/group' File.
3) _____converts IP addresses into hostnames.
4) Pieces of information associated with an entry, such as an organization's address or employees' phone numbers in LDAP is called _____.
5) _____ is an open source program for managing electronic mail discussions.

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

(a) State the difference between Windows and Linux.
(b) Write any 5 options that can be used with RPM command.
(c) Explain each field of '/etc/shadow' file by giving a simple example.
(d) Define GRUB. Differentiate between GRUB Legacy and GRUB2.
(e) Discuss '/etc/inittab' file.
(f) What is Makefile? Explain its different targets.

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

(a) Explain FTP in regards with the following points:
   i) Installing FTP.
   ii) Staring FTP service.
   iii) Setting up FTP server for anonymous user only.

(b) State the use of following options in Apache configuration file.
   i) Listen
   ii) ServerName
   iii) ServerAdmin
   iv) DocumentRoot
   v) MaxClients

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(c) Write a short note on SMTP.
(d) What is mbox format? Explain POP and IMAP.
(e) Write the different configuration options found in the 'sshd_config' file.
(f) What is DNS? Explain DNS structure in detail.

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

(a) Write a short note on NFS.
(b) Explain Declarations and Parameters of DHCP configuration file.
(c) How can we create a share using Samba? Also, write the steps to install and start Samba server.
(d) Discuss Jabber.
(e) Write the steps to configure Master NIS Server.
(f) Describe various OpenLDAP Utilities.

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

(a) Define the following terms regarding volume management.
  i) Physical Volume
  ii) Logical Volume
  iii) Volume Group
(b) Explain the SNAT, DNAT and Masquerading in regards with Network Address Translation (NAT).
(c) Discuss the 3 Email components.
(d) Describe Kerberos.
(e) Write any three RPC processes that facilitate NFS service.
(f) What is Database Engine? Explain MyISAM and InnoDB.
(g) What are the different measures one can follow to provide local security?
(h) List and explain any two DFS implementations in brief.

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TYBSC sem V

(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

(a) Multiple Choice Questions **(10M)**

i. Which requirements are the foundation from which quality is measured?
   a. Hardware
   b. Software
   c. Programmers
   d. Tester

ii. Which of the following is not included in External failure costs?
   a. testing
   b. help line support
   c. warranty work
   d. complaint resolution

iii. An informal review may consist of_____.
   a. Casual meeting
   b. Correction
   c. Inspection
   d. Analysis

iv. PDCA concept is related to?
   a. Process Improvement
   b. Process evaluation
   c. Process Selection
   d. Correction

v. Normally, Testing covers how much time of a Software Development Lifecycle?
   a. 0 - 10 %
   b. 30 - 40 %
   c. 5 - 15 %
   d. 60 - 70 %

vi. Ability to transform a software from one working platform to another is called as _____.
   a. Security
   b. Portability
   c. Usability
   d. Functionality

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vii. In test team _____ is responsible for executing test, gathering and managing test data and evaluate the outcome of each test.
   a. Test Analysts
   b. QA leader
   c. Program member
   d. Test engineer

viii One of the following is not included in levels of validation.
   a. Review
   b. Unit testing
   c. Integration Testing
   d. Acceptance testing

ix. _____testing involves stubs and drivers in the process of testing
   a. Review
   b. Unit testing
   c. Integration Testing
   d. Acceptance testing

x. _____ testing is an onsite acceptance test.
   a. Beta
   b. Gamma
   c. Alpha
   d. Unit

(b) **Fill in the blanks (Efficiency, Maintainability, Parallel Testing, Integrity, Test Manager, validation)** **(5M)**

i. Verification is followed by _____
ii. _____ is responsible for defining test strategies in testing.
iii. _____ principle of Security Testing, means that data should not be changed.
iv. In _____ Testing, we give same inputs in two different versions of the software application.
v. Modifying the software to correct errors is referred to as _____.

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

(a) What is software? Why it should be tested?
(b) What is Error? Explain with its types in software engineering
(c) Explain in brief software testing principles
(d) Give the concept of software inspection and structured walkthrough.
(e) Explain in brief qualities of good tester
(f) What is Quality assurance?

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Q. 3		**Attempt the following (Any THREE)**	**(15M)**
	(a)	Write a short note on quality Management?	
	(b)	What is software verification? Explain in brief.	
	(c)	Discuss the phases of V-model	
	(d)	Explain the phases of formal review.	
	(e)	What is White box testing? Explain in detail.	
	(f)	Explain cyclomatic metric with example.s	
Q. 4		**Attempt the following (Any THREE)**	**(15M)**
	(a)	Explain Total quality management	
	(b)	What are the advantages of ISO 9000 standards?	
	(c)	What is the cost of quality?	
	(d)	Explain in brief Software quality assurance activities	
	(e)	Write a short note on Review meeting.	
	(f)	Discuss Defect management process	
Q. 5		**Attempt the following (Any FIVE)**	**(15M)**
	(a)	Briefly describe the software development life cycle	
	(b)	Explain the concept function point in brief.	
	(c)	Discuss the causes of Defect	
	(d)	Write a note on Software reliability	
	(e)	Explain the concept of defect reporting	
	(f)	Discuss the different software reliability metrics	
	(g)	Write a note on six sigma	
	(h)	What is SQA plan? Explain in brief.	

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TYBSc Sem - V

(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 ANY FOUR from the following: (20M)

(a) Explain how dot product is used in calculation of back face detection.
(b) Discuss the concept of 2D scaling with examples.
(c) Describe the role and significance of color in the context of 3D modelling and rendering.
(d) Given a homogeneous point (1, 2, 3). Apply rotation 90 degree towards X, Y and Z axis and find out the new coordinate points.
(e) Explain types of parallel projections.
(f) Write a short note on Shader Models.

Q. 2 Attempt ANY FOUR from the following: (20M)

(a) Explain 2D and 3D game development with NumPy.
(b) Describe the concept of IDE.
(c) Explain about feature levels in Direct3D.
(d) Discuss the game engine architecture.
(e) Describe the process of animating a game object in Pygame, providing detailed steps and explanations for implementing animation with Pygame's game object.
(f) Write a short note on multisampling theory.

Q. 3 Attempt ANY FOUR from the following: (20M)

(a) Which are the game design strategies, explain.
(b) How to use sprites in Unity, explain.
(c) Describe the steps necessary to script collision events.
(d) Write a note on Unity Colliders.
(e) Explain various animation types and components used in Unity.
(f) Briefly discuss Unity's virtual world.

Q. 4 Attempt ANY FIVE from the following: (15M)

(a) How to calculate the surface area of parallelogram using vectors r and s?
(b) Which are the main components of game engine?
(c) Describe the primary functions used by Unity's game loop.
(d) Describe any three types of light used in models.
(e) Write any three key features of 2D Pygame.
(f) Explain loops are supported by Unity.

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TYBSC - CS - sem V

(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

(a) **Choose the correct alternative from the options given** **(10M)**

(i) _____ is the ability to limit and control the access to host systems and applications via communications links.
a. Confidentiality b. Access Control
c. Integrity d. Authentication

(ii) Number of phases in the handshaking protocol of SSL?
a. one b. two
c. three d. four

(iii) _____ consists of measures to determine, prevent, detect, and correct security violations that involve the transmission of information.
a. Database Security b. Physical security
c. Network and internet security d. Cyber security

(iv) In AES stages, A substitution that makes use of arithmetic over GF (2^8) is called ____.
a. Substitute bytes b. Shift Rows
c. Mix Columns d. Add Round Key

(v) Hash-based message authentication code (HMAC) provides the server and the client each with a _____that is known only to that specific server and that specific client.
a. private key b. user key
c. manual key d. public-key

(vi) _____ block cipher mode of operation is applied for Secure transmission of single value.
a. CTR b. CBC
c. ECB d. CFB

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(vii) _____ are difficult to identify as they keep on changing their type and signature.
a. Non-resident virus
b. Boot Sector Virus
c. Polymorphic Virus
d. Multipartite Virus

(viii) _____ are used as the base of the Public Key Infrastructure.
a. SSL certificates
b. TLS certificates
c. HAS certificates
d. X.509 certificates

(ix) PGP is abbreviated as _____.
a. Pretty Good Privacy
b. Powerful Good Privacy
c. Protocol Giving Privacy
d. Pretty Good Protocol

(x) A honey pot is an example of what type of software?
a. Intrusion-detection
b. Encryption
c. Security policy
d. Virus

(b) **Fill in the blanks by selecting the correct option from the pool of options:** (5M)
(Tunnel, 6, Trojan Horse, RSA, Transport, 10, Network, Spyware, SSA, 8)

(i) IPSec is designed to provide security at the _____ layer.

(ii) In the _____ mode, IPSec protects information delivered from the transport layer to the network layer.

(iii) _____ is a general term for malicious software that pretends to be harmless so that a user willingly allows it to be downloaded onto the computer

(iv) _____ is a public key cryptography algorithm.

(v) AES has _____ number of rounds.

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

(a) Discuss the Principles of security.

(b) Explain Playfair Cipher, encrypt the plain text "SECRET MESSAGE" by using keyword "PROBLEM".

(c) List and briefly define categories of security services.

(d) Explain the following algorithm modes :
i. ECB
ii. CBC

(e) Using RSA algorithm, what is the value of cipher text C, if the plain text M=5 and p=3, q=11 and d=7?

(f) What are transposition techniques? Explain any one with the help of an example.

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

(a) Explain the working of the SHA algorithm.
(b) What is digital signature? List the requirements of Digital signatures.
(c) Write a note on HMAC.
(d) Give a brief overview of Kerberos.
(e) Discuss the format of X.509 Certificate.
(f) What are the Problems with public key exchange and explain man in middle attack with example.

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

(a) Explain the format of ESP Header in IPSec.
(b) Write a short note on Honeypots.
(c) Explain the working of the SSL Handshake Protocol.
(d) What is a Firewall? Enlist its characteristics
(e) Explain Intrusion Techniques in detail.
(f) Discuss various virus Countermeasures.

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

(a) Define:
i. Confidentiality
ii. Integrity
iii. Availability
(b) List the differences between Kerberos Version 4 and 5.
(c) Explain the concept of a Hash Function.
(d) What are the components of simple symmetric cipher model?
(e) List the advantages of IPSec.
(f) Differentiate between TLS and SSL
(g) Discuss Mono Alphabetic Cipher with the help of an example.
(h) Explain the different types of intruders.

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(15)

TY/BSc

Time :2 ½ Hours [Total Marks: 60]

N.B: (1) All questions are compulsory.
(2) Figures to the **right** indicate full marks.
(3) **Assume additional data if necessary** but state the same clearly.
(4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.

Q.1	Attempt **any two** of the following	**(12)**
a)	Explain the basic concept of bipolar transistor	**06**
b)	Explain the difference between dc load line and ac load line. Give the applications of FET.	**06**
c)	Explain the Common emitter input characteristics of NPN transistor.	**06**
d)	Explain data transmission using SPI-peripherals interface	**06**
Q.2	Attempt **any two** of the following	**(12)**
a)	What are the basic characteristics of IOT?	**06**
b)	Write an example of an enhanced level and advanced level of smart object classes.	**06**
c)	Explain in detail IOT Architecture.	**06**
d)	Write a note on IoT cloud.	**06**
Q.3	Attempt **any two** of the following	**(12)**
a)	Describe the layered architecture of IoT gateway.	**06**
b)	What is IoT edge computing and what are its main benefits?	**06**
c)	Explain the mapping of IoT protocol categories to five-layer architecture.	**06**
d)	Write a short note on DDS.	**06**
Q.4	Attempt **any two** of the following	**(12)**
a)	Briefly describe the functionality of three multilayer security attacks.	**06**
b)	What are various features of SIoT system?	**06**
c)	How reference architecture of IoV is different from SIoV?	**06**
d)	Explain the slot architecture in detail.	**06**
Q.5	Attempt **any two** of the following	**(12)**
a)	Write a note on BIBO Stable systems.	**06**
b)	Difference between CPS and IoT.	**06**
c)	Explain the working of MQTT.	**06**
d)	What are the applications of SIoT smart thing relationships?	**06**

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TYBSC-CS. Sem VI

(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** (15M)

(a) **Multiple Choice Questions**

i) Which of the following performs search based on only heuristic function?

a) A*
b) Greedy best first search
c) Depth limited search
d)Breadth first search

ii) A network with all the inputs connected directly to the outputs is called a _____.

a) Feed Back Neural Network
b) Recurrent Neural Network
c) Feed Forward Neural Network
c) Single Layer neural network

iii) ----------environment give access to agent's sensor to the complete set.

a) Fully Observable
b) partially observable
c) deterministic
d) Episodic

iv) Uninformed Search is also known as _____

a) Blind Search
b) Informed Search
c) Best First Search
d) Secure Search

v) _____search algorithm searches forward from initial state and backward from goal state till both meet to identify a common state.

a) IDA*
b) Breadth First Search
c) Bidirectional Search
d) Depth First Search

vi) _____ is a measure of the uncertainty of a random variable.

a) Backtracking
b) Trimming
c) Entropy
d) Prunning

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vii)In ..... learning agent learns from the series of rewards or punishments.

a) Supervised
b) Unsupervised
c) Reinforcement
d) Semi-Supervised

viii) The idea of _____ is to select a collection of hypotheses from the hypothesis space and combine their predictions.

a) SVM
b) Online Learning
c) Ensemble Learning
d) Parametric Model

ix) The set of all leaf nodes available for expansion at any given point is called.....

a) Frontier
b) Backtier
c) Depth
d) Width

x) An elimination of decision tree nodes that are not clearly relevant is known as _____.

a) Prunning
b) Cutting
c) Backing
d) Eliminating

(b) Fill in the blanks.

(Bagging, rimming margin, Utility Based Agent, Supervised Learning, Simple Reflex Agent, task environment, Reward Function, Boosting, Bayesian Learning)

i) In SVM, _____ is twice the distance from the separator to the nearest example point.

ii) A ---------- specification includes performance measure, the external environment, actuators and sensor.

iii) ---------- calculates the probability of each hypothesis, given the data and make predictions on that basis.

iv) _____ are used to decide which one is best among multiple possible alternatives.

v) The most widely used ensemble method is called _____.

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

(a) Write short note on Utility-based reflex agents.

(b) Explain Greedy Best First Search strategy.

(c) Explain following properties of task environment-
   a) Episodic vs. Sequential
   b) Known vs. Unknown

(d) Explain Thinking Humanly and Acting Humanly approaches of AI.

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(e) Write short note on Bidirectional Search
(f) Explain state, initial state, actions, transition model, goal state and path cost for Toy problem

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

(a) Explain the concept of Multilayer Feed forward neural network.
(b) Explain the concept of Supervised Learning.
(c) How Boosting algorithm works?
(d) Write short note on Nonparametric Model.
(e) Explain the concept of Decision Tree.
(f) Write a note on Support Vector Machine.

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

(a) Write short note on Statistical Learning.
(b) List and explain the applications of Reinforcement Learning.
(c) Write note on Passive Reinforcement Learning.
(d) Explain EM Algorithm.
(e) Write a note on Naïve Bayes model.
(f) Explain the concept of Unsupervised Learning.

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

(a) What do you mean by PEAS? Explain with a suitable example.
(b) Briefly explain Depth First Search strategy.
(c) What is entropy? How do we calculate it?
(d) Explain Neural Network Structure. Describe mathematical model for neuron.
(e) What are hidden variables or Latent Variables? Explain with example.
(f) Write a note on Hidden Markov Model.
(g) Explain the following:
    i) Bias
    ii) Variance
(h) Explain the concept of overfitting.

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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 **(15M)**

(a) Multiple Choice Questions: **(10M)**

(i) _____ is XML based standards for describing, publishing and finding web services.

(a) SOAP (b) HTTP

(c) WSDL (d) UDDI

(ii) Which RESTful method is used to delete a resource from the server?

(a) GET (b) POST

(c) DELETE (d) OPTIONS

(iii) URI stands for _____.

(a) Uniform Resource Identifier (b) Unified Resource Identifier

(c) Unique Resource Identifier (d) Unique Representation Identifier

(iv) What is the purpose of SOAP in a web service?

(a) To describe the availability of service

(b) To transfer a message

(c) To tag the data

(d) To discover the services

(v) Which of the following message exchange pattern is not supported in WCF?

(a) One Way (b) Request Reply

(c) Duplex (d) Multiway

(vi) Which of the following is NOT a characteristic of service-oriented architecture?

(a) Interoperability (b) Discoverability

(c) Reusability (d)Variability

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(vii) Which of the following annotation of JAX RS API is used to annotate a method to create a resource?

(a) @GET (b) @Path

(c) @PUT (d) @POST

(viii) Which type of contract is applicable to interface in WCF?

(a) Message Contract (b) Service Contract

(c) Operation Contract (d) Data Contract

(ix) Which is the fusion of Address, Contract and Binding?

(a) startpoint (b) endpoint

(c) middlepoint (d) Servicepoint

(x) What is the full form of SOA?

(a) Service Object Architecture (b) Service Oriented Architecture

(c) Service Oauth Architecture (d) Simple Object Architecture

(b) Fill in the blanks: (5M)

(SOAP, UDDI , 200, RPC Style , XML and JSON, Document Style , HTML and XML, Channels, 404)

(i) HTTP response status code _____ which means resource not found.

(ii) In _____ SOAP messages carry method name and parameters and it is tightly coupled soap style.

(iii) _____ are the mark up languages available in REST Services.

(iv) The messaging layer in a WCF Architecture is composed of _____.

(v) _____is the standard messaging protocol used by web services.

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

(a) What is WSDL? Describe the various tags of WSDL document.

(b) Write a short note on SOAP.

(c) What are Web Services?

(d) Write a short note on JAX-WS.

(e) Explain XML document structure with an example.

(f) Write a program to create a simple web service method that returns the addition of two numbers.

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