

SHRI RAMSWAROOP MEMORIAL UNIVERSITY

End Semester Examination (2023-24)–Odd Semester

B. Tech (CSE) (CC & AI)/ B. Tech (CSE) (DS & AI)/ B. Tech (CE)/ B. Tech (ME)/ B. Tech (EC)/ B. Tech (EE)/ B. Tech (EE)(EV)/ B. Tech (Bio-Tech)/Integrated B. Tech (Bio-Tech)-M. Tech (Bio-Tech)/ Integrated B. Tech (Bio-Tech)-MBA – I Year (I Sem)

Course Name: Programming for Problem Solving

Code: UCS1801/ BCS1701

Time: 03 Hours

Max Marks: 60

University Roll No.

2 0 2 3 1 • 1 0 1 1 4 0 0 0 9

(To be filled by the Student)

Note: Please read instructions carefully:

- The question paper has 03 sections and it is compulsory to attempt all sections.
- All questions of Section A are compulsory; questions in Section B and C contain choice.

Section A: Very Short Answer type Questions

Attempt all the questions.

BL	CLO	Marks (10)
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1.	Compare between system software and application software.	BL2	CLO1	01
2.	Calculate: $(365.025)_{10} = (?)_2$	BL3	CLO1	01
3.	What is keyword? Give some examples.	BL2	CLO2	01
4.	Define complier in C.	BL1	CLO1	01
5.	What is flow chart in C?	BL2	CLO3	01
6.	What is the difference between user defined and library functions?	BL1	CLO3	01
7.	What is a macro in C?	BL1	CLO3	01
8.	Find different type of data types in C.	BL1	CLO4	01
9.	Compare between high level language and low level language.	BL2	CLO4	01
10.	What is the role of assembler.	BL1	CLO3	01

Section B: Short Answer Type Questions

Attempt any 08 out of 09 questions.

BL	CLO	Marks (20)
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1	What is computer memory? Differentiate between primary and secondary memory.	BL1	CLO1	2.5
2	Illustrate the use of Algorithm? Write an algorithm to find factorial of a given number.	BL3	CLO2	2.5
3	Develop a flowchart for find the Fibonacci series in C.	BL3	CLO2	2.5
4	Write a C program to find the largest of three numbers.	BL3	CLO3	2.5
5	Distinguish between call by value and call by reference with examples	BL4	CLO3	2.5
6	Define the switch cases statement in C with suitable example.	BL1	CLO2	2.5

7.	Write a C program to calculate the value of a raised to b (a^b) without using library function.	BL3	CLO4
8.	Write a C program to find the length of string without using library function.	BL3	CLO3
9.	What is structure? Explain the C syntax of structure declaration with example	BL1	CLO4
Section C: Long Answer Type Questions			BL
Attempt any 05 out of 06 questions.			CLO
1.	Examine the basic functions of each components of computer with a neat block diagram.	BL4	CLO1
2.	Write a C program to check whether input number is palindrome or not.	BL3	CLO2
3.	Write a C program to calculate the Fibonacci sequence using recursion functions..	BL3	CLO2
4.	Write a C program to swap two numbers without using the third variable using pointer.	BL3	CLO3
5.	Illustrate any five string functions with example.	BL4	CLO3
6.	Classify the use of File in C? Discuss different modes of file system.	BL4	CLO4

End Semester Examination (2023-24)-Odd Semester

B. Tech (CE)/ B. Tech (ME)/ B. Tech (EC)/ B. Tech (EE)/ B. Tech (EE) (EV)/
 B. Tech (Bio-Tech)/ B. Tech (CSE) (CC & AI)/ B. Tech (CSE) (DS & AI)/
Integrated B. Tech (Bio-Tech)-M. Tech (Bio-Tech)/ Integrated B. Tech (Bio-Tech) - MBA – I Year (I Sem)

Course Name: Chemistry	Code: UCY1801/BCY1701
Time: 03 Hours	Max Marks: 60
University Roll No.	2 0 2 3 0 1 0 1 1 4 0 0 0 9 (To be filled by the Student)

Note: Please read instructions carefully:

- a) The question paper has 03 sections and it is compulsory to attempt all sections.
- b) All questions of Section A are compulsory; questions in Section B and C contain choice.

Section A: Very Short Answer type Questions Attempt all the questions.		BL	CLO	Marks (10)
1.	What causes temporary hardness in water?	BL1	CLO3	01
2.	Find the oxidation number of Fe in Fe_2O_3 .	BL1	CLO3	01
3.	Explain bathochromic shift.	BL2	CLO2	01
4.	Show the ascending order of energy of the following electronic transitions: (i) $\pi-\pi^*$ (ii) $\sigma_{\text{ig}}-\sigma^*$ (iii) $\eta-\sigma^*$ (iv) $n-\pi^*$	BL2	CLO2	01
5.	First ionization potential of B is less than that of Be. Explain	BL2	CLO1	01
6.	Name the type of intermolecular force found in water and alcohol.	BL1	CLO3	01
7.	Discuss the term free energy with its formula.	BL2	CLO3	01
8.	What are nucleophiles? Give two examples.	BL1	CLO4	01
9.	Summarize elements of symmetry.	BL2	CLO4	01
10.	Explain, which type of disease is cured by phenacetin.	BL2	CLO4	01

Section B: Short Answer Type Questions Attempt any 08 out of 09 questions.		BL	CLO	Marks (20)
1.	Identify the $^1\text{H-NMR}$ signals in the following compounds and give reason for your answer: a. $\text{CH}_3\text{-CH}_2\text{-O-CH}_2\text{-CH}_3$ b. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{Cl}$	BL3	CLO2	2.5
2.	Explain chromophore with suitable examples.	BL2	CLO2	2.5
3.	Organize the following chemical species in ascending order of their size: (i) Na^+ (ii) Mg^{2+} (iii) Cl^- (iv) Ar	BL3	CLO1	2.5
4.	Show the crystal field splitting and find the number of unpaired electrons in $[\text{Ni}(\text{CO})_4]$.	BL3	CLO3	2.5
5.	Construct the molecular orbital diagram of N_2^+ and calculate its bond order.	BL3	CLO3	2.5
6.	Compare between bonding and anti-bonding molecular orbitals.	BL4	CLO3	2.5

7.	Classify the following as soft or hard bases and justify your answer: NH_3 , ROH , I^- , CO , O_2^-	BL4	CLO ₀
8.	Illustrate E/Z configuration of isomers with an example.	BL4	CLO ₀
9.	Discuss the synthesis of paracetamol with its pharmacological uses.	BL2	CLO ₀
Section C: Long Answer Type Questions			
Attempt any 05 out of 06 questions.			BL CLO ₀
1.	Summarize Bronsted-Lowry concept of acids and bases with examples.	BL5	CLO ₃
2.	Discuss crystal field theory in detail. Determine the Crystal field stabilization energy (CFSE) and magnetic moment of $[\text{Fe}(\text{CN})_6]^{3-}$.	BL6	CLO ₃
3.	Illustrate the vibrational modes of molecules in Infrared spectroscopy.	BL4	CLO ₂
4.	Elaborate the critical phenomena in Chemistry and explain the terms critical temperature, critical pressure and critical volume.	BL6	CLO ₃
5.	Discuss the <i>cis-trans</i> isomerism and determine the R/S configuration of the following organic molecules:	BL5	CLO ₄
<p>(a)</p> <p>(b)</p>			
6.	Outline the following terms with examples: a) Electronegativity b) Ionisation energy	BL4	CLO ₁

End Semester Examination (2023-24)-Odd Semester

B. Tech (CSE)/ B. Tech (CE)/ B. Tech (ME)/ B. Tech (EC)/ B. Tech (EE)/ B. Tech (EE) (EV)/ B. Tech (CSE) (CC & AI)/B. Tech (CSE) (DS & AI) – I Year (I Sem)

Course Name: Mathematics-I	Code: UMA1003/ BMA1001
Time: 03 Hours	Max Marks: 60

University Roll No.	2 0 2 3 1 0 1) 4 0 0 0 9
(To be filled by the Student)	

Note: Please read instructions carefully:

- a) The question paper has 03 sections and it is compulsory to attempt all sections.
- b) All questions of Section A are compulsory; questions in Section B and C contain choice.

Section A: Very Short Answer type Questions			BL	CLO	Marks (10)
Attempt all the questions.					
1.	Write the condition that function of two variables attains its maximum value.	BL1	CLO3	01	
2.	Define consistent equation with example.	BL1	CLO4	01	
3.	Define Nilpotent matrix.	BL1	CLO4	01	
4.	Write the convergence of sequence of real Numbers.	BL1	CLO2	01	
5.	Define gradient of a scalar point function.	BL1	CLO1	01	
6.	Find the value of $\beta(3,4)$.	BL1	CLO3	01	
7.	Write Maclaurin's series expansion for function of two variables.	BL1	CLO1	01	
8.	What do you understand by eigen values of matrix?	BL1	CLO4	01	
9.	Find rank of matrix $A = \begin{bmatrix} 1 & 4 & 4 \\ -1 & 2 & 3 \end{bmatrix}$.	BL1	CLO4	01	
10.	Write the condition for consistency of nonhomogenous system of equation.	BL1	CLO4	01	

Section B: Short Answer Type Questions			BL	CLO	Marks (20)
Attempt any 08 out of 09 questions.					
1.	Prove that $\beta(m, n) = \beta(m + 1, n) + \beta(m, n + 1)$.	BL5	CLO1	2.5	
2.	Under what condition the rank of following matrix is 3 $A = \begin{bmatrix} 2 & 4 & 2 \\ 2 & 1 & 3 \\ 1 & 0 & x \end{bmatrix}$.	BL3	CLO4	2.5	
3.	Determine the eigen value of matrix $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 3 \end{bmatrix}$	BL5	CLO4	2.5	
4.	Examine the convergence of sequence $a_n = n$.	BL4	CLO2	2.5	
5.	Verify Rolle's theorem for $f(x) = x^2$ in $[-1, 1]$.	BL5	CLO3	2.5	
6.	If $\vec{r} = 2x\vec{i} + 2y\vec{j} + 2z\vec{k}$, Show that $\operatorname{curl} \vec{r} = \vec{0}$.	BL3	CLO3	2.5	

7.	Show that the system of equations $x + y + z = -3; 3x + y - 2z = -2, 2x + 4y + 7z = 7$ is not consistent.	BL3	CLO4
8.	Evaluate $\lim_{(x,y) \rightarrow (0,0)} \frac{x+y}{x-y}$.	BL5	CLO3
9.	Define directional derivative of function and irrotational vector.	BL1	CLO3
Section C: Long Answer Type Questions			
Attempt any 05 out of 06 questions.			BL CLO
1.	Verify the Cayley-Hamilton theorem and hence evaluate A^{-1} for the matrix: $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 2 \end{bmatrix}$	BL4	CLO4
2.	Solve the system of equations $x + y + z = 9; 2x + 5y + 7z = 52, 2x + y - z = 0$.	BL4	CLO3
3.	Evaluate $\int_0^2 x(8 - x^3)^{1/3} dx$.	BL5	CLO1
4.	Reduce the matrix $A = \begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 1 \\ 0 & -1 & -1 \end{bmatrix}$ into Normal form and determine its Rank.	BL5	CLO4
5.	Calculate the divergence and curl of the vector: $\vec{V} = 6xyz\hat{i} + 3x^2y\hat{j} + (xz^2 - y^2z)\hat{k}$.	BL4	CLO4
6.	State the Euler's theorem on homogenous functions. Verify Euler's theorem for the function $f(x,y) = ayz + bxz + cxy$.	BL5	CLO3

End Semester Examination (2023-24)-Odd Semester

**B. Tech (CE)/B. Tech (ME)/B. Tech (ME) (EVE)/B. Tech (EC)/ B. Tech (EE)
/B. Tech (EE) (EVE)/ B. Tech (Bio-Tech)/ Integrated B. Tech (Bio-Tech)-M.
Tech (Bio-Tech)/ Integrated B. Tech (Bio-Tech)-MBA– I Year (I Sem)**

Course Name: English	Code: BHU1701/UEG1801
Time: 03 Hours	Max Marks: 60

University Roll No.	2 0 2 3 1 0 1 0 1 1 4 0 0 0 9
	(To be filled by the Student)

Note: Please read instructions carefully:

- a) The question paper has 03 sections and it is compulsory to attempt all sections.
- b) All questions of Section A are compulsory; questions in Section B and C contain choice.

Section A: Very Short Answer type Questions Attempt all the questions.		BL	CLO	Marks (10)
1.	Describe complex word.	BL2	CLO1	01
2.	Tell the significance of a topic sentence in a paragraph.	BL1	CLO2	01
3.	What are the loan words?	BL1	CLO2	01
4.	Show your acquaintance with clichés.	BL1	CLO1	01
5.	Demonstrate key features of sensible writing.	BL2	CLO2	01
6.	Define simple sentence giving a suitable example.	BL1	CLO1	01
7.	Find affixes in the word, “existentialism”.	BL1	CLO1	01
8.	Outline principles of reading comprehension.	BL2	CLO1	01
9.	Compare adjective phrase and adverb phrase.	BL2	CLO1	01
10.	What is unity in a paragraph?	BL1	CLO2	01
Section B: Short Answer Type Questions Attempt any 08 out of 09 questions.		BL	CLO	Marks (20)
1.	Use suitable preposition: 1) Please take ____ your shoes before entering the temple. 2) End number of people died ____ Corona around the world. 3) Since the door was closed, I entered the house ____ window. 4) Do not jump ____ the river if don't know swimming. 5) There is much tension ____ Israel and Hamas.	BL3	CLO2	2.5
2.	Illustrate the key features of inflectional suffix giving suitable examples.	BL4	CLO2	2.5
3.	“Knowledge is the power.” Construct a paragraph using the given sentence as a topic sentence.	BL4	CLO2	2.5
4.	Compare a linear and a chronological paragraph.	BL4	CLO2	2.5

SHRI RAMSWAROOP MEMORIAL UNIVERSITY

End Semester Examination (2023-24)-Even Semester

B. Tech (CSE) (DS & AI)/ B. Tech (CSE) (CC & AI) – I Year (II Sem)

Course Name: Physics	Code: UPH2801
Time: 03 Hours	Max Marks: 60

University Roll No.	2 0 2 3 1 0 1 0 1 1 4 5 0 0 9
	(To be filled by the Student)

Note: Please read instructions carefully:

- a) The question paper has 03 sections and it is compulsory to attempt all sections.
- b) All questions of Section A are compulsory; questions in Section B and C contain choice.

Section A: Very Short Answer type Questions		BL	CLO	Marks (10)
Attempt all the questions.				
1.	What statisticis followed by electrons as per Drude's model?	BL1	CLO1	01
2.	Mention the significance of the term density of states for a material.	BL2	CLO1	01
3.	What type of impurity atoms are required for the construction of n type semiconductor, and why?	BL2	CLO2	01
4.	Illustrate the charge generation and recombination process in semiconducting materials with proper band diagram.	BL2	CLO2	01
5.	Define stimulated emission process and mention an opto-electronic device working on this principle.	BL1	CLO3	01
6.	Mention the principal of UV spectroscopy.	BL1	CLO4	01
7.	Explain the photovoltaic effect.	BL2	CLO3	01
8.	Describe the Hall voltage along with its mathematical relation.	BL2	CLO4	01
9.	Mention two applications of quantum dots and quantum wire each.	BL1	CLO5	01
10.	Interpret the bottom up approach for the synthesis of the semiconducting nano-materials.	BL1	CLO5	01

Section B: Short Answer Type Questions		BL	CLO	Marks (20)
Attempt any 08 out of 09 questions.				
1.	What are the basic assumptions of the quantum free electron theory?	BL2	CLO1	2.5
2.	An electron is constrained to move in a one-dimensional box of length 0.20 nm. Find out the associated de Broglie wave lengths for the first exited state.	BL3	CLO1	2.5
3.	Explain the law of mass action for the semiconducting materials. Mention its significance.	BL4	CLO2	2.5

4.	The effective mass of an electron is equal to three times the effective mass of the hole. Find the distance of Fermi level in intrinsic semiconductor from the center of the forbidden band gap at room temperature. ($k = 1.38 \times 10^{-23} \text{ J/K}$)	BL3	CLO2	
5.	Explain the term phonons assisted transition in semiconductors.	BL2	CLO3	2.
6.	The spontaneous lifetimes for radiative and non-radiative recombination for an energy level in a particular semiconductor are 1 ms and 100 μs , respectively. Calculate the total spontaneous lifetime of the level.	BL3	CLO3	2.
7.	Explain the Tauc's relation for the determination of the band gap.	BL2	CLO4	2.5
8.	The Hall coefficient of a specimen of silicon was found to be $-7.35 \times 10^{-5} \text{ m}^3/\text{C}$ from 100 to 400 K. Calculate the density of charge carriers at room temperature.	BL3	CLO4	2.5
9.	Mention the expression and draw the diagrams of density of state vs. energy for bulk material, quantum wire and quantum dot.	BL2	CLO5	2.5
Section C: Long Answer Type Questions Attempt any 05 out of 06 questions.		BL	CLO	Marks (30)
Derive an expression for carrier concentration of electron in conduction band.		BL5	CLO1	06
Write the basic theory and final expression of Kronig Penny model and discuss the conditions of free particle.		BL4	CLO1	06
Explain the variation of Fermi level with temperature in p-type semiconductor using schematic diagram.		BL5	CLO2	06
Deduce an expression for optical joint density of state.		BL5	CLO3	06
Describe the van der Pauw (VdP) method for determination of resistivity of an arbitrary shaped object. Why this method is superior to the other methods used for the determination of the resistivity.		BL4	CLO4	06
Discuss some important characterization techniques for quantum nanostructure. Also compare the relative merits and demerits of these characterization techniques.		BL4	CLO5	06

SIDDHARTH COLLEGE OF ENGINEERING

End Semester Examination (2023-24) Even Semester

B. Tech (CSE) R. Tech (CSE) (I) & A.Y.R. Tech (CSE) (II) & A.Y.P.

B. Tech. (CSF) (Cybersecurity) R. Tech. (CSF) (Rheochemistry)

Integrated B. Tech (CSE) M. Tech (CSE) - II Year (IV Sem)

Course Name: Operating Systems

Time: 03 Hours

University Roll No.	2021010501122
Date:	20/05/2024 Time allotted to the Session

Note: Please read instructions carefully:

- The question paper has 03 sections and it is compulsory to attempt all sections
- All questions of Section A are comprehensive questions of Section B and C contain objective type questions

Section A: Very Short Answer Type Questions

Attempt all the questions.

Ques.	Ans.	Ques.	Ans.	Ques.	Ans.
1	Outline some key characteristics of an operating system	Ans. 1	Ques. 1	Ans. 1	Ques. 1
2	Explain the purpose of a monitor in a single term	Ans. 2	Ques. 2	Ans. 2	Ques. 2
3	Compare between a program and a process in one sentence	Ans. 3	Ques. 3	Ans. 3	Ques. 3
4	Discuss Process Control Block (PCB)	Ans. 4	Ques. 4	Ans. 4	Ques. 4
5	Describe what four conditions are and how they can be resolved	Ans. 5	Ques. 5	Ans. 5	Ques. 5
6	Explain the concept of mutual exclusion in deadlock	Ans. 6	Ques. 6	Ans. 6	Ques. 6
7	Distinguish between logical and physical address space in the context of memory management?	Ans. 7	Ques. 7	Ans. 7	Ques. 7
8	Why mutual exclusion is important in multi-process environments?	Ans. 8	Ques. 8	Ans. 8	Ques. 8
9	List some real time operating systems used in various applications	Ans. 9	Ques. 9	Ans. 9	Ques. 9
10	Outline the steps involved in the first come first served (FCFS) scheduling algorithm	Ans. 10	Ques. 10	Ans. 10	Ques. 10

Section B: Short Answer Type Questions

Attempt any 08 out of 09 questions.

Ques.	Ans.	Ques.	Ans.	Ques.	Ans.
1	Compare and contrast two different types of operating systems based on their functionality	Ans. 1	Ques. 1	Ans. 1	Ques. 1
2	Explain the difference between process and thread in following	Ans. 2	Ques. 2	Ans. 2	Ques. 2
3	Differentiate between threads and processes	Ans. 3	Ques. 3	Ans. 3	Ques. 3
4	What are the following thread priorities in & scheduling methods used by windows	Ans. 4	Ques. 4	Ans. 4	Ques. 4
5	What are the following thread priorities in & scheduling methods used by windows	Ans. 5	Ques. 5	Ans. 5	Ques. 5

- Discuss two techniques to deal with fragmentation.
- Explain the concept of demand paging and discuss its benefits for memory utilization.

BL3	CLO3	2.5
BL2	CLO3	2.5

- Outline the process of mounting a file system and explain its significance in making files accessible.

BL4	CLO3	2.5
BL3	CLO3	2.5

- Demonstrate the different techniques used for deadlock prevention.
- Analyze any one Disk Scheduling algorithm

BL4	CLO3	2.5
BL3	CLO3	2.5

- Illustrate paging and segmentation memory management techniques.
- Section C: Long Answer Type Questions**

BL	CLO	Marks (30)
BL6	CLO4	06

- Discuss Round Robin Scheduling in detail.
- A system has four processes with their arrival times and burst times as follows:

Process	Arrival Time	Burst Time
P1	0 ms	4 ms
P2	2 ms	2 ms
P3	5 ms	5 ms
P4	7 ms	1 ms

- Solve the given problem to -
- a) Determine if the system is in a safe state using the Banker's algorithm.

Process	Allocation	Available
P1	3 2 2	1 1 1
P2	2 2 1	1 1 1
P3	4 0 0	1 1 1
P4	0 0 0	1 1 1

3.	Consider the following scenario. Available resources: A (3 units), B (2 units), C (1 unit) Maximum claim matrix (Max):	BL5	CLO4	06
Proces	s A B C			
P1	7 5 3			
P2	3 2 2			
P3	9 0 2			
Allocation matrix (Allocation):				
Proces	s A B C			
P1	3 2 2			
P2	2 2 1			
P3	4 0 0			

- Solve the given problem to -
- a) Determine if the system is in a safe state using the Banker's algorithm.
- b) Explain your reasoning and show the steps involved in checking for safety.
4. Elaborate the Deadlock problem in operating systems. Explain the necessary conditions for deadlock to occur and the methods for deadlock prevention, avoidance, and detection.
5. Discuss the concept of real-time scheduling and its importance in specific systems.
6. Consider a disk with 200 cylinders numbered 0 to 199. The head is currently positioned at cylinder 100. The following is the sequence of read/write requests:

170, 43, 120, 60, 140, 85, 90, 190, 110	BL6	CLO4	06
a) Estimate the total seek time for servicing these requests using both SSTF and FCFS scheduling algorithms.	BL6	CLO4	06

b) Compare the performance of these algorithms in terms of total seek time.	BL5	CLO4	06
170, 43, 120, 60, 140, 85, 90, 190, 110	BL6	CLO4	06

SHRI RAMSWAROOP MEMORIAL UNIVERSITY

End Semester Examination (2023-24)-Even Semester

B. Tech (All)/ Integrated B. Tech (Bio-Tech)-M. Tech (Bio-Tech)/
Integrated B. Tech (Bio-Tech)-MBA – I Year (II Sem)

Course Name: Environmental Science

Code: XESX601/
UCE2801

Time: 1 ½ Hours

Max Marks: 30

University Roll No.

2 0 2 3 1 0 1 0 1 1 4 0 • 9

(To be filled by the Student)

Note: Please read instructions carefully:

- The question paper has 03 sections and it is compulsory to attempt all sections.
- All questions of Section A are compulsory; questions in Section B and C contain choice.

Section A: Very Short Answer type Questions

Attempt all the questions.

		BL	CLO	Marks (10)
1.	Define environmental ethics.	BL1	CLO2	01
2.	What are secondary pollutants? Give example too.	BL1	CLO3	01
3.	Who gave the term ‘biodiversity’?	BL1	CLO2	01
4.	Extend the acronym IUCN.	BL2	CLO2	01
5.	Why was Project Tiger started?	BL1	CLO2	01
6.	What is Montreal Protocol?	BL1	CLO4	01
7.	What is Chakravarthy Bug?	BL1	CLO3	01
8.	When was Environment Protection Act enacted?	BL2	CLO4	01
9.	Which country hosted Rio Summit-2012?	BL1	CLO2	01
10.	Who are Amrita Bishnoi and MC Mehta?	BL1	CLO2	01

Section B: Short Answer Type Questions

Attempt any 04 out of 05 questions.

		BL	CLO	Marks (10)
1.	Elaborate the meaning of air quality index.	BL6	CLO3	2.5
2.	Give a summary of National Forest Policy of India.	BL4	CLO4	2.5
3.	List different means to spread environmental awareness.	BL3	CLO2	2.5
4.	Write a short note on eutrophication and its effects.	BL6	CLO3	2.5
5.	How many types of ecosystem are there? List them.	BL4	CLO1	2.5

Section C: Long Answer Type Questions

Attempt any 02 out of 03 questions.

1.	‘Noise is a wrong sound at wrong place at wrong time’. Justify the statement suitably giving examples.	BL5	CLO3	05
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		chain reaction mechanism of	BL5	CLO3
2.	What is ozone layer? Explain the destructive ozone depletion.	sustainable development goals	BL4	CLO2

3. What is sustainable development? How many are set to be achieved? Discuss them briefly.

SHRI RAMSWAROOP MEMORIAL UNIVERSITY

End Semester Examination (2023-24)–Even Semester

B. Tech (CE)/ME(EV)/EC/EE/EE(EV) /B. Tech (CS)/Integrated B.Tech-
 M.Tech. (CS)/Integrated B.Tech (CS) - MBA /B. Tech (CS)-Data Science /
 B. Tech (CS)-Cloud Computing/B. Tech (CSE)-Industry Integrated –
 I Year (II Sem)

Course Name: Mathematics -II	Code: UMA2003 / BMA2001
Time: 03 Hours	Max Marks: 60

University Roll No. 202316121149
 (To be filled by the Student)

Note: Please read instructions carefully:

- a) The question paper has 03 sections and it is compulsory to attempt all sections.
- b) All questions of Section A are compulsory; questions in Section B and C contain choice.

Section A: Very Short Answer type Questions		BL	CLO	Marks (10)
Attempt all the questions.				
1.	What are spherical polar coordinates?	BL1	CLO1	01
2.	Find the value of the integral $\int_1^2 \int_3^4 xy dx dy$.	BL1	CLO1	01
3.	State Green's theorem for a closed plane region.	BL1	CLO1	01
4.	Define circulation for a vector field .	BL1	CLO1	01
5.	Find the order and degree of the given equation: $\frac{d^2y}{dx^2} + \sqrt{1 + \left(\frac{dy}{dx}\right)^2} = 0$	BL1	CLO2	01
6.	Write the condition to be an exact differential equation for the equation $M dx + N dy = 0$.	BL1	CLO2	01
7.	Find the C.F. of the differential equation: $\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 15y = 0$	BL1	CLO3	01
8.	Find P. I. of the differential equation $(D^2 + 4)y = \cos 2x$.	BL1	CLO3	01
9.	What is the mass of a plane lamina in polar coordinates?	BL1	CLO1	01
10.	Define ordinary point of a differential equation?	BL1	CLO4	01

HPI
Session Course B/C

Answer Type Questions

Answer as out of 09 questions.

Change the order of Integration in $\iint_S \frac{e^{-x}}{y} dx dy$

$$\int_0^1 \int_0^{z^2} (x+y+z) dy dx dz$$

$$\int_0^1 \int_0^{z^2} (x+y+z) dy dx dz$$

If $\bar{F} = 2x^2 \hat{i} + 3xy \hat{j}$, calculate $\int_C \bar{F} \cdot d\bar{r}$, where C is the arc of the curve $y=4x^2$ from origin to (1, 4).

Calculate $\iint_S (yz \hat{i} + zx \hat{j} + xy \hat{k}) \cdot d\bar{s}$ where S is the surface of the sphere $x^2 + y^2 + z^2 = a^2$ in the first octant.

Solve the differential equation: $x \frac{dy}{dx} + x \sin 2y = x^3 \cos^2 y$.

Solve the differential equation: $(D^3 - 6D^2 + 11D - 6)y = e^{-2x} + e^{-x}$.

Solve the differential equation $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - y = 0$.

Check whether x = 0 is the ordinary or regular singular point of the differential equation,

$$x^2 \frac{d^2y}{dx^2} + (2x^2 - x) \frac{dy}{dx} + y = 0$$

$$\text{Solve: } p^2 - 7p + 12 = 0 \text{ where } p = \frac{dy}{dx}$$

Section C: Long Answer Type Questions

Attempt any 05 out of 06 questions.

1. Evaluate $\iint_R xy dx dy$, where R is the quadrant of the circle $x^2 + y^2 = a^2$ where $x \geq 0$ and $y \geq 0$.

2. Using Gauss Divergence theorem evaluate the following integral $\iint_S (x \hat{i} + y \hat{j} + z \hat{k}) \cdot d\bar{n}$ where S is the portion of the plane $+2y + 3z = 6$ which lies in the first octant.

3. Evaluate $\iiint_V x^2 y^2 z^2 (x^2 + y^2 + z^2)^{-1} dx dy dz$ over the first octant of the sphere $x^2 + y^2 + z^2 = a^2$.

4. Evaluate the following differential equation: $(D^2 + 2D + 1)y = x \cos x$.

BL	CLO	Marks (20)
BL3	CLO1	2.5
BL5	CLO1	2.5
BL3	CLO2	2.5
BL3	CLO2	2.5
BL1	CLO2	2.5
BL3	CLO3	2.5
BL3	CLO3	2.5
BL3	CLO4	2.5
BL5	CLO3	06

5	Applying method of variation of parameter, solve the differential equation $\frac{d^2y}{dx^2} + a^2 y = \sec ax$	BL3	CLO3	06
6.	Solve in series the differential equation $\frac{d^2y}{dx^2} + xy = 0$	BL3	CLO4	06