	Harcourt Butler Technical University Kanpur		MID SEM I
Branch	CE/ME/EE/ET/CS/IT	Program	B. Tech
Course Name	Introduction to Civil Engineering	Semester	I
Course Code	NCE 102	Year	2023(ODD)
Time: 1:00 Hr	Answer All Questions	Maximum Marks	15
Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating
	K2: Understanding	K4: Analysing	K6: Creating

Q. No	Questions	Marks	COs	KL
1a	Briefly explain different types of levelling	3	CO1	K2
1b	Explain the working principle of Surveying.	2	CO1	K2
1c	Differentiate between W.C.B and Q.B.S.	2	CO1	K2
2a	What are Bouge's compounds? Explain in detail how each one of these compounds influences the strength and setting properties of cement.	3	CO2	K2
2b	Briefly explain different types of cement	3	CO2	K2
2c	Differentiate between P.C.C and R.C.C.	2	CO2	K2

Course Outcomes	CO1	To understand the overview and scope of Civil Engineering and apply fundamentals of Surveying.
	CO2	To understand the various types of materials used in Civil Engineering.

	Harcourt Butler Technical University Kanpur		Mid Sem II
Branch	**All Branches**	Program	**B. Tech**
Course Name	**Introduction to Civil Engineering**	Semester	**I**
Course Code	**NCE 101**	Year	**2023(ODD)**
Time: 1:00 **Hr**	**Answer All Questions**	Maximum Marks	**15**
Knowledge Level (KL)	**K1**: Remembering	**K3:** Applying	**K5**: Evaluating
	K2: Understanding	**K4**: Analysing	**K6**: Creating

Q. No	Questions	Marks	COs	KL
1a	Briefly explain Air pollution, its causes, effects, and remedies.	4	CO3	K1
1b	Briefly explain treatment of wastewater.	4	CO3	K2
2a	Distinguish between Flexible Pavement and Rigid Pavement.	4	CO4	K2
2b	Draw a neat sketch of cross-section of the pavement.	3	CO4	K1

CO	**CO3**	To understand the basic concepts of water and wastewater quality, infrastructure, and also, basics of different pollution.
	CO4	To understand the basics of Highways, Railways and Airport Engineering.

	Harcourt Butler Technical University Kanpur			END SEM
Branch	CE/EE/ME/ET/CS/IT		Program	B. Tech
Course Name	Introduction to Civil Engineering		Semester	I
Course Code	NCE 101		Year	2023(ODD)
Time: 2:30 Hr	Answer All Questions		Maximum Marks	50
Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating	
	K2: Understanding	K4: Analysing	K6: Creating	

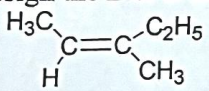
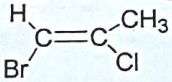
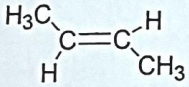
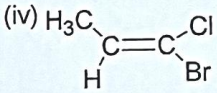
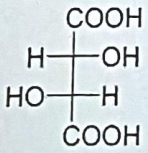
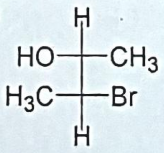
Q. No	Questions	Marks	COs	KL
1a	Enlist the advantages and disadvantages of Chain Survey and Compass Survey.	5	CO1	K2
1b	Write a short note on scope of civil engg.	5	CO2	K2
2a	Write a short note on the following Building material: (i) Bricks (ii) Stone (iii) R.C.C (iv) Steel	5	CO2	K2
2b	Enlist common types of Soils found in India.	3	CO2	K2
2c	What are the desirable properties of Building Aggregates?	2	CO2	K2
3a	Briefly explain Air pollution, its causes, effects and remedies.	5	CO3	K1
3b	Write a short note on parameters of raw water.	5	CO3	K2
4a	Briefly discuss types of rails.	3	CO4	K2
4b	Differentiate between R.C.C and Steel sleepers	2	CO4	K1
4c	Draw a neat sketch of Airport Layout	5	CO4	K2
5a	Write a short note on Beams and its types.	5	CO5	K2
5b	Briefly explain different types of retaining walls.	5	CO5	K2

Course Outcomes		
	CO1	To understand the overview and scope of Civil Engineering and apply fundamentals of Surveying.
	CO2	To understand the various types of materials used in Civil Engineering.
	CO3	To understand the basic concepts of water and wastewater quality, infrastructure, and also, basics of different pollution.
	CO4	To understand the basics of Highways, Railways and Airport Engineering.
	CO5	To understand the basic design principles for various Civil Engineering structure.

	Harcourt Butler Technical University Kanpur		MID SEM TEST
Branch	Common to CSE/IT/CE/ME/EE/ET	Program	B. Tech.
Course Name	Engineering Chemistry	Semester	I
Course Code	NCY 101	Year	2023-24
Time	1 Hr	Maximum Marks	15

Knowledge Level (KL)			
	K1: Remembering	K3: Applying	K5: Evaluating
	K2: Understanding	K4: Analyzing	K6: Creating

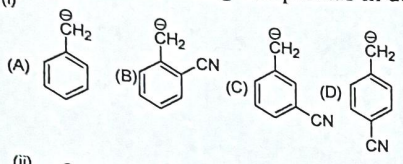
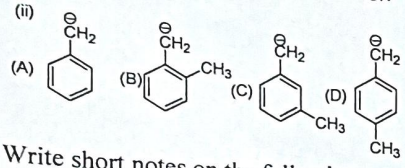
Note: Answer all questions. Marks shown against each question.

Q. No	Questions	Marks	COs	KL
1.	(a) Give the shape and geometry of XeF_2.	2	CO1	K2, K3
	(b) With the help of VBT explain hybridization, geometry and magnetic property of $[NiCl_4]^{2-}$.	2		K4, K5
2.	(a) Find correct rate law expression for following reaction: $A \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} B$ (fast) $2A + B \xrightarrow{k_2} P$ (slow)	2	CO2	K5
	(b) Explain Ostwald's isolation method for determining order of a given reaction.	2		K2, K3
3.	(a) How to differentiate between chiral and achiral molecule?	1	CO4	K1, K2
	(b) Assign the E or Z configuration to the following compounds: (i)  (ii)  (iii)  (iv) 	2		K5
	(c) How to differentiate enantiomers and diastereomers? Explain with examples?	2		K3
	(d) Assign the R or S configuration to the following compounds: (i)  (ii) 	2		K5

	Harcourt Butler Technical University Kanpur			END SEM
Branch	Common to CS/IT/ME/ET/EE/CE		Program	B. Tech.
Course Name	Engineering Chemistry		Semester	I
Course Code	NCY 101		Year	2023-24
Time	2:30 Hr		Maximum Marks	50
Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating	
	K2: Understanding	K4: Analyzing	K6: Creating	

Note: Answer all questions. Marks shown against each question.

Q.No	Questions	Marks	COs	KL
1.	(a) Write the Beer-Lambert Law of UV-vis spectroscopy. The solution of compound having concentration 0.0001g/l gave 0.2 absorbance value when measuring using 1.0cm cell. Calculate the molar extinction coefficient.	3	CO1	K4,K5
	(b) How would you identify the following pairs of compounds with the help of IR technique? (i) Ethanol and propanone (ii) Methanol and ethanoic acid (iii) Ethylamine and acetamide	1		K2
	(c) Write the postulates of Crystal field Theory for octahedral and tetrahedral complex. Show the splitting of d-orbitals of $[Co(NH_3)_6]^{2+}$ and fill the metal electrons.	2		K3
	(d) What is mesophase? Classify the liquid crystal and explain the types of organic molecules working as liquid crystal.	2		K1
	OR Draw the Jablonski diagram and explain the term: Absorbance, fluorescence, phosphorescence, intersystem crossing and internal conversion.			K3
2.	(a) Discuss Freundlich adsorption isotherm and write its limitations.	3	CO2	K2
	(b) Discuss kinetics of enzyme catalysis and derive Michaelis-Menten equation.	3		K1
	(c) Differentiate between physisorption and chemisorption.	2		K3
	OR How many times the rate of reaction increases at 20^0C for a reaction having the activation energies in the presence and absence of a catalyst as 50KJ mol^{-1} and 75 $KJmol^{-1}$?			K5

3.	(a) What are the sources, ill-effects and remedies of oxides of nitrogen pollutant?	2	CO3	K1, K2
	(b) Write short note on solar cell.	2		K1, K2
	(c) What are nanomaterials? Write their classification.	2		K1
	(d) Calculate the pH of the cell: $Pt_{(s)}/H_{2(g,1atm)}/H^+ // Ag^+_{(aq,1.00M)}/Ag_{(s)}$ Given: E= 1.2 V at 25^{0}C $E^0_{Ag+/Ag}$ = +0.8 V	2		K5
	OR			
	Write short note on electrostatic precipitator used to control particulate matter.			K2
4.	(a) Arrange the following compounds in decreasing order of stability. (i)  (ii) 	2	CO4	K2,K3
	(b) Write short notes on the following: (i) Electromeric effect (ii) Allenes	2		K1,K2
	(c) What is atropisomerism?	1		K2
	(d) Differentiate the singlet carbene and triplet carbene?	1		K4
	(e) Explain Favorski rearrangement with its mechanism.	2		K4,K5
	OR			
	Write mechanism of Wagner-Meerwein rearrangement.			
5.	(a) Calculate temporary, permanent and total hardness of a sample of water containing: Ca $(HCO_3)_2$=45.6 mg/L, Mg $(HCO_3)_2$=25.5mg/L, $MgCl_2$ =11.5 mg/L, $CaSO_4$=16.5 mg/L, KCl=20.0 mg/L and Na_2SO_4=22.5 mg/L.	2	CO5	K2
	OR			
	What are the major sources of urban solid wastes?			
	(b) Discuss hot lime soda process of softening of water and write advantages and disadvantages of lime soda process.	2		K4
	(c) Explain classification of polymers on the basis of number of monomer and method of synthesis.	2		K3
	(d) Differentiate between thermoplastic and thermosetting polymers.	2		K1
6.	(a) Define viscosity. Write the factors affecting viscosity?	2	CO6	K1,K2
	(b) What is an indicator? Give classification of indicator.	2		K1,K2
	(c) What is the working pH range of phenolphthalein and methyl orange?	2		K3
	(d) Define primary and secondary standard with the help of example.	2		K1,K2
	(e) Write the reaction involved in estimation of hardness of water using EDTA.	2		K5

	Harcourt Butler Technical University Kanpur	MID SEM

Branch	CSE/IT/ME/CE/ET/EE	Program	B. Tech.
Course Name	Introduction to Computer Science	Semester	I
Course Code	NCS 101	Year	2023-24
Time: 1:00 Hr	Answer All Questions	Maximum Marks	15

Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating
	K2: Understanding	K4: Analyzing	K6: Creating

Note: Attempt all Questions

Q. No.	Questions	Marks	COs	KL
1	What is Digital Computer and Explain its type in brief.	3	CO1	K2
2	What do you mean by translators? Differentiate between Compiler and Interpreter.	3	CO1	K4
3	What is Software? Explain difference between System and Application software?	3	CO1	K4
4	What do you understand by Operating system and explain its functions?	3	CO2	K1
5	Convert: (i) $(111100011)_2$ to $()_{16}$ (ii) $(111011)_2$ to $()_{\text{gray code}}$ (iii) $(127.5)_{10}$ to $()_8$	3	CO1	K5

Course Outcomes	CO1	Understand hardware components of computer system such as memory system organization, input/output devices, be aware of software components of computer system.
	CO2	Understand Operating systems and be able to develop basic shell scripts.
	CO3	Develop basic understanding of programming and get a concept of algorithmic thinking.
	CO4	Understand Databases, Use SQL to write queries.
	CO5	Explain how Internet works and be able to make basic static webpage.

	Harcourt Butler Technical University Kanpur	MID SEM-II

Branch	CSE/IT/ME/CE/ET/EE	Program	B. Tech
Course Name	Introduction to Computer Science	Semester	I
Course Code	NCS 101	Year	2023-24
Time: 1:00 Hr	Answer All Questions	Maximum Marks	15

Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating
	K2: Understanding	K4: Analyzing	K6: Creating

Note: Attempt all Questions

Q. No	Questions	Marks	COs	KL
1	What are the key features of Unix operating system? Also explain any five UNIX commands.	3	CO2	K1
2	Explain different data types in C language. Also mention the size and range of each.	3	CO3	K2
3	Write a program to find the largest among three numbers.	3	CO3	K3
4	Write a program to calculate the sum of ten numbers using an array.	3	CO3	K3
5	Explain various types of storage classes in C programming language.	3	CO3	K2

Course Outcomes	CO1	Understand hardware components of computer system such as memory system organization, input/output devices, be aware of software components of computer system.
	CO2	Understand Operating systems and be able to develop basic shell scripts.
	CO3	Develop basic understanding of programming and get a concept of algorithmic thinking.
	CO4	Understand Databases, Use SQL to write queries.
	CO5	Explain how Internet works and be able to make basic static webpage

	Harcourt Butler Technical University Kanpur	End Sem

Branch	CSE/IT/ME/CE/ET/EE	Program	B. Tech
Course Name	Introduction to Computer Science	Semester	I
Course Code	NCS 101	Year	2023-24
Time:	2:30 Hr	Maximum Marks	50

Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating
	K2: Understanding	K4: Analyzing	K6: Creating

Note: Attempt all Questions.

Q. No	Questions	Marks	COs	KL
1	a) What is a digital computer? Explain it's various types in details. Also explain detailed architecture of digital computer with diagrammatic representation and explain it's each part. b) Convert the following: a. $(1101101111)_2$ to ( ) gray code. b. $(1111000011)_2$ to ( )$_8$ c. $(AB23)_{16}$ to ( )$_{10}$ d. $(126.25)_{10}$ to ( )$_2$ e. $(567)_8$ to ( )$_{16}$	5X2=10	CO1	K2,K3
2	(a) Explain the concept of operating system along with it's functions. Differentiate between multiprogramming and multitasking Operating system. (b) Explain the role of kernel in UNIX Operating system. Write atleast five basic UNIX commands.	5X2=10	CO2	K2
3	(a) Explain different types of loops in C programming language. Write a C program to find the smallest among three numbers. (b) Define various data types in C and also explain storage classes in C.	5X2=10	CO3	K2,K3
4	(a) Explain DBMS along with it's properties. Also differentiate between File system and DBMS. (b) Illustrate five SQL commands in brief.	5X2=10	CO4	K2
5	(a) Explain Internet. What are the features and applications of Internet. (b) Write short notes on any two: a. Domain Name System b. HTML5 tags c. CSS	5X2=10	CO5	K2

Course Outcomes	CO1	Understand hardware components of computer system such as memory system organization, input/output devices, be aware of software components of computer system.
	CO2	Understand Operating systems and be able to develop basic shell scripts.
	CO3	Develop basic understanding of programming and get a concept of algorithmic thinking.
	CO4	Understand Databases, Use SQL to write queries.
	CO5	Explain how Internet works and be able to make basic static webpage

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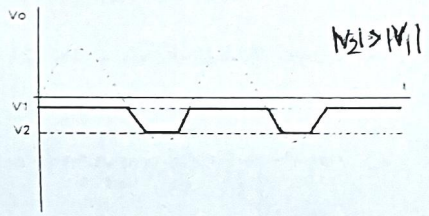
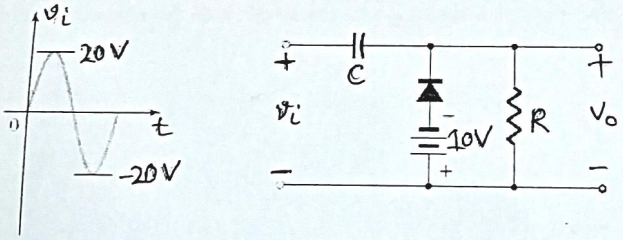
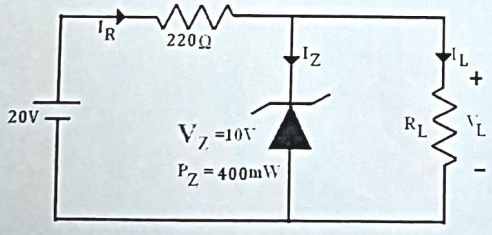
	Harcourt Butler Technical University Kanpur		FIRST MID SEM EXAM 2023-24
Branch	CE/CSE/EE/ET/IT/ME	Program	B. Tech
Course Name	Introduction to Electronics Engineering	Semester	I
Course Code	NET-101	Year	I
Time: 1:00 Hr	Answer All Questions	Maximum Marks	15

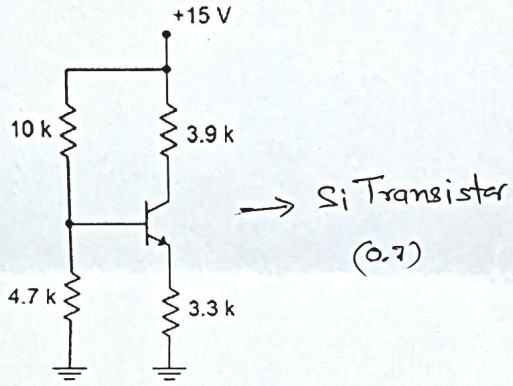
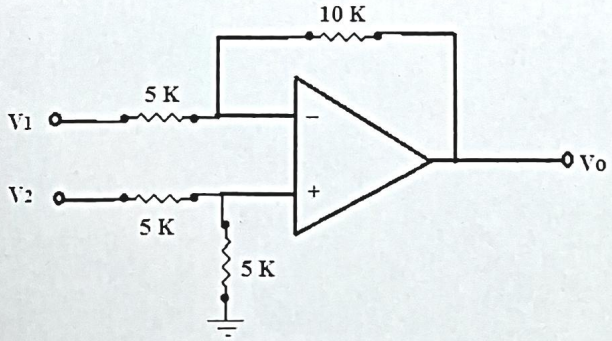
Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating
	K2: Understanding	K4: Analysing	K6: Creating

Note: Assume any data if necessary.

Q. No	Questions	Marks	COs	KL
1	Write the current equation of a p-n junction diode and draw its V-I characteristics. Also derive the expression of dynamic forward resistance of diode?	3	CO1	K1, K2
2	Draw and explain the working of Bridge rectifier with input and output waveforms. Why bridge type full wave rectifier is preferred over center-tapped full wave rectifier.	3	CO1	K2
3	Draw the circuit diagram of given output waveform for sine wave input given in the Figure Q. 3.  Figure Q. 3	3	CO1	K2, K6
4	*Draw the output waveform for the sinusoidal input applied to the circuit shown in Figure Q. 4, by presenting all the necessary calculations which have been done to determine this output.*  Figure Q. 4	3	CO1	K3
5	Explain avalanche & zener breakdown. Calculate I_L and V_L for the network shown in Figure Q.5 if R_L=250Ω.  Figure Q. 5	3	CO1	K2, K5

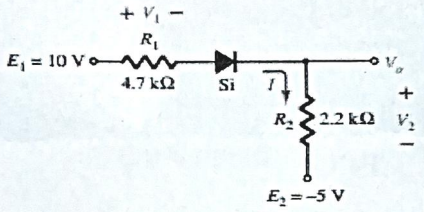
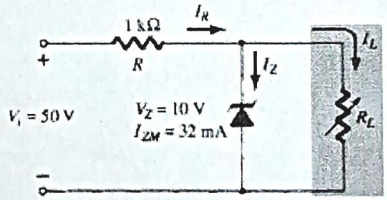
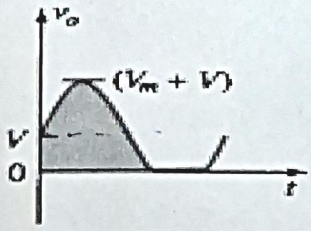
	Harcourt Butler Technical University Kanpur			SECOND MID SEM EXAM 2023-24
Branch	CE/CSE/EE/ET/IT/ME		Program	B. Tech
Course Name	Introduction to Electronics Engineering		Semester	I
Course Code	NET-101		Year	I
Time: 1:00 Hr	Answer All Questions		Maximum Marks	15
Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating	
	K2: Understanding	K4: Analysing	K6: Creating	

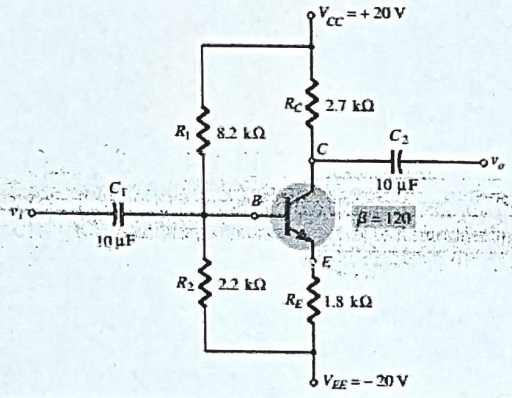
Note: Assume any data if necessary.

Q. No	Questions	Marks	COs	KL
1	Explain working of BJT in CE configuration and sketch the input and output characteristics. Also indicate active region, cutoff region and saturation region on the output characteristic curve.	3	CO2	K1, K2
2	Find I_C and V_{CE} for the circuit of Figure Q. 2, assuming β=200. Also determine the value of V_B.  **Figure Q. 2**	3	CO2	K3, K5
3	Explain the construction and operation of Enhancement MOSFET. Draw drain and transfer characteristics.	3	CO2	K1, K2
4	Write the characteristics of an ideal op-amp. Find the output voltage v_0 for the Op-Amp circuit of Figure Q. 4, where v_1=10 volt and v_2= 5 volt.  **Figure Q. 4**	3	CO2	K4, K5
5	By showing all the calculations, do as directed: (I) $(110110.011)_2 = (?)_8$ (II) $(1BA8)_{16} = (?)_{10}$ (III) $(AB9CF)_{16} = (?)_8$	3	CO3	K2, K5

	Harcourt Butler Technical University Kanpur		End Sem exam 2023-24
Branch	ET,EE,CS,ME,CE,IT	Program	B. Tech
Course Name	Introduction To Electronics Engineering	Semester	I
Course Code	NET-101	Year	1st Year
Time: 2:30 Hr	Answer All Questions	Maximum Marks	50
Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating
	K2: Understanding	K4: Analysing	K6: Creating

Note: Assume any data if necessary. Attempt all parts of question at one place

Q. No	Questions	Marks	COs	KL
1a	(i)Draw and discuss the Full wave rectifier using center tapped transformer and derive the expression of output DC voltage (V_{avg}), AC output voltage (V_{rms}), Efficiency and PIV. (ii)Determine I , V_1 , V_2 , and V_o for the series dc configuration of Fig 	3+2	CO1	K1,K2
1b	(i) For the given network determine the range of R_L and I_L that will result in V_{RL} being maintained at 10 V. Determine the maximum wattage rating of the diode.  (ii) Design the circuit diagram for the given output after providing the full sine wave as input to the circuit. 	3+2	CO1	K4,K5
2(a)	Explain the drain and transfer characteristics of N Channel Enhancement type MOSFET with suitable diagram.	5	CO2	K2

2(b)	Determine the quiescent levels of I_{CQ} and V_{CEQ} for the network of Fig.  	5	CO2	K4,K5
3(a)	Find the minimal expression and realize it with basic gates. F(A,B,C,D)= ∑m (1, 5, 6, 12, 13, 14) + *d* (2, 4)	2+3	CO3	K5,K6
3(b)	Write down the truth table of full adder, find the minimal expression of SUM, CARRY and realize these expressions with basic gates. Also implement the Full Adder using Half Adders.	3+2	CO3	K3,K4

4 (a)	Explain the working principle of Linear Variable Differential Transducer (LVDT) and also mention its merits and demerits.	3+2	CO4	K2, K4
4(b)	Describe the construction and working principle of thermocouple with suitable diagram.	5	CO4	K2
5(a)	Draw the block diagram of CRO and briefly explain the working of each block.	5	CO5	K2 K5
5(b)	Draw the block diagram of RAMP TYPE Digital Voltmeter and explain it's working by drawing the voltage to time conversion waveforms.	5	CO5	K1, K2

Course Outcomes	**CO1**	To understand the basic concept of diodes, and use the diode as a circuit element for different applications.
	CO2	To understand the working of BJT, FET, OP-amp and their application.
	CO3	To design the simple digital circuits using different logic gates.
	CO4	To identify the errors while making electronic measurements and to understand the working of different types of transducers.
	CO5	To understand the working principle of electronic instruments and displaying it on electronic devices.

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	Harcourt Butler Technical University Kanpur		1st MID SEM Exam
Branch	CE/IT	Program	B. Tech.
Course Name	Introduction to Chemical Engineering & Technology	Semester	I
Course Code	NCT101	Year	2023-2024
Time: 1.00 Hr	Answer all questions	Maximum Marks	15
Knowledge Level (KL)	K1:Remembering, K3:Applying, K5:Evaluating		
	K2:Understanding, K4:Analysing, K6:Creating		
Note: All questions carry marks, as shown against them.			

Q. No.	Questions	Marks	COs	KL
	Module 1: Introduction to Biochemical Engineering and Food Technology			
1	What does a Biochemical Engineer do?	2.5	CO2	K2
2	Define a microorganism and its classification.	2.5	CO2	K3
3	Explain the benefits of Microorganisms	2.5	CO2	K2
4	What are the primary constituents of food, and how do they play essential roles in human nutrition and overall health?	2.5	CO2	K2
5	Define food safety hazards and categorize them. List the names of four common bacteria responsible for causing foodborne diseases.	2.5	CO2	K2
6	Name the government agency responsible for all matters pertaining to food safety and quality in India. Provide eight essential pieces of information that food companies are mandated to include on their product labels in accordance with Indian food regulation.	2.5	CO2	K2

Course Outcomes	CO1	To understanding the basic concepts of microbiology and food processing
	CO2	To understand the basic concepts about Oils, fats, oleo-chemicals, essential oils & paints, their ingredients, functions and formulation of paints.
	CO3	To understand the basics and applications of Polymers and Plastics
	CO4	To understand basics and application of chemical engineering
	CO5	To understand Leather sector in India, Hides and Skins Protein, Pre-tanning and Tanning Concept and Machine in leather processing

	Harcourt Butler Technical University Kanpur			2nd MID SEM Exam
Branch	Civil Engineering & Information Technology		Program	B.Tech.
Course Name	Introduction to Chemical Engineering & Technology		Semester	I
Course Code	NCT 101		Year	2023
Time: 1.00 Hr	Answer all questions		Maximum Marks	15
Knowledge Level (KL)	K1:Remembering	K3:Applying	K5:Evaluating	
	K2:Understanding	K4:Analysing	K6:Creating	
Note: All questions carry marks, as shown against them.				

Q → Powder coating

Q. No.	Questions	Marks	COs	KL
	Module 2: Introduction to Oil and Paint Technology			
1A	Write down the components formed during hydrolysis of oils and fats, along with their significance.	3.5	CO2	K2
1B	Briefly explain the non tri glyceride components present in oils and fats.	4	CO2	K3
2A	Define "Paint", its main functions and ingredients.	4	CO2	K3
2B	With the help of flow chart, discuss the steps in paint manufacture. Also list out any two machines used for manufacture of paint.	3.5	CO2	K3

Q → Hide V/s Skin Q → Fatty acids in oil & classification (it's).

Q → Describe Dermis layer of Hides & Skins

Q → Write Chemical Composition of Hide & Skins

Q → Write short note on collagen protein.

Q → What do you understand by Bating

Q → Deliming & it's objectives Q → use of solvent in paint

Q → What are the fundamental reasons for studying thermodynamics within the field of engineering, & how does this discipline enhance our understanding & application of energy transformations & the relationships between different thermodynamic properties.

Q → Different types of controllers. Adv. & Disadv. → P, PI, PID

Q → Define term i) ETP ii) STP iii) BOD iv) COD

Q → Pickling Q → Liming & it's objectives. Q → Essential oil & examples

Q → fibrous & non-fibrous protein.

→ Classify the polymers based on line structures. → linear, branched, cross linked

→ Adv. & Disadv. of plastic materials over the metallic compounds.

→ (Addition Polymerisation)

→ Derive an expression for mass balance for homogenous chemical process for A → A also give one example based on mass conservation.

→ techniques of solid waste management → composting, incineration, (W-T-Energy) vermicomposting, etc. landfill.

→ Block diagram of negative & positive feedback loop control system.

→ Adv. & disad. of P, PI & PID controller.

→ Acid value, Iodine value & Essential Oils.

→ Sand mills, Ball mills, Attritor.

→ Analyse the utility of free radical initiator in polymerization. Derive the rate of polymerisation in terms of monomer & initiator conc.

→ Draw a schematic diagram of a chemical engineering manufacturing plant & explain three types of unit operation.

	Harcourt Butler Technical University Kanpur		END SEM
Branch	CE/CS/IT/EE/ET/ME	Program	B.Tech
Course Name	Introduction to Chemical Engineering & Chemical Technology	Semester	I
CourseCode	NCT-101	Year	2023-2024
Time:2:30 Hr	Answer AllQuestions	MaximumMarks	50
Knowledge Level (KL)	K1:Remembering	K3:Applying	K5:Evaluating
	K2:Understanding	K4:Analysing	K6:Creating

Note: Attempt all questions in order. All questions carry marks as shown.

Q.No	Questions	Marks	COs	KL
	Module 1: Introduction to Biochemical Engineering and Food Technology			
Q. 1 (a)	Names the organelles of eukaryotic cell with their function	3	CO1	K1
Q. 1 (b)	Draw the bacteria cell structure with diagram.	2	CO1	K2
Q. 1 (c)	Describe food safety hazard? Enlist major food allergens, which cause 90% of allergic reactions.	3	CO1	K1
Q. 1 (d)	How can food labels help consumers make informed decisions about allergen content? Name the government agency responsible for matters pertaining to food safety and quality in India.	2	CO1	K2
	Module 2: Introduction to Oil and Paint Technology			
Q. 2 (a)	Write down the various steps involved in refining of edible oil and also elaborate the essential fatty acids present in edible oil along with their nutritional significance.	5	CO2	K2
Q. 2 (b)	Answer the following: i. What are binders? Why they are used in paints? Write the name of any two binders. ii. Any two test methods for the testing of liquid paints iii. Any two test methods for the testing of dry films iv. Any two machines used for manufacturing of paint	5	CO2	K2
	Module 3: Introduction to Polymer Science and Technology			
Q. 3 (a)	What do you understand by Plastic recycle code? Discuss its significance. Classify common plastics based on recycle code.	5	CO3	K2
Q. 3 (b)	Compare the major differences between addition and condensation polymerization in tabular form. Give examples of polymers synthesized by addition and condensation polymerization.	5	CO3	K2
	Module 4: Introduction to Chemical Engineering			
Q. 4 (a)	Diameters of a pipe at two ends are 20 and 25 cm respectively. Find discharge of water flowing through pipe in liter/sec at section 1 which is having velocity 10 m/s. Determine velocity at section 2.	3	CO4	K1
Q. 4 (b)	Define process/ steps involved in ETP	2	CO4	K2
Q. 4 (c)	What are the three types of unit operations? Name two equipment for each type of unit operations.	3	CO4	K2

Q. 4 (d)	Explain the two fundamental equations (phenomenological/constitutional and conservation) which are used in modelling of these unit operations.	2	CO4	K2
	Module 5: Introduction to Leather Technology			
Q. 5 (a)	Write anatomical structure of hide and skins. Describe dermis layer of hides and skins.	5	CO5	K1
Q. 5 (b)	What do you understand by deliming and pickling? Write its objective.	5	CO5	K2

Course Outcomes	**CO1**	To understanding the basic concepts of microbiology and food processing
	CO2	To understand the basic concepts about Oils, fats, oleo-chemicals, essential oils & paints, their ingredients, functions and formulation of paints.
	CO3	To understand the basics and applications of Polymers and Plastics
	CO4	To understand basics and application of chemical engineering
	CO5	To understand Leather sector in India, Hides and Skins Protein, Pre-tanning and Tanning Concept and Machine in leather processing