Reg.No.: ☐☐☐☐☐☐☐☐☐☐☐☐☐

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 6022

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023
Third Semester
Information technology
P19ITE22 – INFORMATION SECURITY
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	List the categories of the resources that can be attacked by Denial of service attack.	2	K1	CO1
2.	What is IKE and explain why it is needed in the IPSec?	2	K1	CO1
3.	What are the key points that should be addressed by an organizational security policy?	2	K2	CO2
4.	What is port scanning? How to prevent the port scanning attacks?	2	K2	CO3
5.	What is the differences between host-based intrusion detection system and network-based intrusion detection system?	2	K1	CO1
6.	Differentiate between Stateful firewalls and packet filters.	2	K1	CO1
7.	What measures can be taken to protect against XSS attacks?	2	K4	CO2
8.	List the vulnerabilities that can be exploited by an attacker for Buffer overflow attack.	2	K2	CO3
9.	What is the difference between Access Control List and Capability List.	2	K2	CO2
10.	Explain the differences between authentication and authorization with a suitable example.	2	K2	CO2

PART – B

Q.No.	Questions	Marks	KL	CO
11. a)	What is the risk of using small-size keys in SSL or TLS? What type of attack can an intruder try on the short keys?	13	K3	CO1
	(OR)			
b)	Consider the following scenario. What is the name of attack imposed by an attacker C? How can Alice and Bob avoid such attack in the future? Discuss in detail. Alice transmits a file to Bob. The file contains sensitive information (e.g., financial data) that is to be protected from disclosure. User C, who is not authorized to read the file, is able to monitor the transmission and capture a copy of the file during its transmission.	13	K3	CO3
12. a)	Explain the role of various stake holders in the risk management process.	13	K1	CO1
	(OR)			
b)	Describe the steps in detail to implement Identity & Access Management (IAM).	13	K1	CO1
13. a)	How can be Intrusion Detection system is the backbone of Information system? Justify along with its categories?	13	K4	CO2
	(OR)			
b)	Inline sensors are inserted into a network segment so that the traffic being monitored passes through them. These sensors perform both intrusion detection and intrusion prevention functions. However, passive sensors are more commonly used. Why?	13	K4	CO2
14. a)	Define buffer overflows attacks. Give an example. What are its security implications?	13	K2	CO2
	(OR)			
b)	What is secure coding? Why is it important? What are the measures that one should include in secure coding best practices?	13	K2	CO2
15. a)	Assume a system with K subject attributes, M object attributes and Range() denotes the range of possible values that each attribute can take. What are the number of roles and permissions required for a Role based access control model? What is the problem with this approach if additional attributes are added?	13	K5	CO3
	(OR)			
b)	Elaborate the term access control? What is include in authorization process for (File, Program, Data rights) and explain the all types of control?	13	K1	CO1

PART – C

Q.No.	Questions	Marks	KL	CO

16. a) A drone is a flying robot that can be remotely controlled or fly autonomously using software-controlled devices. Drones are equipped with electronic speed controllers, which control a motor's speed and direction, flight controller, GPS module, battery, antenna, receiver, cameras, sensors (ultrasonic sensors and collision avoidance sensors), accelerometer (measures speed), and altimeter (measures altitude). They can carry different kinds of equipment to fly distances. Keeping the above scenario in mind, answer the following:

    i. Can drones be hacked? If yes, then How? If not, then Why?   5

    ii. What are the advantages of drone in wars?   5   K6   CO5

    iii. What are the possible risks associated with drone?   5

(OR)

b) There is an organization (for example HPCL) who outsources its data to a public cloud server (For example AWS). HPCL (as a data owner) can perform any operation such as read/ write/ delete on its outsourced data. A user who join the HPCL, first registered itself to the organization. Upon successful registration, HPCL provides data access tokens to the user. These token are used by the user to access (Read or Write) the data directly from the cloud server. The write operation is performed only after read operation.

Since cloud is a third party storage-as-a-service provider, it may misuse the stored data for its personal gains. For example, it may share the organization's data to its rival organizations. Former users may also get access to the data with or without collusion with the cloud service provider.

Keeping the above scenario in mind answer the following:

    i. Find out the possible adversaries and categorize them as an internal or external adversary.   5   K6   CO5

    ii. Prepare a list of data security issues imposed by such adversaries.   5

    iii. Give possible solutions to mitigate the security issues found in Step 2.   5

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Question Paper Code: 7033

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023
Third Semester
Information technology
U19EC308 – ELECTRONIC DEVICES AND CIRCUITS

(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Differentiate between Avalanche and Zener breakdowns	2	K2	CO1
2.	What is the importance of Law of Junction	2	K1	CO1
3.	Relate α,β andγ of transistor.	2	K1	CO2
4.	What is thermal run away?	2	K2	CO2
5.	Mention the difference in operation of a depletion mode and enhancement mode MOSFET.	2	K2	CO3
6.	Show that $\mu = g_m r_d$ in a Field Effect Transistor.	2	K1	CO3
7.	List the applications of Light Emitting Diode.	2	K1	CO4
8.	Draw the V-I characteristics of a tunnel diode	2	K3	CO4
9.	What are the different types of Regulators	2	K1	CO5
10.	Compare Half-wave and Full-wave Rectifiers?	2	K2	CO5

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Question Paper Code: 6025

M.E./ M.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023
Third Semester
Information Technology
P19ITE19 – ENERGY AWARE COMPUTING
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q. No.	Questions	Marks	KL	CO
1.	Mathematically define Speed-Up and describe its characteristics	2	K1	CO2
2.	Differentiate CPU-bound tasks and memory-bound tasks	2	K2	CO1
3.	Describe the pros and cons of the Li-Ion Batteries (at least two bullet points for each)	2	K2	CO2
4.	What is a switching regulator?	2	K1	CO1
5.	Does the DVFS-enabled cluster scheduling algorithm use the FIFO queue? Justify your answer?	2	K4	CO3
6.	What is voltage scaling?	2	K1	CO2
7.	Give an example of the burst scheduling	2	K3	CO3
8.	Define a Dynamic Regulator Scheduling (DRS) problem	2	K1	CO3
9.	How is the total execution time of an application calculated?	2	K5	CO1
10.	How is the H.264 decoder different from MPEG-4 decoder?	2	K4	CO2

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	What is Energy awareness? How is it evaluated?	5	K1	CO1
		ii.	State and describe at least 4 different ways of achieving an energy-efficient design at every level of abstraction from system level down to transistor device level.	8		CO2
			(OR)			
	b)	i.	Describe the profiling of Workload characteristics using performance counters.	5	K1	CO1
		ii.	Describe the workload of tasks running on a processor in terms of the two components: on-chip workload and off-chip workload.	8		CO2
12.	a)	i.	List 2-3 emerging technologies arising in the Energy Storage Devices sector?	5	K2	CO1
		ii.	Describe the Kinetic Battery Model (KiBaM) with pictorial illustration	8	K3	CO2
			(OR)			
	b)	i.	What is the use of a switching regulator in energy efficient storage systems?	3	K2	CO1
		ii.	How do the stochastic models describe the discharging and the recovery effect using Markov chains?	10	K3	CO2
13.	a)	i.	What is Passive Voltage Scaling (PVS)?	3	K3	CO1
		ii.	Describe a discrete passive voltage scaling system and its components in detail.	10		CO2
			(OR)			
	b)		State the VM scheduling algorithm that minimises power consumption and describe its computational aspects in details	13	K3	CO1 CO2
14.	a)	i.	Define an Energy Minimization Problem	3	K4	CO1
		ii.	Illustrate the thermal characteristics of a multi-core system in details with a 3-D die-stacking structure	10		CO3
			(OR)			
	b)	i.	What is energy aware memory scheduling?	3	K4	CO1
		ii.	Describe and Analyse different types of energy-aware scheduling techniques with their pros and cons of each technique	10		CO3
15.	a)		Describe H.264/AVC video codec architecture in detail and derive the computational complexity of H.264/AVC Codec	13	K2	CO3
			(OR)			
	b)		Explain the power scalability of the H.264/AVC Codec with a special focus on the power modelling of video codec architecture.	13	K2	CO3

Q.No.		Questions	Marks	KL	CO
16.	a)	Describe various runtime power management techniques to minimise the total energy consumption and derive cost lower bound of any two of these techniques.	15	K2	CO2
		(OR)			
	b)	Describe the SSD power model in evaluating the designs of dynamic power management policy and the SSD power estimation flow.	15	K2	CO2

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Question Paper Code: 6024

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023
Third Semester
Information Technology
U19IT305 – PROFESSIONAL ETHICS AND HUMAN VALUES
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks
Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Why Honesty is important in the Workplace?	2	K1	CO1
2.	Show the Nature of Civic Virtue.	2	K2	CO1
3.	Define Moral Autonomy	2	K1	CO2
4.	Infer any Two Characteristics of Professionalism	2	K2	CO2
5.	Outline the Purpose of Steam Boat Code in USA	2	K2	CO3
6.	How Codes of Ethics protect the Status Quo of a Professional?	2	K1	CO3
7.	What is considered as fair use of Copyrighted Material?	2	K1	CO4
8.	Distinguish between Stealing and Embezzlement.	2	K4	CO4
9.	Define Computer Ethics.	2	K1	CO5
10.	Name the Adulterants in Intentional Food Adulteration.	2	K1	CO5

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a.	"When you treat people with respect, you gain respect."- Justify with the importance of Caring and Sharing at the Workplace.	13	K5	CO1
		(OR)			
	b.	Examine the role of Yoga and Meditation in managing Stress of a Professional.	13	K4	CO1
12.	a.	How is Gilligan's Theory different from Kohlberg's Theory of moral development? Explain.	13	K2	CO1
		(OR)			
	b.	State the Importance of Professional Ideals and Elaborate the different Models of Professional Roles.	13	K2	CO1
13.	a.	"Because of modern engineering practices, the complication in accepting one's Moral Accountability further worsened."-Evaluate the Statement with suitable examples.	13	K5	CO1
		(OR)			
	b.	Elucidate the Essential Roles and Limitations of Codes of Ethics.	13	K2	CO1
14.	a.	Elaborate the Steps to conduct a Failure Modes and Effects Analysis to assess the Risks.	13	K6	CO1
		(OR)			
	b.	Is Bhopal Gas Tragedy a Corporate Crime? What are the Ethical Issues in Bhopal Disaster? Discuss in detail.	13	K3	CO1
15.	a.	Classify the Forms of Computer Abuse and Describe the Ten Commandments of Computer Ethics given by the Computer Ethics Institute.	13	K2	CO1
		(OR)			
	b.	What are the major Ethical Issues in conducting Quantitative Research? Explain.	13	K2	CO1

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a.	Kamala knew that something was wrong when Jagan got back at his desk. Jagan had been with Akash & Akash for twenty years. He was sincere, hardworking and also a strong supporter of the Company. Kamala joined this accounting firm one year ago, after passing her C.A. exam. One morning, Jagan was moody and upset. When Kamala was wishing him a good morning, Jagan Said: "Look here, Kamala, I	15	K3	CO1

have been denied a senior position. I am working 60 hours per week for the last 20 years. This company wants me to wait for some more time". Kamala asked him, "What are you going to do?" Jagan replied, "I don't know".

Later on, Jagan began behaving in different way. He used to come late and go early. On a Sunday, when Kamala went to office to collect some papers, she noticed Jagan was copying some software used on auditing and consulting. Jagan began to do some consulting work for small firms. He also said that long-term service was not recognized in that company. Kamala was disturbed by this even.

Questions:

   i.   What are the ethical issues in this case?

   ii.   Do you have some suggestions for this company?

(OR)

b.   You are a traffic constable and while on duty you see 3 people riding a motorcycle without a helmet and jumping the red signal. On stopping them, you came to know that one of them met with an accident due to potholes and is severely bleeding and due to non-arrival of ambulance they are taking him to the hospital. On further enquiry, you came to know that the driver does not have a driving license and works as day wager. While on his way to work, he found the man lying injured on the road and in a rush to take him to hospital, he left his helmet on the site of an accident. The driver expresses his financial inability to pay increased fines. Recently, due to the enforcement of new Motor Vehicles Act, you are under severe pressure from your seniors for strict enforcement.   15   K3   CO2

Questions:

   i.   What are the ethical issues involved and the options available to you in such a situation?

   ii.   Also suggest a course of action you would like to follow.

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Question Paper Code: 6021

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023

Third Semester

Information technology

U19IT304 – COMPUTER ORGANIZATION & ARCHITECTURE

(Common to Computer Science and Technology)

(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is the elapsed time of a computer system?	2	K2	CO1
2.	Write the difference between Multiprocessor and Multicomputer.	2	K3	CO1
3.	What is Conditional Branching in microinstruction?	2	K1	CO2
4.	What is the difference between packed and unpacked microinstructions?	2	K1	CO2
5.	Define Data path.	2	K1	CO3
6.	What is branch hazard?	2	K2	CO3
7.	Differentiate static and dynamic RAMs.	2	K2	CO4
8.	What is locality of reference?	2	K2	CO4
9.	What do you mean by vectored interrupt?	2	K1	CO5
10.	Define cycle stealing.	2	K2	CO5

PART – B

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	List the various components of a computer system and explain with a neat diagram.	8	K1	CO1
		ii.	When indirect addressing mode is used in a computer system? Explain with an example.	5	K2	CO2
			(OR)			
	b)	i.	Illustrate relative addressing mode with an example.	5	K1	CO2
		ii.	What is meant by an instruction cycle? Describe its two phases with an example.	8	K2	CO1
12.	a)	i.	Explain multiple bus organizations in detail.	8	K3	CO2
		ii.	What are the advantages and disadvantages of hardwired and microprogrammed control?	5	K2	CO2
			(OR)			
	b)	i.	Draw and explain about microprogram control unit.	8	K1	CO1
		ii.	Explain Direct and indirect encoding with examples.	5	K2	CO2
13.	a)	i.	Briefly explain the Control hazard with an example.	8	K3	CO3
		ii.	Briefly explain the influence of instruction sets.	5	K2	CO3
			(OR)			
	b)	i.	Explain the basic concepts of pipelining and compare it with sequence processing with a neat diagram.	5	K2	CO2
		ii.	What is data hazard? Explain the methods for dealing with data hazard?	8	K3	CO3
14.	a)	i.	Discuss the different mapping techniques used in cache memories and their relative merits and demerits.	8	K2	CO4
		ii.	Comparing paging and segmentation mechanisms for implementing the virtual memory.	5	K3	CO4
			(OR)			
	b)	i.	Describe in detail about associative memory.	8	K2	CO4
		ii.	Relate the access speed, size and cost of various memories in memory hierarchy system.	5	K2	CO4
15.	a)	i.	Explain various data transfer modes used in DMA.	8	K2	CO4
		ii.	Describe the working principle of USB.	5	K3	CO4
			(OR)			
	b)	i.	What are the basic differences among a branch instruction, a call subroutine instruction, and program interrupt?	8	K4	CO5
		ii.	Give comparison between memory mapped I/O and I/O mapped I/O.	5	K4	CO5

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	A computer employs RAM chips of 256×8 and ROM chips of size 1024×8. Extend the memory system to 4096 bytes of RAM and 4096 bytes of ROM. List the memory address map and indicate what size decoders are needed?	8	K5	CO4
		ii.	Briefly explain different types of instruction sets used for common CPUs.	7	K4	CO5
			(OR)			
	b)	i.	Explain Data formats of IBM 360/370 machine.	7	K4	CO5
		ii.	Illustrate the multiplication of signed numbers using Booth algorithm. $A=(-34)_{10}=(1011110)_2$ and $B=(22)_{10}=(0010110)_2$ where B is multiplication and A is multiplier.	8	K5	CO2

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Reg.No.:

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Question Paper Code: 6020

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN.2023
Third Semester
Information Technology
U19IT302 - DATA COMMUNICATIONS
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q. No.	Questions	Marks	KL	CO
1.	What is the difference between half-duplex and full-duplex transmission modes?	2	K1	CO1
2.	Differentiate between an analog and a digital electromagnetic signal.	2	K1	CO1
3.	Distinguish between data rate and signal rate	2	K2	CO2
4.	What is a quantizing error?	2	K3	CO2
5.	Define carrier signal	2	K4	CO3
6.	Which characteristics of an analog signal are changed to represent the digital signal in QAM?	2	K2	CO3
7.	What is a datagram?	2	K3	CO4
8.	Define error control	2	K4	CO4
9.	How is a switch different from a hub?	2	K5	CO5
10.	What is a transceiver?	2	K6	CO5

1

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	There are two computers connected by an Ethernet hub at home. Is this a LAN or a WAN? Explain with reasons	7	K1	CO1
		ii.	With diagrams, explain how transmission of a signal takes place in an optical fiber. Also list few of its applications.	6	K3	CO1
			(OR)			
	b)		With a neat block diagram, explain the functions performed by various layers in an OSI model.	13	K2	CO1
12.	a)	i.	Explain how PCM is done for an input signal with appropriate diagrams.	7	K2	CO2
		ii.	It is required to transmit 1000 characters with each character encoded as 8 bits.			
			1. Find the number of transmitted bits for synchronous transmission	3	K4	CO2
			2. Find the number of transmitted bits for asynchronous transmission	3	K4	CO2
			(OR)			
	b)	i.	What is line encoding? Explain any three line encoding schemes in detail	7	K3	CO2
		ii.	Compare and contrast PCM and DM.	6	K2	CO2
13.	a)	i.	What are the different aspects of digital to analog conversion? Explain.	7	K3	CO3
		ii.	Which of the three analog-to-analog conversion techniques (AM, FM, or PM) is the most susceptible to noise? Justify your answer.	6	K2	CO3
			(OR)			
	b)		What is the need for modulation? What are its types? Highlight the characteristics of each. Explain the working of PSK technique.	13	K3	CO3
14.	a)	i.	What are the different types of error detection techniques available in data link layer? With examples, explain each of them.	7	K3	CO4
		ii.	With appropriate diagrams, explain the principle of working of packet switching networks.	6	K4	CO4
			(OR)			

b)	i.	Discuss in brief about the various techniques for error control in data link layer.	7	K5	CO4
	ii.	What is a frame relay? What are the function performed by the User plane of a frame relay? Explain.	6	K3	CO4
15.	a)	What are the most commonly used networking devices in each layer of the OSI model? Explain their need and functions.	13	K5	CO5

(OR)

b)	Write short notes on the usefulness of				
	i.	Network Interface card	7	K6	CO5
	ii.	Wireless Access point	6	K6	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Discuss in detail about the characteristics and the types of Wireless transmission.	15	K3	CO1

(OR)

b)	What is a firewall? Why is it required? What are its types? Explain.	15	K5	CO5

_____

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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN

[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]

Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 6019

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN.2023

Third Semester

Information Technology

U19IT303 – DATA STRUCTURES

(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

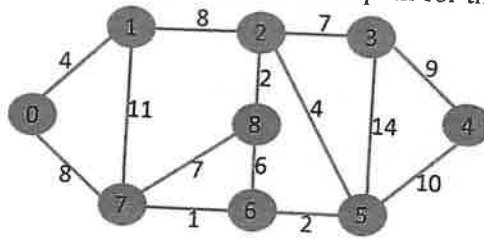| Q.No.	Questions	Marks	KL	CO
1.	Why you need a data structure? Give example for data structure	2	K2	CO1
2.	Compare array with singly linked list.	2	K2	CO1
3.	Convert the following infix expression into postfix expressions using a stack data structure. $(A - B) / (C – D*F)$	2	K2	CO1
4.	Mention the advantages of representing stacks using linked lists than arrays.	2	K1	CO2
5.	List the properties involved in heap sort.	2	K1	CO3
6.	Find how many passes are required to sort the elements 15, 23, 42, 64, 11, 24, 51, 33 using bubble sort.	2	K4	CO3
7.	Write the difference between binary tree and binary search tree.	2	K2	CO4
8.	Define the term Strictly Binary Tree	2	K1	CO4
9.	Compare and contrast shortest path algorithm and minimum spanning tree.	2	K2	CO5
10.	List out the data structures used for representing. Graph	2	K1	CO5

PART – B

Q.No.	Questions	Marks	KL	CO

11. a) Explain in detail about the circular linked list and one dimensional array.   13   K2   CO1

(OR)

b) Assume that a doubly linked list is implemented with a header.   13   K3   CO1
Write a class that includes methods to:
   i. add a value 20 after the position 5.
   ii. remove a value 30 after the position 3.
   iii. to check whether the list is empty.

12. a) Let a stack maximum size is 8. Write the routines for insertion   13   K3   CO2
and deletion of the following into stack 11, 22, 34, 65, 93, 20, 45, 81. Then pop 93, 20 and replace 65 by 85, display the final content of stack.

(OR)

b) Write the code for given requirements of stack using linked list: 13   K2   CO2
   i. Push a given element on to a stack.
   ii. Pop the topmost element from a stack.
   iii. Make a stack empty.
   iv. Determine the depth of a stack.

13. a) Illustrate the concept of bubble sort and selection sort with   13   K2   CO3
suitable example.

(OR)

b) Apply the two properties of heap to implement the heap sort for   13   K3   CO3
205, 216, 315, 112, 28, 34, 219, 18, and 102 and find the time constraint in best, worst and average case.

14. a)   i. Write code for AVL tree with single rotation and double   7   K2   CO4
rotation.
   ii. What is open addressing and give example.   6

(OR)

b) Write the routine for insertion and deletion using binary search   13   K3   CO4
tree. Show the result of inserting 302, 102, 444, 678, 909, 211, 50, 78, 789, 106, 409, 550, 756 into an initially empty Binary Search tree and show the result of deleting the root.

15. a) Write BFS, DFS algorithm and find path for the following graph.   13   K3   CO5
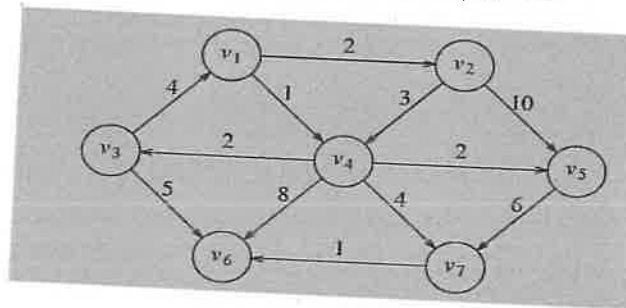

(OR)

b) Show the step by step result of Prim's and kruskal algorithm for the graph given in question 15 (a).   13   K2   CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO

16. a) Explain the working of Dijkstar's algorithm for the given graph starting from vertex V1 and give the time complexity.   15   K3   CO3

(OR)

b) Write the pseudo code for quick sort and merge sort. Apply the quick sort and merge sort in the given array and show the result step by step, and find the time constraint in best, worst and average case.   15   K3   CO3

Input array : 405, 162, 335, 117, 228, 314, 210, 187, and 802
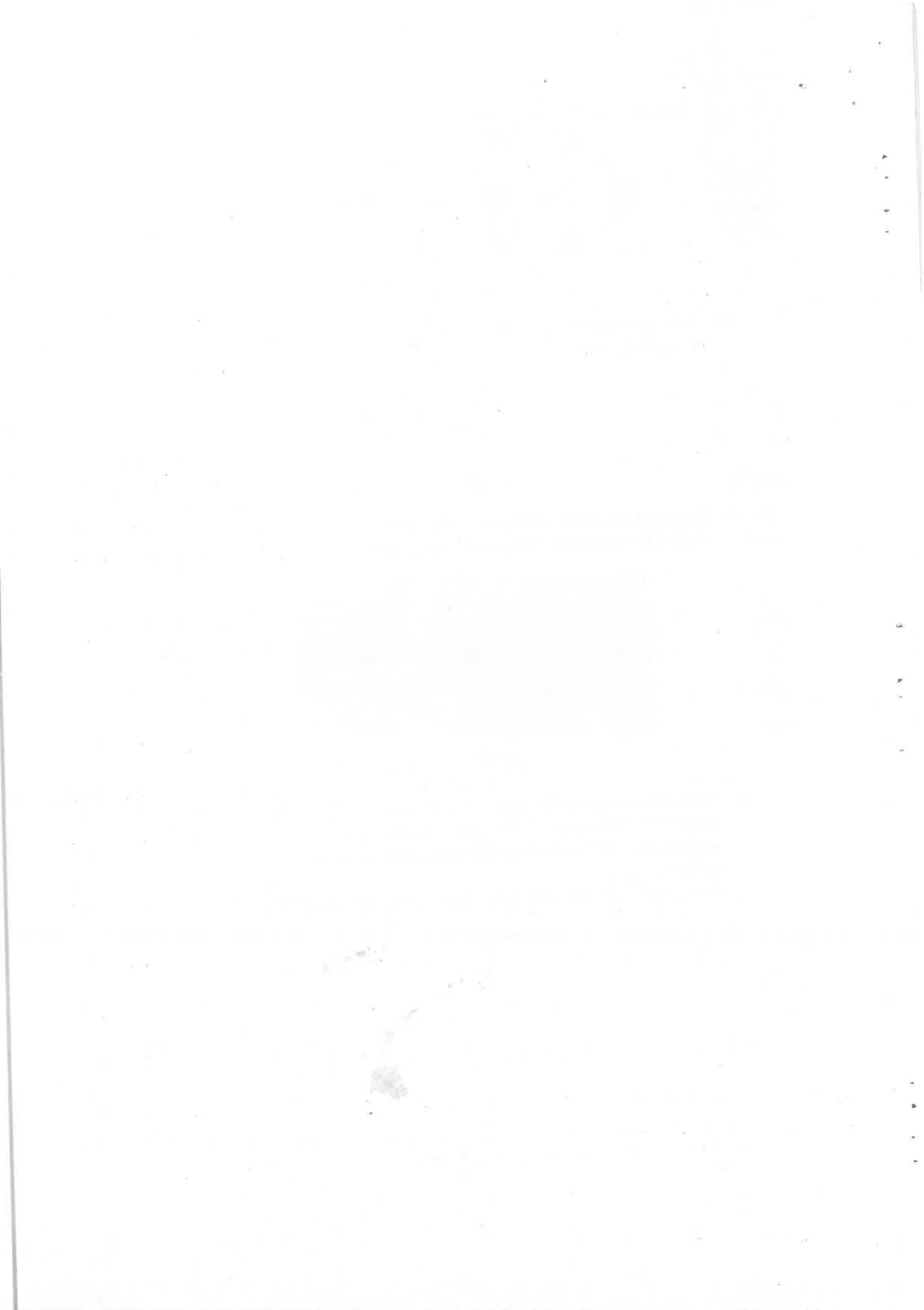
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3

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 6026

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023
Second Semester
Information Technology
U19IT201 – OBJECT ORIENTED PROGRAMMING
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks
Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Write down the syntax for creating an array of objects. Also mention how they can be used to access data members of the class.	2	K1	CO1
2.	In C++, a variable can be declared anywhere in the scope. What is the significance of this feature?	2	K2	CO1
3.	Can we make copy constructor as a private?	2	K2	CO2
4.	Define pitfalls.	2	K1	CO2
5.	Write a template class that adds two integer or floating point numbers.	2	K3	CO3
6.	How does an inline function differ from a preprocessor macro?	2	K3	CO3
7.	Give a sample C++ code snippet that writes a formatted output viz., a character and an integer to a file "input.txt". (Hint : Use *ofstream:outfile* which creates an *ofstream* object)	2	K3	CO4
8.	What is meant by pure virtual function? Write an example code snippet for the same.	2	K1	CO4
9.	Mention the cardinal difference between function overloading and function overriding with respect to Java programming paradigm.	2	K2	CO5
10.	Outline the benefits to use "finally" after try-catch block in Java.	2	K1	CO5

PART – B

Q.No.	Questions	Marks	KL	CO

11. a) Design a class to rep a bank account. Include the following members **13   K3   CO1**
Data members:
*Name of depositor.
*account number.
*type of account.
*balance amount in the account.
Methods:
*to assign initial values.
*to deposit an amount.
*to withdraw an amount after checking balance
*to display the name and balance.

(OR)

b) Illustrate Class, Objects, and pointer to object relationship and static classes with suitable example **13   K2   CO1**

12. a)   i.   Write a sample C++ program that performs overloading of the operator '+' so as to concatenate two strings. **8   K3   CO2**

   ii. What do you mean by dynamic initialization of objects? Why do we need to do this? **5**

(OR)

b)   i.   What are Constructors and Destructors? How they differ from ordinary member functions? Write a sample C++ program that uses constructors and destructors. **8   K4   CO2**

   ii. What is a scope resolution operator? Can we overload it? **5**

13. a) What is a friend function? What is its purpose? Give an example C++ program for declaring and accessing friend functions. What are the merits and demerits of using friend functions? **13   K3   CO3**

(OR)

b) Outline the purpose of exception handling in C++. Write short notes on the purpose of try, catch and throw blocks pertaining to C++. Give examples. **13   K3   CO3**

14. a) What are virtual functions? What is the purpose? Give a sample code snippet that reveals the working philosophy of virtual functions. **13   K3   CO4**

b)	Explain about various types of Inheritance with suitable illustrations. Give examples	13	K3	CO4
15. a)	i. Briefly explain the super keyword in Java Overriding functions. Give examples. Would it be possible to access the method of the super class after overriding? Justify with an appropriate example.	8	K4	CO5
	ii. Can multiple inheritance supported in java? If not, Why? Give examples that supports your point.	5		

(OR)

b)	Assume a GPU processor wants to generate a series of random numbers from a seed value(x). It adopts a procedure of generating random series by counting the digits present in x. for instance, x = 1 is read off as 11(one times 1).Similarly, x = 2 is read of as 12(one times 2). Given a seed value 'x', generate n random number series by reading the digits of x. Write a java program for the above specified problem statement.	13	K4	CO5

Example:

Input: x = 1; n =5

1, 11, 21, 1211, 111221

The output can be deciphered as (1, one 1, two 1, one 2 one 1, one 1 one 2 two 1).

PART – C

(1 x 15 = 15Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Devise a Java program that perform Polynomial addition using Arrays. Every polynomial expression is represented in a single array. The first cell of the array denotes the number of indeterminate present in that polynomial. Subsequently every term present in the polynomial occupies two cell, in which the first cell denote the coefficient and the second cell denote the indeterminate.	15	K5	CO1

For example, $A(x) = 7x^3 + 5x^2 + 2x + 11$ can be represented as

A	4	7	3	5	2	2	1	11	0

Perform $C(x) = A(x) + B(x)$

(OR)

b) Assume that you are provided with an input text file (ip.txt) which has a paragraph of English sentences. The lines of the paragraph are not aligned properly i.e. aligned left in such a way that more extra spaces are present in the right side of the end of every line. You are asked to devise a java program that simulates a text justification function which distributes the text evenly between the margins. The margin size may be customized as per the requirement. Write a Java code snippet for the same.   15   K5   CO-1

Example:

Input: ip.txt

The sequence is made up of four bases: A, G, T and C. In this context, assume that the polynucleotide chains are formed by alphabet symbols and are finite in length. Given two strands of polynucleotide chains (P_1 and P_2) check whether DNA molecule (D) formed is correct or not.

Output:

The sequence is made up of four bases: A, G, T and C. In this context, assume that the polynucleotide chains are formed by alphabet symbols and are finite in length. Given two strands of polynucleotide chains (P_1 and P_2) check whether DNA molecule (D) formed is correct or not.