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First/Second Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Applied Chemistry for CSE Stream

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks , L: Bloom's level , C: Course outcomes.

3. VTU Formula Hand Book is permitted.

Module – 1			M	L	C
Q.1	a.	What are electrochemical sensors? Explain the application in the measurement of dissolved oxygen.	7	L2	CO2
	b.	What are quantum dot sensitized solar cells? Explain the working principle and applications.	7	L2	CO2
	c.	Define Battery. Give the classification of batteries with example.	6	L1	CO1
OR					
Q.2	a.	Explain the construction and working of Li-ion battery and mention any two advantages.	7	L2	CO1
	b.	Explain the principle, working and application of conductometric sensors.	7	L2	CO1
	c.	What are transducers and explain about disposable sensors?	6	L2	CO2
Module – 2					
Q.3	a.	Explain the types of organic memory devices by taking p-type and n-type semiconducting material.	7	L2	CO1
	b.	What are Liquid Crystals? Explain the classification of liquid crystals. Mention any two properties of liquid crystals.	7	L2	CO1
	c.	Define optoelectronic devices. Mention any four properties and application of OLED.	6	L1	CO1
OR					
Q.4	a.	What are memory devices? Explain the classification of electronic memory devices with example.	7	L2	CO1
	b.	Discuss the working mechanism of liquid crystals in display system.	7	L2	CO1
	c.	Discuss the use of polyimide polymeric material for organic memory device.	6	L2	CO4

Module – 3

Q.5	a.	Define metallic corrosion. Describe the electrochemical theory of corrosion taking iron as an example.	7	L2	CO4
	b.	What are reference electrode? Explain the construction and working of calomel electrode. Mention its two applications.	7	L2	CO4
	c.	Explain the principle, instrumentation and working of conductometry using estimation of weak acid using strong base as an example.	6	L2	CO3

OR

Q.6	a.	Explain the corrosion control by anodization of aluminium and sacrificial anodic method for iron.	7	L2	CO1
	b.	Explain the construction and working of glass electrode.	7	L2	CO3
	c.	What is Galvanization? Explain the differential aeration corrosion by taking water line corrosion as example.	6	L1 L2	CO1

Module – 4

Q.7	a.	Explain the preparation, properties and application of Kevlar.	7	L2	CO3
	b.	What is green fuel? Explain the construction and working of photovoltaic cell.	7	L1 L2	CO1
	c.	Explain the synthesis and oxidative doping process of polyacetylene.	6	L2	CO4

OR

Q.8	a.	Define number average and weight average molecular weight of polymer. A polymer of polypropylene is found to have the composition $\left[\text{CH}_2 - \overset{\text{CH}_3}{\underset{ }{\text{CH}}} \right]_{300}, \quad \left[\text{CH}_2 - \overset{\text{CH}_3}{\underset{ }{\text{CH}}} \right]_{400} \quad \text{and} \quad \left[\text{CH}_2 - \overset{\text{CH}_3}{\underset{ }{\text{CH}}} \right]_{500}$ with 20%, 30% and 50% respectively in a polymer material. Calculate the number and weight average molecular mass of the polymer.	7	L2	CO5
	b.	What are conducting polymer? Explain the reductive doping of polyacetylene. Mention the two application of conducting polymer.	7	L1 L2	CO2
	c.	What is Green Hydrogen? Explain the proton exchange membrane electrolysis. Mention its advantage.	6	L1 L2	CO4

Module – 5

Q.9	a.	Discuss the role of following in recovery of metals from E-waste i) Pyrometallurgy ii) Hydrometallurgy	7	L2	CO2
	b.	Mention the sources of E-waste, explain the need of E-waste management.	7	L1	CO1
	c.	Explain the direct recycling of E-waste.	6	L2	CO2

OR

Q.10	a.	Explain the adverse effects of toxic materials used in manufacturing electrical and electronic products.	7	L2	CO2
	b.	What is E-waste? Explain the advantages of recycling and recovery of E-wastes.	7	L1 L2	CO2
	c.	Explain the extraction of gold from E-wastes. Mention the advantages.	6	L2	CO2

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2. M : Marks , L: Bloom's level , C: Course outcomes.

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	b.	What are reference electrode? Explain the construction and working of calomel electrode. Mention its two applications.	7	L2	CO4
	c.	Explain the principle, instrumentation and working of conductometry using estimation of weak acid using strong base as an example.	6	L2	CO3

OR

Q.6	a.	Explain the corrosion control by anodization of aluminium and sacrificial anodic method for iron.	7	L2	CO1
	b.	Explain the construction and working of glass electrode.	7	L2	CO3
	c.	What is Galvanization? Explain the differential aeration corrosion by taking water line corrosion as example.	6	L1 L2	CO1

Module – 4

Q.7	a.	Explain the preparation, properties and application of Kevlar.	7	L2	CO3
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	c.	Explain the synthesis and oxidative doping process of polyacetylene.	6	L2	CO4

OR

Q.8	a.	Define number average and weight average molecular weight of polymer. A polymer of polypropylene is found to have the composition $\left[\text{CH}_2 - \overset{\text{CH}_3}{\underset{ }{\text{CH}}} \right]_{300}, \quad \left[\text{CH}_2 - \overset{\text{CH}_3}{\underset{ }{\text{CH}}} \right]_{400} \quad \text{and} \quad \left[\text{CH}_2 - \overset{\text{CH}_3}{\underset{ }{\text{CH}}} \right]_{500}$ with 20%, 30% and 50% respectively in a polymer material. Calculate the number and weight average molecular mass of the polymer.	7	L2	CO5
	b.	What are conducting polymer? Explain the reductive doping of polyacetylene. Mention the two application of conducting polymer.	7	L1 L2	CO2
	c.	What is Green Hydrogen? Explain the proton exchange membrane electrolysis. Mention its advantage.	6	L1 L2	CO4

Module – 5

Q.9	a.	Discuss the role of following in recovery of metals from E-waste i) Pyrometallurgy ii) Hydrometallurgy	7	L2	CO2
	b.	Mention the sources of E-waste, explain the need of E-waste management.	7	L1	CO1
	c.	Explain the direct recycling of E-waste.	6	L2	CO2

OR

Q.10	a.	Explain the adverse effects of toxic materials used in manufacturing electrical and electronic products.	7	L2	CO2
	b.	What is E-waste? Explain the advantages of recycling and recovery of E-wastes.	7	L1 L2	CO2
	c.	Explain the extraction of gold from E-wastes. Mention the advantages.	6	L2	CO2

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BESCK204E

Second Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Introduction to C Programming

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Define Computer. With neat block diagram, explain different components of a computer.	10	L2	CO1
	b.	Explain Input and Output devices.	10	L2	CO1
OR					
Q.2	a.	Define Variable. Explain the rules for declaring the variables.	6	L2	CO1
	b.	Explain the structure of 'C' program , with an example.	10	L2	CO1
	c.	Write a C program to compute sum and average of three numbers.	4	L3	CO1
Module – 2					
Q.3	a.	Explain 'If – else' conditional branching statements in C language.	7	L2	CO2
	b.	Explain 'for' iterative statement with example.	7	L2	CO2
	c.	Explain 'goto' statement with example.	6	L2	CO2
OR					
Q.4	a.	Explain Arithmetic Operators in 'C' with example.	6	L1	CO2
	b.	Explain Type conversion and Type casting.	6	L2	CO2
	c.	Write a C program to check the given character is Lower case or Upper case or special character.	8	L3	CO2
Module – 3					
Q.5	a.	Explain following terms with examples : i) Function declaration ii) Function definition iii) Function call.	7	L2	CO4
	b.	What is Function in C program? Explain needs of function.	7	L2	CO4
	c.	Write a C program to find factorial of a given number using recursion.	6	L3	CO3
OR					

Q.6	a.	List the applications of arrays.	4	L1	CO3
	b.	Write a C program to implement matrix multiplication and validate the rules of multiplication.	10	L3	CO3
	c.	With syntax example, explain scan set function.	6	L2	CO3
Module – 4					
Q.7	a.	Write a C program to find the length of a given string without using inbuilt function.	10	L2	CO3
	b.	What is a Pointer? Show the use of two pointer operators & and *.	10	L2	CO3
OR					
Q.8	a.	Write a C program to perform addition of two matrices.	7	L3	CO3
	b.	Illustrate to access elements of two dimensional arrays. Explain with example.	7	L2	CO3
	c.	Illustrate to pass two dimensional arrays to function. Explain with example.	6	L2	CO3
Module – 5					
Q.9	a.	Explain the following string manipulation functions : i) Strlen () ii) Strcpy () iii) Strcmp () iv) Strcat ()	8	L3	CO3
	b.	Write a C program to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers using pointers.	8	L3	CO4
	c.	Explain string taxonomy with help of example.	4	L2	CO3
OR					
Q.10	a.	Define Structure. Explain the declaration of a structure with an example.	8	L2	CO4
	b.	Write a C program to implement structure to read , write and compute average marks and the students scoring above and below the average marks for a class of N students.	12	L3	CO4

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BETCK205H

Second Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Introduction to Internet of Things (IoT)

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Describe how two hosts A and B, communicate over a network using TCP/IP suite, and include a block diagram to illustrate the process.	8	L2	CO1
	b.	Differentiate between IoT and CPS.	4	L2	CO1
	c.	Discuss the various enablers of IoT and their complex interdependencies.	8	L2	CO1
OR					
Q.2	a.	Describe the sequence of technological advancements that have contributed to the development of modern IoT.	8	L2	CO1
	b.	Explain various networking components of IoT.	8	L2	CO2
	c.	Differentiate between point to point and multipoint connection type.	4	L2	CO2
Module – 2					
Q.3	a.	Explain the classification of sensors, based on sensor output and power requirement.	10	L2	CO2
	b.	List and explain the characteristics of sensors.	5	L1	CO1
	c.	Define Actuators. Explain in brief any 2 actuator types.	5	L1	CO1
OR					
Q.4	a.	With neat diagram, explain scalar and multimedia sensing techniques.	6	L2	CO2
	b.	Compare mechanical, soft and shape memory polymer based actuators.	6	L2	CO2
	c.	Define sensor node. Explain the simple sensing operation in IoT node with its functional blocks.	8	L2	CO1
Module – 3					
Q.5	a.	Describe the data offloading strategies : Offload location and Offload decision making.	10	L2	CO2
	b.	Explain in brief the importance of processing in IoT.	7	L2	CO2
	c.	Mention the IoT Device design and selection considerations.	3	L1	CO1

OR					
Q.6	a.	How does collaborative processing differ from remote processing?	10	L2	CO2
	b.	Highlight the pros and cons of onsite-processing.	5	L2	CO1
	c.	Differentiate between structured and unstructured data.	5	L2	CO2
Module – 4					
Q.7	a.	Discuss various cloud service models with examples.	8	L2	CO2
	b.	Define cloud computing. Explain in brief the advantages of virtualization.	6	L2	CO1
	c.	Compare the features of Open Stack and Amazon Web Services (AWS).	6	L2	CO2
OR					
Q.8	a.	With neat diagram, explain the components of Agricultural IoT.	10	L2	CO2
	b.	Discuss the Importance and metrics of Service Level Agreement (SLA) in cloud computing.	7	L2	CO2
	c.	What are the features of Green Cloud?	3	L1	CO1
Module – 5					
Q.9	a.	Explain the architecture of vehicular IoT with neat diagram.	8	L2	CO2
	b.	Explain the advantages and risk of healthcare IoT.	7	L2	CO2
	c.	What are the advantages of IoT in transportation?	5	L1	CO1
OR					
Q.10	a.	Describe the layered architecture of AmbuSen system.	10	L2	CO2
	b.	Define Machine Learning. List and explain the advantages and challenges of machine learning.	7	L1	CO1
	c.	Mention the four categories of machine learning algorithms with the diagram.	3	L1	CO1

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BETCK205I

Second Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Introduction to Cyber Security

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain the classification of Cyber Crimes.	10	L2	CO1
	b.	Explain the following terms related to cyber crimes: i) Internet Time Theft ii) Data Didling iii) Email Spoofing iv) Salami Attack v) Spamming	10	L2	CO1
OR					
Q.2	a.	Who are Cyber Criminals? Classify them and explain cyber defamation.	10	L3	CO2
	b.	Explain the following terms related to cyber crimes: i) Hacking ii) Password sniffing iii) Phishing iv) Cyber Stalking v) Software Piracy	10	L2	CO1
Module – 2					
Q.3	a.	What is Social Engineering? Discuss Human Based Social Engineering with a suitable example.	10	L3	CO2
	b.	Explain the difference between passive and active attacks provide tools as example.	10	L3	CO2
OR					
Q.4	a.	What is Cyber Stalking? Explain various types of stalkers. Explain how it works with a real life example.	10	L3	CO1
	b.	Explain how botnets can be used as a fuel to cybercrime with the help of a block diagram.	10	L2	CO1
Module – 3					
Q.5	a.	What is Password Cracking? List 8 guidelines that needs to be followed to avoid password cracking.	10	L1	CO1
	b.	Explain the difference between Virus and Worms with two examples each.	10	L2	CO1

OR

Q.6	a.	What are the DOS and DDOS attacks and how to protect from DOS and DDOS attacks?	10	L2	CO1
	b.	What are Key Loggers? Explain different types of Key loggers and mention the advantages of using anti key loggers.	10	L2	CO1

Module – 4

Q.7	a.	Explain any 5 types of phishing scams used by phishers.	10	L2	CO1
	b.	Discuss various types of Identity Theft Techniques.	10	L3	CO2

OR

Q.8	a.	Discuss various types of techniques used by phishers to launch phishing attacks.	10	L3	CO1
	b.	Explain four types of methods used by phishers to reveal personal information on Internet.	10	L2	CO1

Module – 5

Q.9	a.	Explain the principles involved in the collection of digital evidence.	08	L2	CO1
	b.	Brief out the guidelines used for the evidence collection phase.	06	L1	CO1
	c.	Illustrate the model for understanding a seizure and handling of forensics evidence legal framework.	06	L3	CO2

OR

Q.10	a.	Write a note on Chain of Custody Concept.	08	L1	CO1
	b.	Discuss the need for concept of computer forensics.	06	L3	CO2
	c.	Briefly explain Network Forensics.	06	L2	CO1

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BPLCK205B

Second Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Introduction to Python Programming

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain the following functions with examples: i) input ii) print iii) len iv) str	08	L2	CO1
	b.	Explain if and elif control statements with syntax and flowchart.	06	L2	CO1
	c.	Develop a program to generate Fibonacci sequence of length (N). Read N from console.	06	L2	CO1
OR					
Q.2	a.	Explain the following with example: i) Def statement with parameters ii) Parameters and Return values	06	L2	CO1
	b.	How to handle exception in python with example.	05	L2	CO1
	c.	Explain the following with syntax and example: i) for loop ii) break iii) continue	09	L3	CO1
Module – 2					
Q.3	a.	Explain the use of in and not in operator in list with examples.	06	L2	CO2
	b.	Explain Negative Indexing, Slicing, index(), append(), remove(), pop(), insert(), and sort() with suitable example.	08	L2	CO2
	c.	Write about mutable and immutable data type in list.	06	L2	CO2
OR					
Q.4	a.	Define Dictionary. Explain the following methods of dictionary: (i) setdefault (ii) get (iii) keys (iv) items	10	L2	CO2
	b.	Develop a program to read the student details like Name, USN and Marks in three subjects. Display the student details, total marks and percentage with suitable messages.	10	L2	CO2
Module – 3					
Q.5	a.	Illustrate with example opening of a file with open() function, reading the contents of the file with read() and writing to files with write().	10	L2	CO3
	b.	Explain how to save variable with the shelve module.	10	L2	CO3

OR

Q.6	a.	Explain any 5 string methods with syntax and example.	10	L3	CO3
	b.	Explain how individual elements of a string are accessed. How to extract a part of string? Explain with examples.	10	L3	CO3

Module – 4

Q.7	a.	Explain permanent delete and safe delete with a suitable python programming example to each.	08	L2	CO3
	b.	Develop a program to backing up a given folder (Folder in a current working directory) into a ZIP file by using relevant modules and suitable methods.	06	L3	CO3
	c.	Explain the role of Assertions in Python with a suitable program.	06	L2	CO3

OR

Q.8	a.	Explain the functions with examples : i) Shutil.copytree() ii) Shutil.move() iii) shutil.rmtree()	06	L3	CO3
	b.	Develop a python program to traverse the current directory by listing subfolders and files.	06	L2	CO3
	c.	Explain the support for Logging with logging module in python.	08	L2	CO3

Module – 5

Q.9	a.	Explain about class and objects with an example.	10	L2	CO4
	b.	Explain with example about pure function and modifier.	10	L2	CO4

OR

Q.10	a.	Explain the methods <code>_init_</code> and <code>_str_</code> with suitable code example to each.	06	L2	CO4
	b.	Explain the program development concept 'prototype and patch' with suitable example.	06	L2	CO4
	c.	Define a function which takes two objects representing complex numbers and returns new complex number with addition of two complex numbers. Define a suitable class 'complex' to represent the complex number. Develop a program to read N (N >= 2) complex numbers and to compute the addition of N complex numbers.	08	L3	CO4

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