MANAV RACHNA UNIVERSITY

DEPARTMENT OF CHEMISTRY

"T3 Examination, Dec-2021"

SEMESTER	III[RD]	DATE OF EXAM	02-12-2021
SUBJECT NAME	Organic Chemistry-I	SUBJECT CODE	CHH237-T
BRANCH	B.Sc. B.Ed.	SESSION	I
TIME	9:00 AM-12:00 NOON	MAX. MARKS	80
PROGRAM	B.Sc. B.Ed.	CREDITS	3
NAME OF FACULTY	Dr. V.V. Pathak	NAME OF COURSE COORDINATOR	Dr. V.V. Pathak

Note: All questions are compulsory.

***Part a and Part B**: MCQ/ Short answer type questions, each question carries 1 mark.*

***Part C and Part D**: Long answer type questions, each question carries 10 marks.*

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	meso -Tartric acid is: (i) Sometime optically active (ii) Sometimes optically inactive (iii) Always optically active (iv) Always optically inactive	1	CO1	BT1	
	1(B)	Which of the following statement is false about enantiomer: (i) Rotate plane polarized light (ii) Are superimposable mirror images (iii) Are non-superimposable mirror images (iv) Is characterized by all of the above	1	CO1	BT1	
	1(C)	2-Butanol is optically active due to: (i) An asymmetric carbon (ii) A plane of symmetry (iii) A hydroxyl group (iv) A centre of symmetry	1	CO1	BT1	
	1(D)	Compound with same molecular formula but different structural formula are called: (i) Isomer (ii) Ortho compounds (iii) Iso compounds (iv) None of these	1	CO1	BT1	

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	1(E)	A molecule is said to be chiral if: (i) It contains plane of symmetry (ii) It contains centre of symmetry (iii) It can not be superimposed on mirror image. (iv) None of these	1	CO1	BT1	
	1(F)	Define tautomerism with example.	1	CO1	BT2	
	1(G)	What do you understand by optically active compounds?	1	CO1	BT2	
	1(H)	Explain Cis and Trans isomers.	1	CO1	BT2	
	1(I)	Define the term Enantiomers.	1	CO1	BT2	
	1(J)	Define the term specific rotation.	1	CO1	BT2	
PART-B	Q2(A)	Which of the following is a saturated hydrocarbon? (i) Isopropane (ii) Propene (iii) Acetylene (iv) None of these	1	CO2	BT1	
	2(B)	Which of the following is the most reactive cycloalkane? (i) Cyclobutane (ii) Cyclopropane (iii) Cyclopentane (iv) Cyclohexane	1	CO2	BT1	
	2(C)	Which of the following Alkane is a chief constituent of Biogas? (i) Ethane (ii) Octane (iii) N-butane (iv) Methane	1	CO2	BT1	
	2(D)	Halogenation of Alkane in presence of light takes place through the: (i) Addition reaction (ii) Elimination reaction (iii) Reduction reaction (iv) Free radical mechanism	1	CO2	BT1	

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	2(E)	Alkene undergoes addition reaction due to: (i) Sigma bond (ii) Pi bond (iii) Hydrogen bond (iv) None of these	1	CO2	BT1	
	2(F)	What do you understand by saturated and unsaturated hydrocarbons?	1	CO2	BT2	
	2(G)	Calculate strain and bond angle in cyclobutane and cyclopropane.	1	CO2	BT2	
	2(H)	Explain banana bond in cyclopropane.	1	CO2	BT2	
	2(I)	Explain Saytzeff rule with example.	1	CO2	BT2	
	2(J)	Write chemical reaction for formation of alkene via dehalogenation.	1	CO2	BT2	
PART-C	Q3	What do you understand by aromaticity? Explain the criteria for aromaticity.	10	CO3	BT3,	
	Q4	Write the methods of preparation of Benzene from Chlorobenzene, Acetylene and phenol. Explain its physical properties.	10	CO3	BT2, BT3	
	Q5	Explain the reaction mechanism for Electrophilic substitution of Benzene with example of Sulphonation and Nitration.	10	CO3	BT3, BTT4	
PART-D	Q6	Explain S_N1 and S_N2 reactions with mechanism for Alkyl halide.	10	CO4	BT4	
	Q7	Why aryl halides do not undergoes Nucleophilic displacement reactions readily?	10	CO4	BT3	
	Q8	How will you synthesis Nitrophenol from p-Nitrochlorobenzene in the presence of aq. NaOH at 160 ºC. Explain with reaction mechanism.	10	CO4	BT4	

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DEPARTMENT OF CHEMISTRY

"T3 Examination, Dec-2021"

SEMESTER	**3rd**	**DATE OF EXAM**	**2-12-2021**
SUBJECT NAME	**Physical chemistry-II**	**SUBJECT CODE**	**CHH201BT**
BRANCH	**Chemistry**	**SESSION**	**MORNING**
TIME	**9:00-12:00am**	**MAX. MARKS**	**100**
PROGRAM	**B.Sc.(H)**	**CREDITS**	**4**
NAME OF FACULTY	**Dr.Priti Gupta**	**NAME OF COURSE COORDINATOR**	**Dr.Priti Gupta**

Note: ALL QUESTIONS ARE COMPULSORY.(Scientific calculator is allowed).

PART-A

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
1(A)	What will be the work done in a constant volume process and why? A)negative B) zero C) positive D)none of the above	2	CO1	BT2
1(B)	"The entropy of the system is constantly increasing ".Justify.	2	CO1	BT2
1(C)	Calculate the entropy change when 2 moles of an ideal gas are allowed to expand isothermally at 293 K from a pressure of 10 atmosphere to a pressure of 2 atmosphere .	3	CO1	BT2
1(D)	When 1 gm of liquid naphthalene ($C_{10}H_8$) solidifies, 150 J of heat is evolved. What is the enthalpy of fusion of $C_{10}H_8$?	3	CO1	BT3
1(E)	Joule-Thomson effect is related to: (A) adiabatic compression (B) adiabatic expansion (C) isothermal expansion (D) isothermal compression	2	CO2	BT4
1(F)	Define Joule Thomson coefficient .Show that it is zero for an ideal gas	4	CO2	BT2

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1(G)	Write a short note on "Le Chatelier's Priciple".	4	CO2	BT2
1(H)	A solution containing 0.513 gm of naphthalene (molar mass = 128) in 50 gm of Carbon tetrachloride gives a boiling point elevation of 0.402°C ,while a solution of 0.625 gm of an unknown solute gives a boiling point elevation of 0.650°C. Find the molar mass of unknown solute?	7	CO2	BT3
1(I)	Define the following terms: a) Molal Elevation Constant b) Raoult's Law	6	CO3	BT2
1(J)	Calculate the vapor pressure of a solution made by dissolving 21.80 g of glucose (molar mass = 180.155 g/mol) in 460.0 g of H_2O at 30.0 °C. (The vapor pressure of the pure solvent is 31.82 mmHg at 30.0 °C.)	5	CO3	BT3
PART-B Q2(A)	Describe the process of Reverse Osmosis with comparison to Osmosis. How Reverse process is used in Desalination of sea water.	8	CO3	BT4
2(B)	What are isotonic solutions? Show that for isotonic solutions at the same temperature, the molal concentrations are same.	6	CO3	BT2
Q3(A)	Derive an expression for the elevation in boiling point of a liquid when a solute is dissolved in and explain how the molecular mass of solute can be evaluated by the Boiling point method.	8	CO3	BT2
PART-C Q4(A)	With the help of two examples, show that the rate can be independent of initial concentration of the reactants. What is the order of such reactions?	8	CO3	BT2
4(B)	50%of the first order reaction is completed in 23 minutes. Calculate the time required to complete 90% of the reaction.	5	CO4	BT3
Q5(A)	Explain the term Effective collision .On what factors does it depends?	6	CO4	BT2
5(B)	For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction	6	CO4	BT3
Q6(A)	Explain various methods for determining the Order of reaction.	7	CO4	BT4
6(B)	Derive integrated Arrhenius equation of activation energy. How is activation energy determined from the plot.	8	CO4	BT2

********** END **********

MANAV RACHNA UNIVERSITY

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DEPARTMENT OF CHEMISTRY

"T3 Examination, December-2021"

SEMESTER	**III**	**DATE OF EXAM**	**06/12/2021**
SUBJECT NAME	**Organic Chemistry-II**	**SUBJECT CODE**	**CHH203B-T**
BRANCH	**Chemistry**	**SESSION**	**I**
TIME	**09:00AM-12:00 Noon**	**MAX. MARKS**	**100**
PROGRAM	**B.Sc. (H) Chemistry**	**CREDITS**	**4**
NAME OF FACULTY	**Dr. Megha Bansal**	**NAME OF COURSE COORDINATOR**	**Dr. Megha Bansal**

Note: All questions are compulsory.

Bloom's Level: L1-Remembering; L2-Understanding; L3-Applying; L4-Analyzing; L5-Evaluating; L6-Creating

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	What happens when two moles of ethyl chloride react with two moles of sodium in the presence of ether what will be formed. Write suitable chemical reaction.	2.5	CO1	L3	1.1.2
	1(B)	Which of the following reactant gives the best method of preparation of alkyl halides when reacts with alcohol and why (a) Zn/HCl (b) PCl_5 (c) $SOCl_2$/ Pyridine (d) PCl_3	2.5	CO1	L3	1.1.1
	1(C)	Which compound is most nucleophilic and why (a) CH_3SH (b) CH_3OH (c) H_2O (d) CH_3COOH (e) BF_3	2.5	CO1	L2	1.2.1
	1(D)	Arrange the substrates in order of increasing SN_2 reactivity with NaCN: (a) Bromoethane (b) 1-chloro-3,3-dimethylpentane (c)1-chloro-2,2-dimethylpentane (d) 2-bromo-2-methylpentane	2.5	CO1	L3	1.2.2
	1(E)	Explain why 2,6-di-tert-buylphenol is a much weaker acid than phenol.	2.5	CO2	L2	1.2.1
	1(F)	Which is more acidic, phenol or o-chlorophenol and why.	2.5	CO2	L3	1.1.1
	1(G)	Explain why the C-O bond in phenol is shorter than in alcohol.	2.5	CO2	L3	1.2.2
	1(H)	Why HI is a better reagent than HBr in the cleavage of ethers.	2.5	CO2	L3	4.1.2

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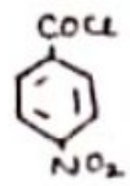
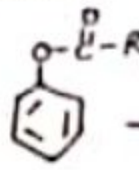
PART-B	Q2(A)	Discuss the mechanism for the reaction of aldehyde with halogens in the presence of alkali.	5	CO3	L3	5.2.1
	2(B)	Complete the following reactions: (a)  LTBA (b)  $AlCl_3$ (c) $3\,CH_2=NH$ Trimerization (d) $CH_3-\overset{O}{\overset{\|}{C}}-H + C_6H_5-NH_2 \xrightarrow{H^+}$ (e) $(CH_3)_2C=O + NH(CH_3)_2 \xrightarrow{TsOH}$	5	CO3	L4	4.1.2
	2 (C)	Aldehydes having α-H atom usually do not undergo the Cannizzaro reaction under its reaction condition. Given an explanation by writing suitable Cannizzaro reaction.	10	CO3	L4	4.1.2
	Q 3(A)	Explain why benzaldehyde gives a positive test with Tollen's reagent but not with Fehling's solution . Why aldehydes are stronger reducing agent than ketones.	5	CO3	L4	4.1.2
	3(B)	Explain following name reactions: (a) Baeyer Villiger oxidation (b) Witting reaction	5	CO3	L4	7.2.1
	3 (C)	Giving reasons, arrange the compounds in order of increasing reactivity towards nucleophilic reagents: (a) CH_3CHO, $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$, CF_3CHO, $CH_3-CH=CH-\overset{O}{\overset{\|}{C}}-H$ (b) $Ar-\overset{O}{\overset{\|}{C}}-Ar$, $Ar-\overset{O}{\overset{\|}{C}}-R$, $R-\overset{O}{\overset{\|}{C}}-R$, $Ar-CH_2-\overset{O}{\overset{\|}{C}}-R$	10	CO3	L4	7.2.1
	Q 4(A)	Discuss the mechanism for the hydrolysis of acetamide under acidic and basic condition.	5	CO4	L2	7.2.1
	4(B)	Discuss the mechanism for the conversion of acid chloride to respective alcohol	5	CO4	L3	5.2.1
PART-C	4(C)	How will you convert: (a) Tartaric acid to oxalic acid (b) Tartaric acid to succinic acid (c) Tartaric acid to Rochelle salt (d) Bromo succinic acid to Malic acid (e) Benzene to Maleic acid	10	CO4	L3	11.2.1
	Q 5 (A)	Compare the reactivities of CH_3COOH, C_6H_5COOH, CCl_3COOH	5	CO4	L5	11.2.1
	5 (B)	Explain why 2-chlorobutanpoic acid is more acidic than 3-chlorobutanoic which is more acidic than butanoic acid.	5	CO4	L3	7.2.1
	5 (C)	Starting with acetic acid and any reagent of your choice write the synthesis of following: (a)Acetophenone (b) Ethyl acetate (c) Acetyl Chloride (d) Propanoic acid (e) Acetamide	10	CO4	L4	7.2.1

********** END **********

DEPARTMENT OF CHEMISTRY

"T3 Examination, Dec-2021"

SET – I

SEMESTER	III	DATE OF EXAM	10.12.2021
SUBJECT NAME	Inorganic Chemistry - II	SUBJECT CODE	CHH202B-T
BRANCH	B.Sc Chemistry	SESSION	2021-2022 (I)
TIME	180 mins	MAX. MARKS	100
PROGRAM	B.Sc Chemistry III sem	CREDITS	5
NAME OF FACULTY	Dr. Roopa Rani	NAME OF COURSE COORDINATOR	Dr. Roopa Rani

***Note**: Attempt all questions*

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
	Part A				
Q1	What is the principle of zone refining? explain diagrammatically.	2	CO1	3	
Q2	How electrode potential values are useful in deciding the reducing and oxidizing properties of a metal?	3	CO1	3,2	
Q3	Out of CO and CO_2 which is a better reducing agent and why?	3	CO1	2	
Q4	Discuss the utility of Ellingham diagram in explaining the reducing properties of metals.	2	CO1	4	
Q5	Discuss the chelation process using EDTA as an example.	3	CO2	4	
Q6	Comment of the following statement – "S-block elements has complex forming tendency".	2	CO2	5	
Q7	Explain the features of alkali metals with respect to a) Sulphates b) Nitrates c) Carbonates	5	CO2	3	
	PART B				
Q8	Which element among the 17th group members doesn't exhibit positive	5	CO3	5	

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		oxidation state? Why?				
	Q9	Why first element of each group show anomalous behavior with rest of the elements? Give proper example.	5	CO3	4	
	Q10	Write short notes on the following – a) Borazines b) Silicones	 5 5	CO3	3	
	Q11	Discuss the trend of ionization energy among group 13-17 elements of p-block.	5	CO3	3	
	Q12	With reference to 13th group elements, discuss the following properties- a) Metallic character b) Electron gain enthalpy c) Melting point d) Atomic size e) Electronic configuration	10	CO3	5	
	Q13	Give the general characteristics of hydrides of group 13, 14 and 15.	5	CO4, CO5	2	
	Q14	Write short notes on the following – a) Oxoacids of Cl b) Halides of P c) Halides of Si d) Oxides of P e) Clathrate compounds of noble gases	 3 3 3 3 2	CO5	3	
	Q15	What are phosphonitrilic halides? How can they be prepared? Discuss their properties and uses.	8	CO5	2	
	Q17	Discuss the structure of interhalogen compounds of the type XY, XY_3, XY_5 and XY_7.	8	CO5	4	
	Q18	Explain in brief the structure and properties of Xenon fluorides.	10	CO4, CO5	4	

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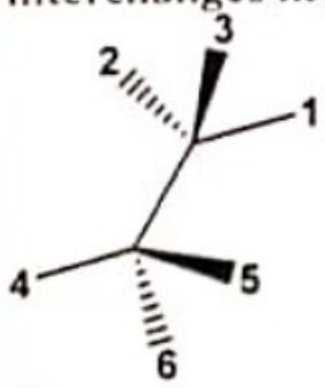
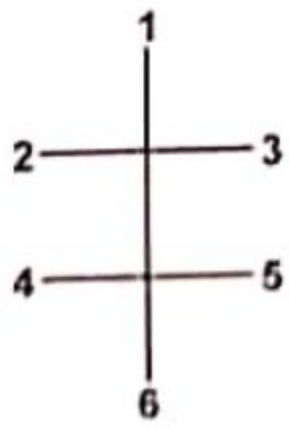
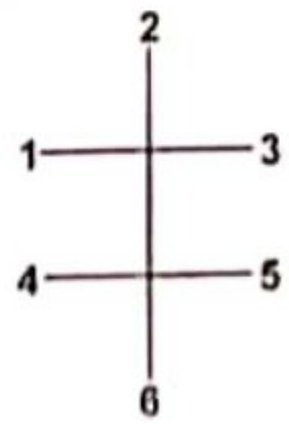
DEPARTMENT OF CHEMISTRY

"T3 Examination, December-2021"

SEMESTER	**III**	**DATE OF EXAM**	**2.12.2021**
SUBJECT NAME	**Organic Special-I: Statistical Stereochemistry & Asymmetric Synthesis**	**SUBJECT CODE**	**CHH 613B**
BRANCH	**CHEMISTRY**	**SESSION**	**I**
TIME	**9:00 a.m. to 12 noon**	**MAX. MARKS**	**100**
PROGRAM	**M.Sc. Chemistry**	**CREDITS**	**4**
NAME OF FACULTY	**Dr. Ekta Rawat**	**NAME OF COURSE COORDINATOR**	**Dr. Ekta Rawat**

Note: All questions are compulsory.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	FI
PART-A	1(A)	Find out the correct Fisher projection formula for the following compound(show with interchanges invovled):  (i)  (ii)  	4	CO1	BT3	

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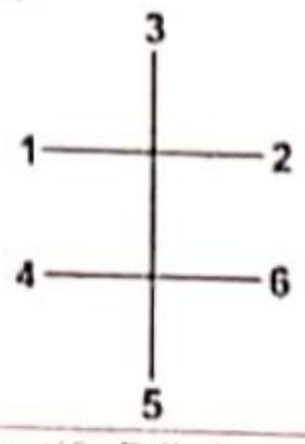
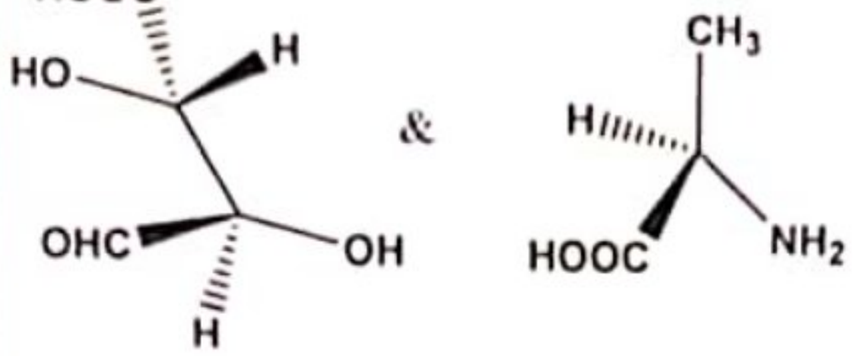
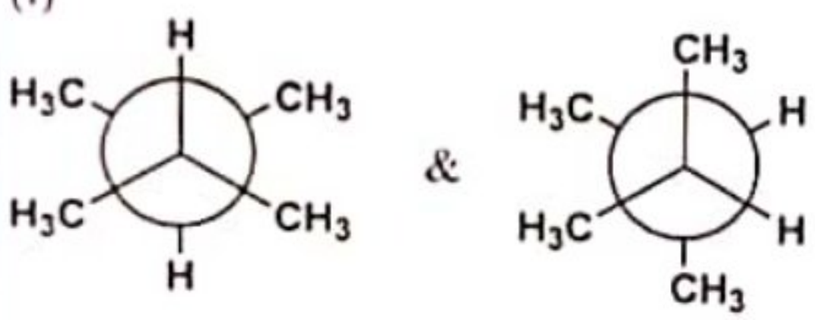
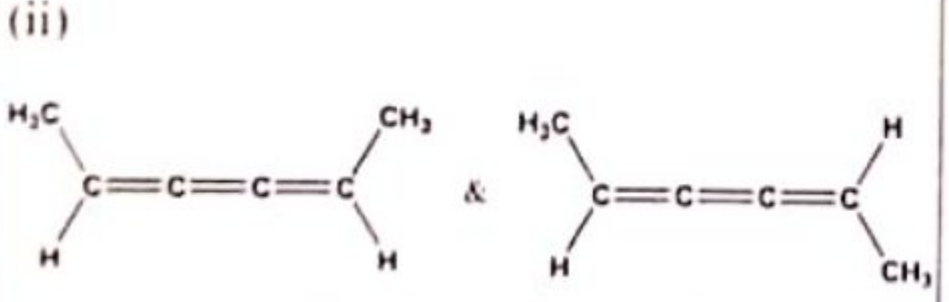
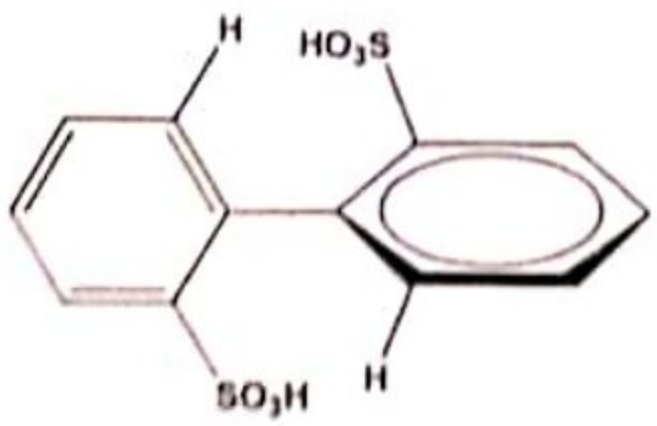
PART-B

		(iii)  (iv)  Identify D/L form in the following compounds:			
	1(B)		(3+3=6)	CO1	BT3
	Q2(A)	Relate the following pair of compounds: (i)  (ii) 	(2+2=4)	CO2,CO3	BT2,BT3
	2(B)	Assign absolute configuration to the following class of organic molecules: (i)Molecules with atrophisomerism 	(2+2+2=6)	CO2,CO3	BT4

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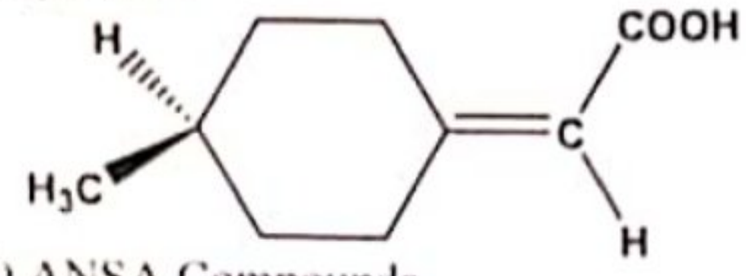
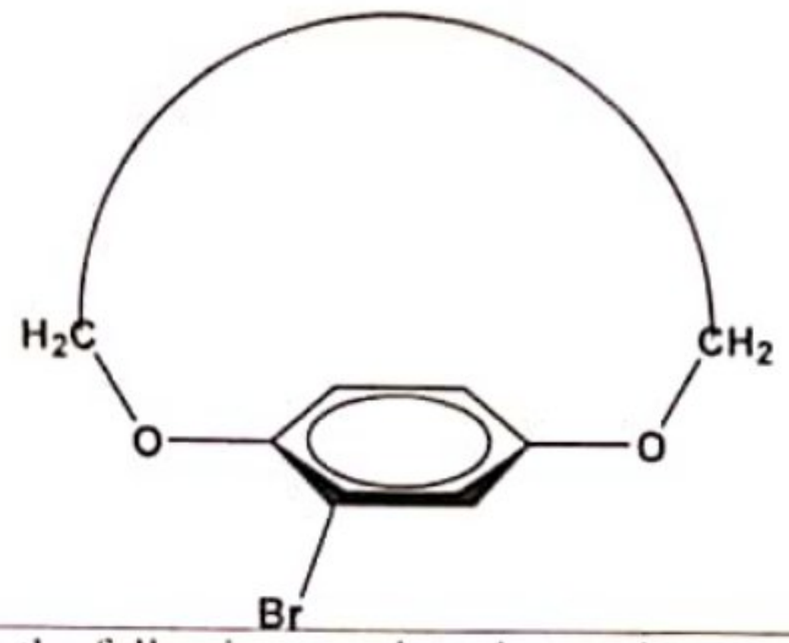
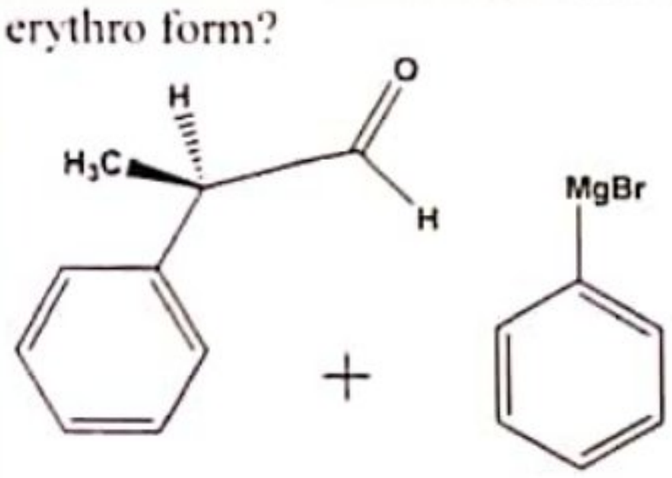
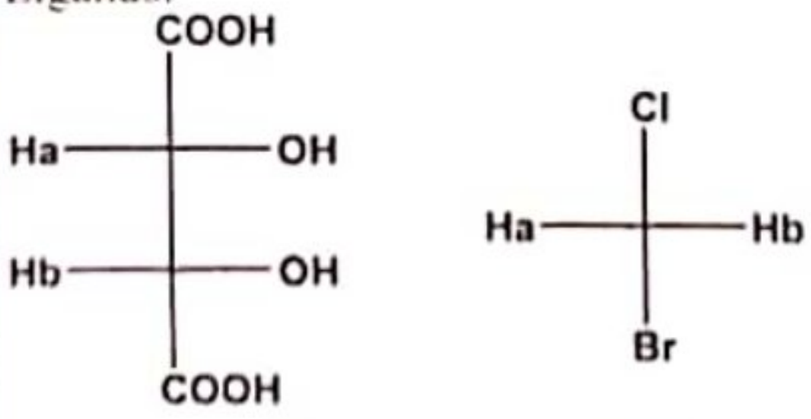
PART-C		(ii) Spiranes  (iii) ANSA Compounds 			
	Q3(A)	In the following reaction, the starting material is a pure enantiomer, the product mixture would show predominance of one diastereomer. Predict which form of the diastereomer will be formed i.e. threo form or erythro form? 	10	CO5, CO6	BT4
	3(B)	Assign topocity to the following ligands/faces: Ligands: 	(2x5=10)	CO4	

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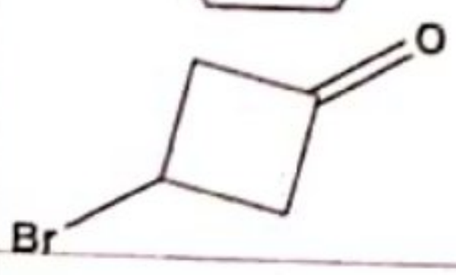
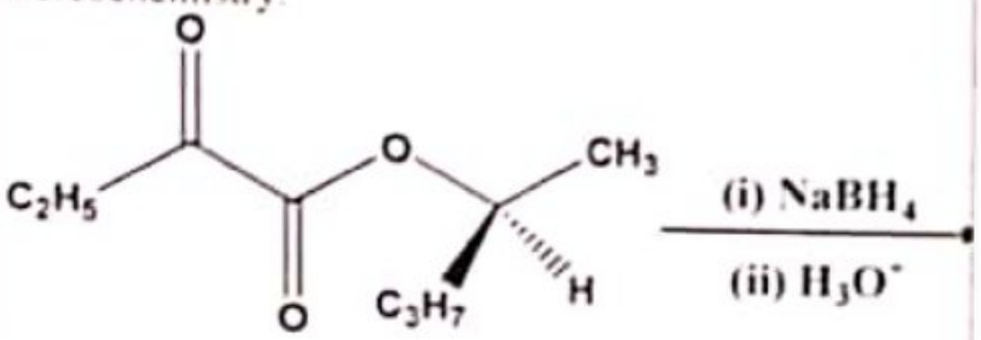
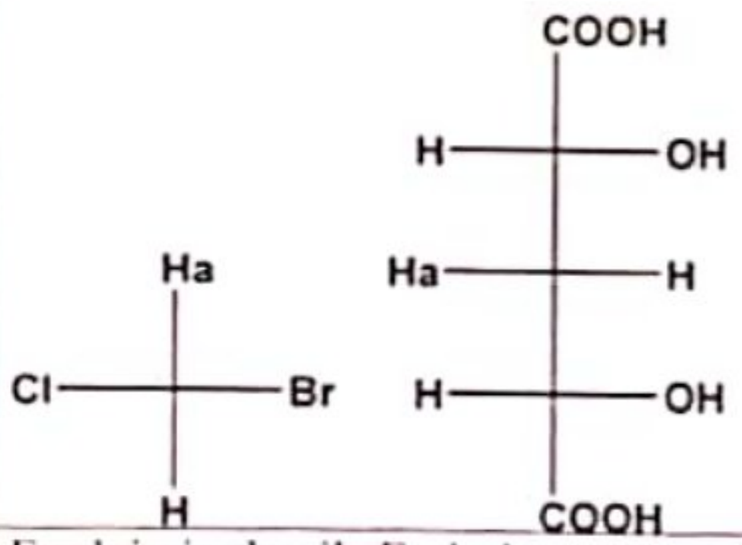
Faces:



	4(A)	What controls the stereochemistry of this product? You are advised to draw a mechanism first and then consider the stereochemistry: 	10	CO4	BT4
	4(B)	Write short note on optical purity and % Enantiomeric excess.	5	CO5	
	4(C)	Assign prochirality (H_a)to the following: 	(2.5+2.5=5)	CO5, CO6	
PART-D	Q5(A)	Explain in details Ender's asymmetric α-alkylation of hydrazones of aldehydes and ketones. What chiral auxiliaries are used in this reaction to carry out the asymmetric synthesis?	(8+4=12)	CO6	
	5(B)	William's method of asymmetric synthesis can be used for mono- and di-substitution in asymmetric α-alkylation of glycine.	8	CO6	

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	Explain.					
Q6(A)	How is Jacobsen`s precatalyst and catalyst synthesized using (R,R)-cyclohexane-1,2-diamine? Explain its enantioselectivity for cis-alkenes transition state diagrams	(8+6=14)	CO6			
6(B)	What is Midland`reagent? Give its synthesis and applications.	6	CO6			

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DEPARTMENT OF CHEMISTRY

"T3 Examination, Dec-2021"

SET - I

SEMESTER	III	DATE OF EXAM	06.12.2021
SUBJECT NAME	Symmetry and Group Theory	SUBJECT CODE	CHH601B
BRANCH	M.Sc Chemistry	SESSION	2021-2022(I)
TIME	180 mins	MAX. MARKS	100
PROGRAM	M.Sc Chemistry III sem	CREDITS	4
NAME OF FACULTY	Dr. Roopa Rani	NAME OF COURSE COORDINATOR	Dr. Roopa Rani

Note: *Attempt all questions*

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
	Part A				
Q1	Define equivalent symmetry elements and equivalent symmetry operations using suitable examples.	4	CO1	3	
Q2	Determine the point group of the following molecules- a) CO_3^{2-} b) SiF_4 c) HCN	6	CO1	3,2	
Q3	Reduce the following representations into irreducible representations referring to the character table of C_{2v} point group E C2 σ(xz) σ(yz) a) 5 5 1 1 b) 10 -4 -10 4	4	CO1	2	
Q4	Write notes on the following a) Direct product b) Vanishing integral c) Position and base vector	6	CO2	4	
	PART B				
Q5	Explain the orgel diagram for D term splitting with the configuration of d^1, d^4, d^6, d^9 tetrahedral and octahedral geometry.	5	CO3	5	
Q6	What do you mean by selection rules? State the spin and laporte selection rule. Why they are necessary?	5	CO3	3	

	Q7	Explain the concept of splitting of terms i.e. one-electron level in an octahedral and tetrahedral environment.	10	CO3	6	
	Q8	What do you mean by co-relation diagrams? Draw the co-relation diagram for d^2 configuration. Explain its utility.	5	CO3	3	
	Q9	Derive the secular determinants of 2-atom system and determine the energy of orbitals involved. Write all the steps involved.	10	CO3	5	
	Q10	Differentiate among VBT and MOT. Which concept is more useful and why?	5	CO4, CO5	4	
	Q11	Using quantum mechanical approach, Verify that the orbitals undergoing sp^2 hybridization has an angle of 120 .	6	CO5	3	
	Q12	Demonstrate different ways of pi bond formation in a molecule. How the hybridization of these molecules can be determined using group theory? Take example of BF_3 molecule.	10	CO5	2	
	Q13	Identify the vibrational modes of freedom in H_2O molecule and classify among themselves for IR and Raman signals.	4	CO4	4	
	Q14	Identify the number of vibrational modes of transition which are IR active and Raman active taking any example of T_d point group.	10	CO4, CO5	3	
	Q15	What is the rule of mutual exclusion? Explain the concept taking a suitable example.	5	CO4	3	
	Q16	Using the group theoretical concept, identify the hybridization of NH_3 molecule. Write all the steps involved	5	CO4	4	

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Character tables

Character table for C_{3v} point group

	E	$2C_3(z)$	$3\sigma_v$	linear, rotations	quadratic
A_1	1	1	1	z	x^2+y^2, z^2
A_2	1	1	-1	R_z	
E	2	1	0	$(x, y)(R_x, R_y)$	$(x^2-y^2, xy)(xz, yz)$

Character table for C_{2v} point group

	E	C_2 (z)	σ_v(xz)	σ_v(yz)	linear, rotations	quadratic
A_1	1	1	1	1	z	x^2, y^2, z^2
A_2	1	1	-1	-1	R_z	xy
B_1	1	-1	1	-1	x, R_y	xz
B_2	1	-1	-1	1	y, R_x	yz

Character table for T_d point group

	E	$8C_3$	$3C_2$	$6S_4$	$6\sigma_d$	linear, rotations	quadratic
A_1	1	1	1	1	1		
A_2	1	1	1	-1	-1		
E	2	-1	2	0	0		(z^2 , x^2-y^2)
T_1	3	0	-1	1	-1	(R_x, R_y, R_z)	
T_2	3	0	-1	-1	1	(x, y, z)	(xy, xz, yz)

D_{3h}	E	$2C_3$ (z)	$3C'_2$	σ_h (xy)	$2S_3$	$3\sigma_v$	linear functions, rotations	quadratic functions	cubic functions
A'_1	+1	+1	+1	+1	+1	+1	-	x^2+y^2, z^2	$x(x^2-3y^2)$
A'_2	+1	+1	-1	+1	+1	-1	R_z	-	$y(3x^2-y^2)$
E'	+2	-1	0	+2	-1	0	(x, y)	(x^2-y^2, xy)	(xz^2, yz^2) [$x(x^2+y^2)$, $y(x^2+y^2)$]
A''_1	+1	+1	+1	-1	-1	-1	-	-	-
A''_2	+1	+1	-1	-1	-1	+1	z	-	z^3, $z(x^2+y^2)$
E''	+2	-1	0	-2	+1	0	(R_x, R_y)	(xz, yz)	[xyz, $z(x^2-y^2)$]

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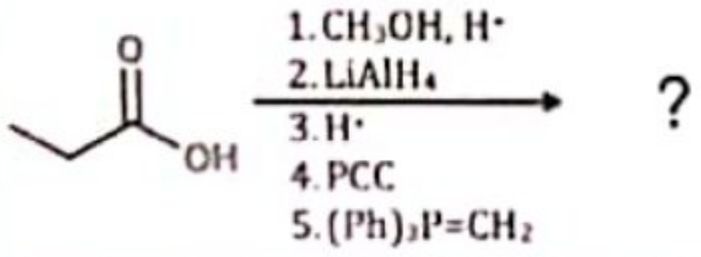
Declared as State Private University vide Haryana Act 26 of 2014

DEPARTMENT OF CHEMISTRY

"T3 Examination, Dec-2021"

SEMESTER	**III**	**DATE OF EXAM**	**09.12.2021**
SUBJECT NAME	**Modern Organic Synthetic Techniques**	**SUBJECT CODE**	**CHH615 B**
BRANCH	**Chemistry**	**SESSION**	**2021-2022 (I)**
TIME	**09:00 - 12:00**	**MAX. MARKS**	**100**
PROGRAM	**M.Sc Chemistry (Organic)**	**CREDITS**	**4**
NAME OF FACULTY	**Dr. Jaya Tuteja**	**NAME OF COURSE COORDINATOR**	**Dr. Jaya Tuteja**

Note: All Questions are compulsory

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q1	Demonstrate the reactivity difference between Li aluminium Hydride or Sodium borohydride, with suitable examples?	3	CO1	BT4	1.3.2
	Q2	With the help of suitable examples state the difference between region and chemoselectivity?	2	CO2	BT2	1.3.2
	Q3	What is the final organic product of the reaction shown? 	3	CO1	BT3	1.3.2
	Q4	Why do Suzuki couplings need a base?	2	CO2	BT3	1.3.2
PART-B	Q5	Does Swern oxidation work with tertiary alcohols?	2	CO3	BT2	1.3.2
	Q6	State suitable reagent for synthesis of diketone?	2	CO3	BT4	1.3.2
	Q7	Explain reductive cleavage of C =O double bond?	3	CO3	BT4	1.3.2
	Q8	How will you bring out the conversions of carboxylic acid to alcohols? State with suitable example?	3	CO4	BT3	1.3.2

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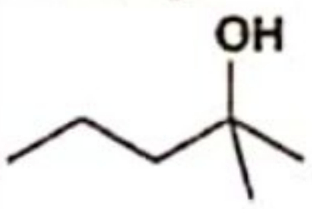
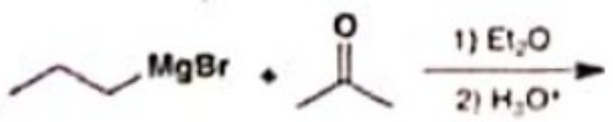
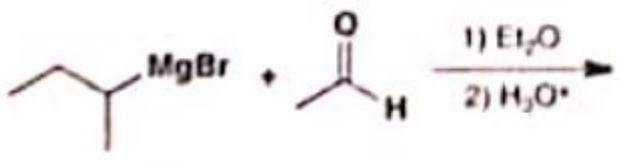
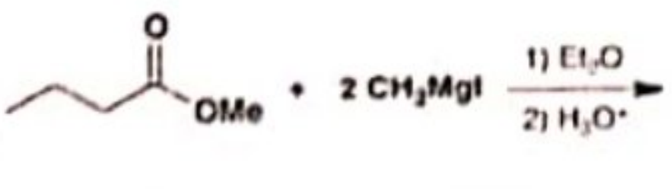
PART-C	Q9	What happens when benzene is added to potassium permanganate?	3	CO5	BT2	1.3.2
	Q10	Which is more reactive enol or enolate and why?	3	CO5	BT4	1.3.2
	Q11	Give a brief on stabilized and unstabilized Phosphorous ylide?	4	CO5	BT3	1.3.2
	Q12	State the process for epoxide and cyclopropane formation from α,β-unsaturated carbonyl compounds?	5	CO5	BT4	1.3.2
	Q13	Why are crown ethers very important in medicine and organic synthesis?	5	CO5	BT3	1.3.2
	Q14	What are the advantages of polymer supported reagents explain with the help of suitable example?	5	CO5	BT2	1.3.2
	Q15	What is phase-transfer catalyst used for and what is the phase transfer process?	5	CO5	BT3	1.3.2
	Q16	Design the synthesis of alkenes with high regioselectivity & stereoselectivity	5	CO5	BT4	1.3.2
	Q17	Explain some reactions of enol and enolates?	5	CO5	BT3	1.3.2
PART-D	Q18	With the help of suitable examples discuss one and two group C-C disconnections?	5	CO6	BT2	1.3.2
	Q19	Why is Retrosynthesis important and How do we assess the quality of a synthesis of a particular organic compound?	5	CO6	BT4	1.3.2
	Q20	Which reaction will **not** provide a synthesis of the following?  a)  b)  c)  d)	3	CO6	BT4	1.3.2
	Q21	Discuss the role of functional group interconversion (FGI) in reterosynthesis with suitable examples?	4	CO6	BT3	1.3.2

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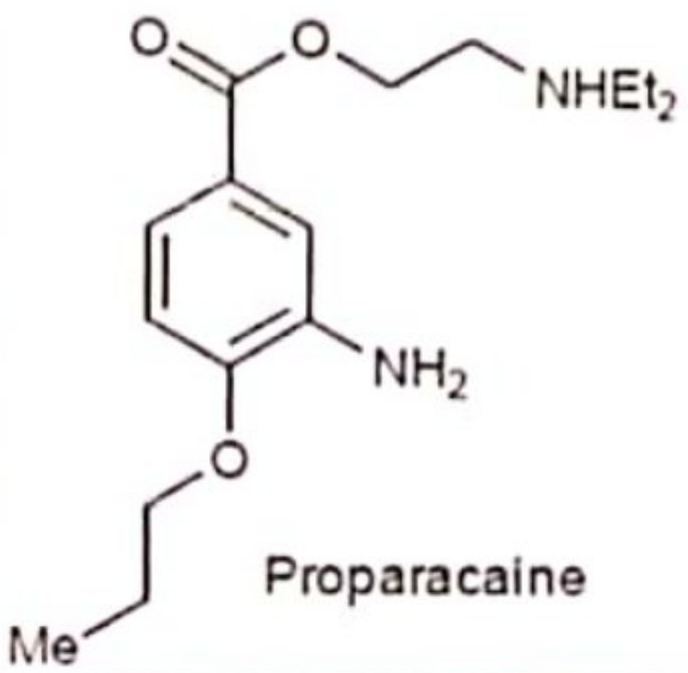
	Q22	Define umpolung? What reaction is related to the concept of umpolung?	3	CO6	BT2	1.3.2
	Q23	What Is The "Retro" Diels-Alder Reaction, Explain with suitable example?	4	CO6	BT4	1.3.2
	Q24	Propose a retrosynthetic analysis of the following compound. Your answer should include both the synthons, showing your thinking, and the reagents that would be employed in the actual synthesis.  Proparacaine	8	CO6	BT5	1.3.2
	Q25	Propose a retrosynthetic analysis of the following compounds. Your answer should include both the synthons, showing your thinking, and the reagents that would be employed in the actual synthesis.  	8	CO6	BT5	1.3.2

**********END**********

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MANAV RACHNA UNIVERSITY

DEPARTMENT OF CHEMISTRY

"T3 Examination, Dec-2021"

SEMESTER	3rd	**DATE OF EXAM**	**13.12.2021**
SUBJECT NAME	Photochemistry & Pericyclic Reaction	**SUBJECT CODE**	**CHH619**
BRANCH	Chemistry	**SESSION**	**Morning**
TIME	**3 hrs**	**MAX. MARKS**	**100**
PROGRAM	**MSc**	**CREDITS**	**4**
NAME OF FACULTY	**Sangita Banga**	**NAME OF COURSE COORDINATOR**	**Sangita Banga**

Note *Part A Each question is of 10 marks, attempt any two of three*

Part B Each question will be of 20 marks and attempt any four from Part B

PART-A

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
1(A)	Explain the mechanism of dimerization of 1,3-butadiene in solution in the presence of acetophenone and benzil sensitiser	2.5	CO2	BT2	2.1.1
1(B)	Trans isomer are geometrically more stable then why the ratio of Cis-isomer would always be higher than Trans in mixture on irradiation	2.5	CO2	BT2	2.1.1
1(C)	How pericyclic reaction differs from normal reaction Give some important characteristics of pericyclic reaction	2.5	CO4	BT1	2.1.1
1(D)	Discuss the mechanism of 1, 2 alkyl shift in substituted aromatics by Prismane Intermediate.	2.5	CO2	BT2	5.1.1
2(A)	What is paterno-buchi reaction? Give an example in support of your answer	2.5	CO2, CO3	BT2	5.1.1
2(B)	What is meant by conrotatory & disrotatory movement? Explain with example	2.5	CO2	BT2	5.1.1.
2(C)	What are group transfer reactions? Explain with the support of suitable example	2.5	CO2, CO4	BT3	5.1.1
2(D)	Write a note on photodimerisation of α,β unsaturated ketones	2.5	CO2, CO3	BT2	2.1.1

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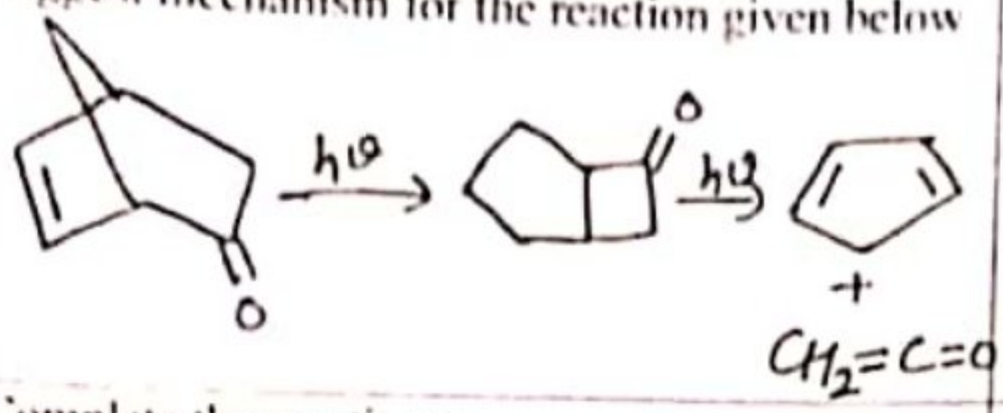
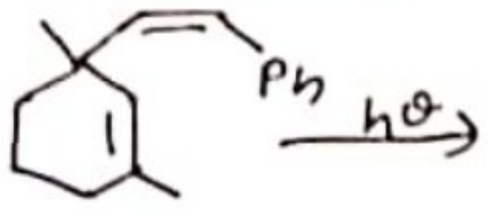
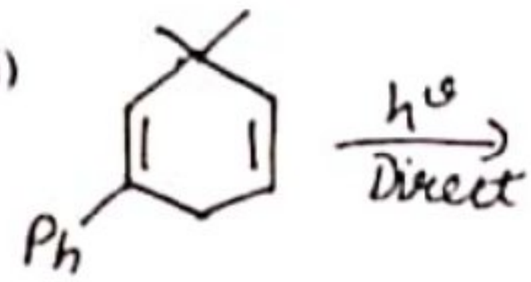
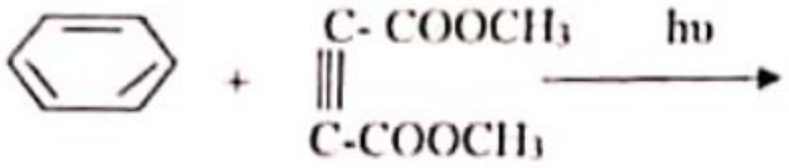
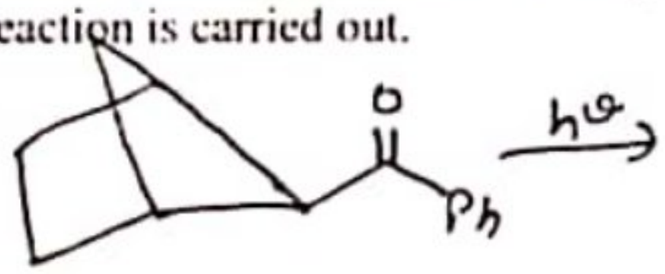
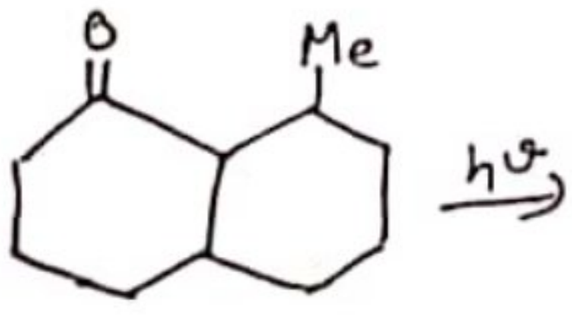
PART-B	3(A)	Suggest mechanism for the reaction given below 	2.5	CO1, CO2	BT3	1.1.1
	3(B)	Complete the reactions: (i)  (ii)  (iii) 	2.5X3	CO3, CO4	BT3	9.1.2, 11.2.1
	Q4(A)	[1,3] Sigmatropic shift of hydrogen is thermally forbidden but photochemically allowed. Explain	5	CO2, CO4	BT3	5.1.1
	4(B)	Using PMO method prove that Cope rearrangement occurs preferentisIly through a chiar like rather than boat like transition state.	5	CO1, CO4	BT4	1.1.1, 2.2.1
	4 (C)	Give product for the following reaction & explain the detailed mechanism through which the reaction is carried out. (i)  (ii) 	5X2	CO3, CO5	BT4	9.1.2, 10.3.1
	Q5(A)	With the help of FMO show that [2+2] cycloaddition reaction is photochemically allowed and thermally forbidden.	5	CO4	BT3	2.2.1

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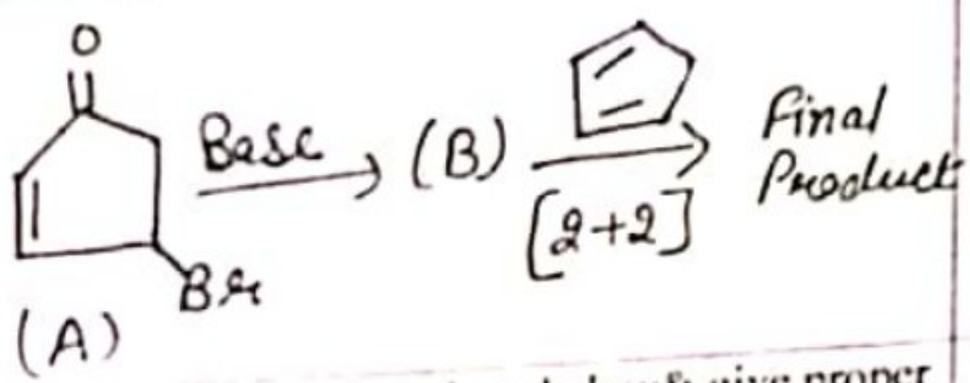
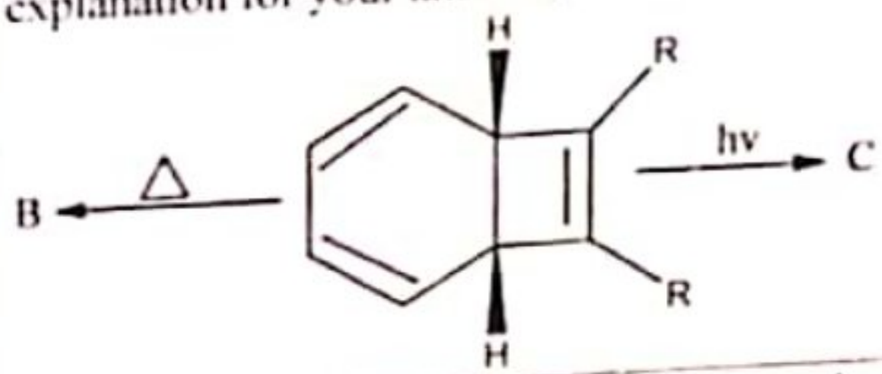
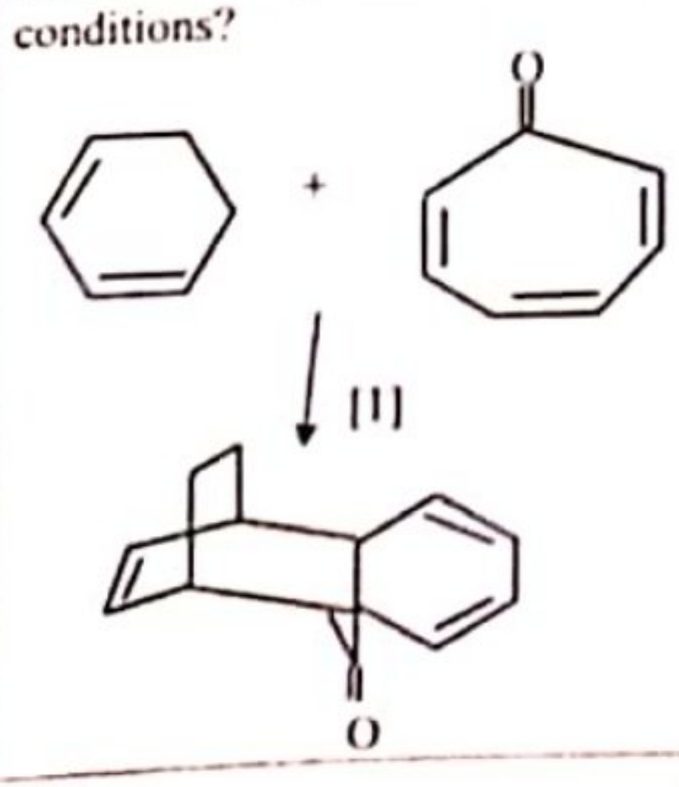
	5(B)	Give the mechanism of Chelotropic cycloaddition reaction between Alkene & Singlet Carben. Discuss why this addition is stereospecific in nature	5	CO2, CO5	BT3	2.2.1, 10.3.1
	5(C)	Predict whether the [4+2] cycloaddition could be photoinduced if the dienophile, instead of diene were the excited reactants. Explain your answer.	5	CO2, CO4	BT4	2.2.1, 11.2.1
	5(D)	The reaction of compound (A) with base gives molecule (B) which underpoes [2+2] cycloaddition reaction with cyclopentadiene to give two different products. Identify the products formed in the reaction with the help of proper movement of bonds and arrows. 	5	CO2, CO5	BT5	2.2.1, 10.3.1
	Q6(A)	Complete the reaction given below& give proper explanation for your answer. 	5	CO2, CO5	BT4	2.2.1, 10.3.1
	6(B)	Explain the mechanism of 1,3 dipolar reaction with the help of frontier molecular orbital diagram.	5	CO2, CO4	BT3	2.2.1
	6(C)	What type of cycloaddition occurs in Reaction [1]? Draw the product of a similar process I Reaction [2]. Would you predict that these reactions occur under thermal or photochemical conditions? 	5	CO2, CO5	BT4	2.2.1, 10.3.1

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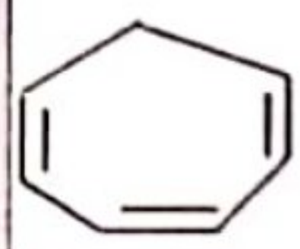
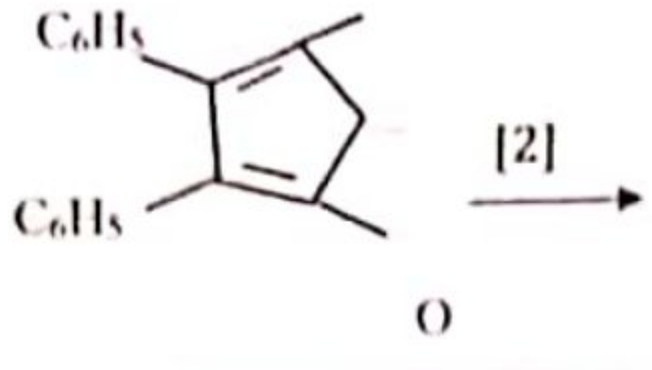
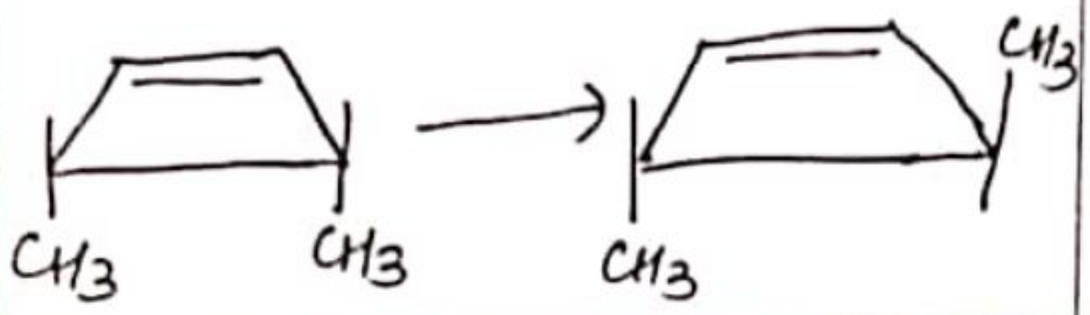
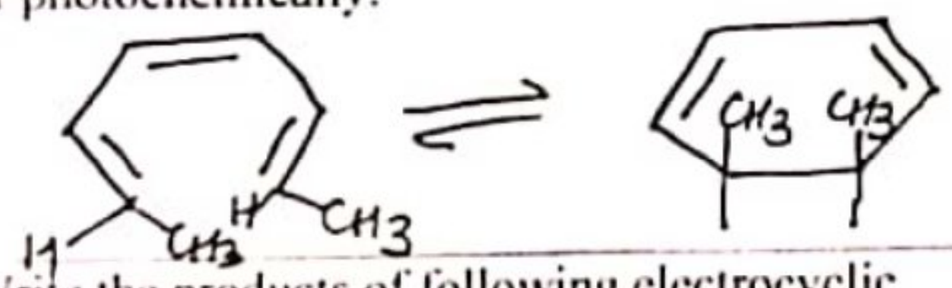
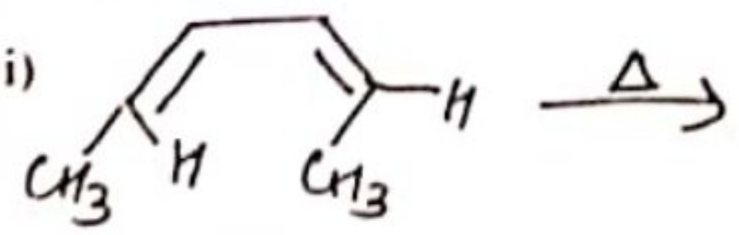
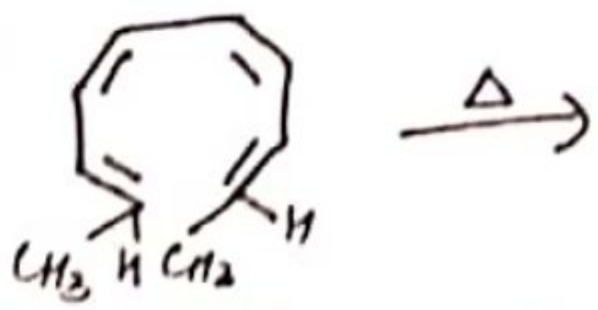
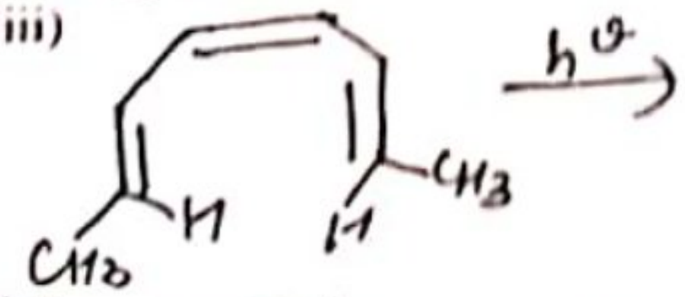
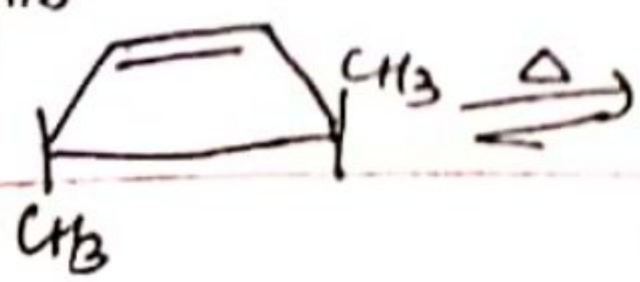
	 				
	How would you carry out conversion of cis 3,4-dimethyl cyclobutene to trans 3,4-dimethyl cyclobutene? Explain & give mechanism.				
6(D)		5	CO2	BT5	2.1.2
Q7(A)	Draw & explain the correlation diagram for the conrotatory & disrotatory interconversion of cyclobutene -butadiene system.	5	CO2, CO4	BT3	2.4.2
7(B)	With the help of FMO approach, explain whether the following reaction will be allowed thermally or photochemically. 	5	CO4	BT4	2.3.1
7(C)	Write the products of following electrocyclic reactions & write whether the reaction will proceed in conrotatory or disrotatory fashion. Also give the stereochemistry of the products. (i)  (ii)  (iii)  (iv) 	2.5X4	CO2, CO5	BT4	2.3.1, 10.3.1

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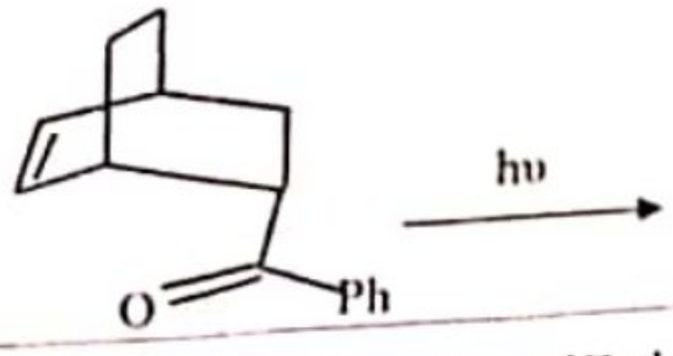
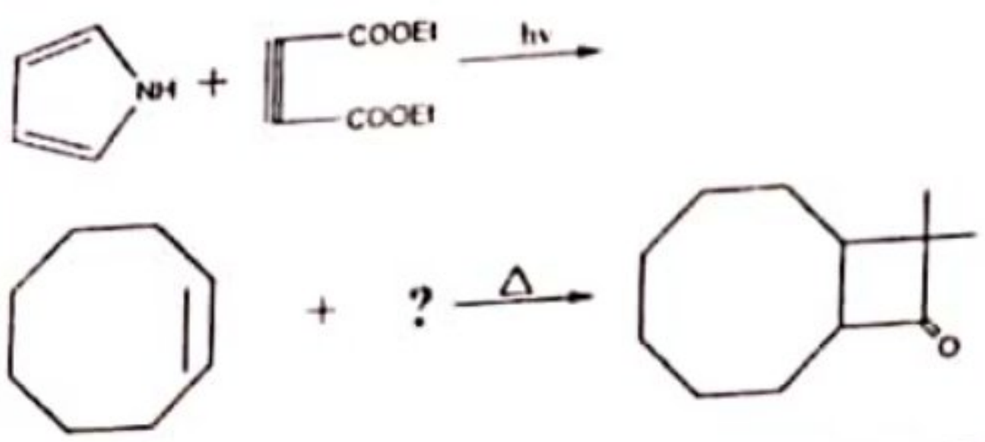
	Q8(A)	In case of ring closure reaction of 1,3-butadiene, explain the selection rules by Huckle Mobius method	5	CO4	BT3	2.4.2
	8(B)	Complete the reaction given below and explain the mechanism for the formation of product. Also mention which name reaction it is known as. 	5	CO2	BT4	2.1.2
	8(C)	Give reason for the formation of Endo product as main product with the help of suitable example.	2.5	CO2	BT2	2.1.1
	8(D)	Reactivity of Diels Alder reaction increases by introduction of electron withdrawing substituent in dienophile. Give reason for your answer through an example.	2.5	CO2	BT2	2.1.1
	8(E)	Predict the missing reactant/ product formed in the given reaction: 	2.5X2	CO2, CO5	BT3	2.2.1, 10.3.1

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Declared as State Private University vide Haryana Act 26 of 2014

DEPARTMENT OF MANAGEMENT

"T3 Examination, Dec-2021"

SEMESTER	- III	DATE OF EXAM	13/12/2021
SUBJECT NAME	Basics of Economics	SUBJECT CODE	MCS 231
BRANCH	~~BA~~ B.Ed, ~~B.Sc. Physics~~, ~~B.Sc. Mathematics~~	SESSION	Morning
TIME	9:00-10:30 am	MAX. MARKS	40
PROGRAM	BA B.Ed, ~~B.Sc. Physics~~, ~~B.Sc. Mathematics~~	CREDITS	2
NAME OF FACULTY	Srishti Bathla	NAME OF COURSE COORDINATOR	Srishti Bathla

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
Q1	Will the first slice of pizza give you the same amount of satisfaction/ utility as the third slice of pizza? Why/ Why not? Explain the law behind it with the help of example	5	CO1	L3
Q2	You bought some FMCG goods from the market worth Rs. 2000. Which type of market do these goods belong? What are the other types of markets in an economy? Distinguish between them with the help of some real-life examples	5	CO4	L3

<table>
<tr><td>Q3</td><td>What law of production applies in the long run? Explain the laws in detail</td><td>5</td><td>CO3</td><td>L2</td></tr>
<tr><td>Q4</td><td>The Market Demand for a good at Rs. 10 per unit is 100 units. Due to increase in price, the market demand falls to 60 units. Find out the new price if the price elasticity of demand is (-)4.</td><td>5</td><td>CO2</td><td>L3</td></tr>
<tr><td>Q5</td><td>What are the factors affecting the Supply of a commodity. Explain the factors with the help of examples.</td><td>5</td><td>CO4</td><td>L2</td></tr>
<tr><td>Q6</td><td>The demand of 'salt' does not change with the change in its price. Why? Explain the reason with graphic representation.</td><td>5</td><td>CO2</td><td>L1</td></tr>
<tr><td>Q7</td><td>Indian Economy is facing a fall in its GDP. What do you think must be reasons for the same? Comment.</td><td>5</td><td>CO1</td><td>L5</td></tr>
<tr><td>Q8</td><td>Complete the table: (Fixed Cost is Rs. 100)
<table>
<tr><th>Output</th><th>Total Variable cost</th><th>Marginal Cost</th><th>Total Cost</th><th>Average Fixed Cost</th><th>Average Variable cost</th><th>Average Total Cost</th></tr>
<tr><td>0</td><td>0</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>1</td><td>60</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>90</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>110</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>150</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>230</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>6</td><td>350</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>510</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>710</td><td></td><td></td><td></td><td></td><td></td></tr>
</table></td><td>5</td><td>CO3</td><td>L3</td></tr>
</table>

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DEPARTMENT OF MANAGEMENT

"T3 Examination, Dec-2021"

SEMESTER	III	**DATE OF EXAM**	3/12/2021
SUBJECT NAME	**INTODUCTION TO FINANCE**	**SUBJECT CODE**	**MCS232**
BRANCH	[redacted], B Ed. [redacted]	**SESSION**	**MORNING**
TIME	**9:00-10:30 am**	**MAX. MARKS**	**40**
PROGRAM	[redacted], B Ed. [redacted]	**CREDITS**	**2**
NAME OF FACULTY	**DR. RASHI BANERJI/ DR. POOJA KAPOOR**	**NAME OF COURSE COORDINATOR**	**DR. RASHI BANERJI/ DR. POOJA KAPOOR**

Rajat

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
Q1(A)	Explain its features, merits and demerits of sole proprietorship?	5	CO1	L1
Q1(B)	Why banks are called financial intermediaries? What are the three roles of financial intermediaries?	5	CO1	L2
Q2(A)	Why analysis of financial statements is important? Give example/format of the three financial statements.	5	CO2	L1
Q2(B)	Explain the significance of Break Even Analysis with the help of a graph?	5	CO2	L2
Q3(A)	What are the differences between equity and preference capital? What is the cost of capital incurred through raising these capitals?	5	CO3	L3
Q3 (B)	Explain the advantages and disadvantages of raising capital from Debentures.?	5	CO3	L2
Q 4 (A)	Why the consideration of time value of money is important in financial decision making?	5	CO4	L2
Q4 (B)	What is the importance of capital budgeting decisions in long term decision making of a firm?	5	CO4	L3

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DEPARTMENT OFCHEMISTRY

"T3 Examination, -DEC 2021"

SEMESTER	**3rd**	**DATE OF EXAM**	**15.12.2021**
SUBJECT NAME	**ENVIRONMENTAL SCIENCES**	**SUBJECT CODE**	**CHH137**
BRANCH	**FAA/HCM/OM/EFB**	**SESSION**	**I**
TIME	**9:00 AM-11:00AM**	**MAX. MARKS**	**60**
PROGRAM	**BBA**	**CREDITS**	**4**
NAME OF FACULTY	**Dr Vinayak V Pathak**	**NAME OF COURSE COORDINATOR**	**Dr Vinayak V Pathak**

Note: All questions are compulsory.

Part A and Part B: *MCQ/ Short answer type questions. Each question carries 2 marks.*

Part C and Part D: *Long answer type questions. Each question carries 10 marks.*

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	What do you understand by Green revolution?	2	CO1	BT1	
	1(B)	Define the term hydrosphere. Explain the distribution of water resource on earth.	2	CO1	BT1, BT2	
	1(C)	Explain the significance of Forest resources. Differentiate between the deforestation and Afforestation.	2	CO1	BT1	
	1(D)	What is Geothermal Energy? Explain its significance.	2	CO1	BT1	
	1(E)	Define the term sustainable development.	2	CO1	BT1	
PART-B	Q2(A)	What is Ecosystem? Differentiate between natural and man made ecosystem.	2	CO2	BT1	
	2(B)	Explain Lentic and lotic ecosystem.	2	CO2	BT1	
	2 (c)	Explain the term eutrophication and Bio-magnification.	2	CO2	BT1	
	2(D)	What do you understand by ecological pyramids? Explain different types of pyramid found in Ecosystem.	2	CO2	BT2	

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	2(E)	Differentiate between pioneer and climax community with example.	2	CO2	BT1, BT2	
PART-C	Q.3	Explain the sources of solid waste generation and its harmful environmental impact. What are the strategies for solid waste management.	10	CO3	BT3, BT4	
	Q.4	What do you understand by Air pollution? Explain cause, impact and its control methods.	10	CO3	BT3	
PART-D	Q.5	What do you understand by demography? Write a brief notes on followings: (i) Mortality (ii) Natality (iii) Population Pyramid (iv) Population Growth curve	10	CO4	BT3	
	Q.6	How information technology is playing a significant role in health care sector and Environmental management?	10	CO4	BT4	

********** END **********

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DEPARTMENT OF EDUCATION AND HUMANITIES

T3 Examination, Dec-2021 (SET A)

SEMESTER	**V**	**DATE OF EXAM**	**03/12/21**
SUBJECT NAME	**Applied Philosophy**	**SUBJECT CODE**	**EDS 288**
BRANCH	**EFB/ HCM/OM**	**SESSION**	**Morning**
TIME	**9.00 am-10.30 am**	**MAX. MARKS**	**40**
PROGRAM	**BBA**	**CREDITS**	**2**
NAME OF FACULTY	**Dr. Savita Sharma**	**NAME OF COURSE COORDINATOR**	**Dr. Savita Sharma**

Note
All questions in Part A are compulsory. Each question carries 2 marks.
Attempt any four Questions in Part B. Each question carries 8 Marks.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q.1	List down practical uses of Philosophy.	2	CO1	BT1	
	Q.2	Briefly explain core principles of Philosophy of Rabindra Nath Tagore.	2	CO2	BT2	
	Q.3	What idea does Democracy hold for you, being an Indian National.	2	CO3	BT3	
	Q.4	'Secularism is the baseline to promote Indian Diversity'. Justify with example.	2	CO4	BT5	
PART-B	Q.5	Compare and Contrast Idealism and Naturalism with reference to their ideas about Knowledge, Reality and Values.	8	CO1	BT4	
	Q.6	Critically analyze the philosophy of Mahatma Gandhji in the modern context.	8	CO2	BT4	
	Q.7	Reflect upon the idea on One India in the backdrop of different kinds of existing diversity.	8	CO3	BT5	
	Q.8	Spirituality is the common underlying base beneath all religion. Support your answer with suitable examples.	8	CO4	BT4	
	Q.9	Explain three branches of Philosophy in Detail.	8	CO1	BT4	
	Q.10	Which aspect of Steve Jobs's life inspires you the most and why?	8	CO2	BT3	

END

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DEPARTMENT OF CHEMISTRY

"T3 Examination, December-2021"

SEMESTER	V	DATE OF EXAM	10.12.2021
SUBJECT NAME	Transition Elements Coordination compounds and Chemical Kinetics	SUBJECT CODE	CHH312-T
BRANCH	Education	SESSION	2021-2022 (II)
TIME	1:00 PM to 4:00 PM	MAX. MARKS	80
PROGRAM	BSc BEd	CREDITS	3
NAME OF FACULTY	Dr. A. Jayamani	NAME OF COURSE COORDINATOR	Dr. A. Jayamani

***Note**: All questions are compulsory. Kindly allow scientific calculator.*

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	P
PART-A	Q1(A)	Which of the following arrangements does not represent the correct order of the property stated against it? (i) $V^{2+} < Cr^{2+} < Mn^{2+} < Fe^{2+}$: paramagnetic behaviour (ii) $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: ionic size (iii) $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$: stability in aqueous solution (iv) Sc < Ti < Cr < Mn : number of oxidation states	1	CO1	BT3	
	1(B)	Identify the ore not containing iron (i) chalcopyrites (ii) carnallite (iii) siderite (iv) limonite	1	CO1	BT2	
	1(C)	All the metals form oxides of the type MO except (i) copper (ii) barium (iii) silver (iv) lead	1	CO1	BT2	
	1(D)	Zinc and Mercury donot show variable valency like d-block elements because (i) they are soft (ii) their d shells are complete (iii) they have only two electrons in their outermost subshell (iv) their d shells are incomplete	1	CO1	BT2	
	1(E)	Which of the following is not a principal physical and chemical characteristics of interstitial compounds? (i) They have high melting points, higher than those of pure metals. (ii) They are very hard, some borides approach diamond in hardness. (iii) They reduce the metallic conductivity, (iv) They are chemically inert.	1	CO1	BT2	

A. Jayamani

	1(F)	Identify the incorrect statement among the following (i) d-Block elements show irregular and erratic chemical properties among themselves (ii) La and Lu have partially filled d orbitals and no other partially filled orbitals (iii) The chemistry of various lanthanoids is very similar (iv) 4f and 5f orbitals are equally shielded	1	CO1	BT1	
	1(G)	Which of the following lanthanoid ions is diamagnetic? (At. nos. Ce = 58, Sm = 62, Eu = 63, Yb = 70) (i) Ce^{2+} (ii) Sm^{2+} (iii) Eu^{2+} (iv) Yb^{2+}	1	CO1	BT4	
	1(H)	Lanthanide contraction is caused due to (i) the appreciable shielding on outer electrons by 4f electrons from the nuclear charge (ii) the appreciable shielding on outer electrons by 5d electrons from the nuclear charge (iii) the same effective nuclear charge from Ce to Lu (iv) the imperfect shielding on outer electrons by 4f electrons from the nuclear charge	1	CO1	BT1	
	1(I)	Larger number of oxidation states are exhibited by the actinoids than those by the lanthanoids, the main reason being (i) 4f orbitals more diffused than the 5f orbitals (ii) lesser energy difference between 5f and 6d than between 4f and 5d orbitals (iii) more energy difference between 5f and 6d than between 4f and 5d orbitals (iv) more reactive nature of the actinoids than the lanthanoids	1	CO1	BT2	
	1(J)	Which of the following pairs of elements cannot form an alloy? (i) Fe, Hg (ii) Fe, Cr (iii) Zn, Cu (iv) Hg, Na	1	CO1	BT3	
PART-B	Q2(A)	How does the conductivity of $[Co(NH_3)_6]Cl_3$ and $[Co(NH_3)_5Cl]Cl_2$ differ from each other? Write the reactions that can prove the difference.	2	CO2	BT4	
	2(B)	Write down the formula of hexamminecobalt (III)chloride and tetracarbonyl nickel (0) and mention the charge on the complex ion.	2	CO2	BT3	
	2(C)	Write down the postulates of crystal field theory	2	CO2	BT2	
	2(D)	Justify how spectrochemical series will be useful for determining high spin and low spin complexes.	2	CO2	BT4	
	2(E)	What is chelate effect? Explain with an example	2	CO2	BT1	

	3(A)	Explain on the methods used to determine of rate law and order of a reaction	7	CO3	BT1
	3(B)	Compare the radioactivity decay and first order reaction with reactions and rate law.	3	CO3	BT2
PART- C	4(A)	Describe how solvent, light and pressure influence the rate of a reaction.	3	CO3	BT2
	4(B)	What is the rate constant for a first order reaction if the concentration of reactant decreases from 800 $moldm^{-3}$ to 50 $moldm^{-3}$ in $2x10^2$ sec?	4	CO3	BT4
	4(C)	Write short notes on collision theory with proper illustrations.	3	CO3	BT4
	5(A)	Illustrate the zero order, first order and second order reactions graphically by integrated rate law.	4	CO3	BT4
	5(B)	Describe in detail about (i) the concept of activation energy (ii) transition state theory	6	CO3	BT3
	6(A)	Explain the concept of surface chemistry and write down the fields where surface phenomenon has applications.	3	CO4	BT2
	6(B)	Define catalysis and explain the different characteristic of catalyzed reactions.	4	CO4	BT3
PART- D	6(C)	Write short notes on the classification of catalysis.	3	CO4	BT2
	7(A)	What are the different types of adsorption isotherm? Explain Freundlich isotherm and Langmuir adsorption isotherm with illustrations	7	CO4	BT2
	7(B)	Write short notes on Gibbs isotherm.	3	CO4	BT1
	8(A)	Compare Brunauer, Emmett, Teller Adsorption isotherm with Langmuir isotherm. Write down the applications and drawbacks of BET adsorption isotherm	6	CO4	BT4
	8(B)	Illustrate the six types of BET isotherm graphically and how they determine the characteristic of adsorbents.	4	CO4	BT3
	********** END **********				

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DEPARTMENT OF CHEMISTRY

"T3 Examination, Dec-2021"

SEMESTER	**V**	**DATE OF EXAM**	**02/12/2021**
SUBJECT NAME	**Physical Chemistry-IV**	**SUBJECT CODE**	**CHH301B-T**
BRANCH	Chemistry	**SESSION**	**II**
TIME	**01:00-4:00**	**MAX. MARKS**	**100**
PROGRAM	**B.Sc. (H) Chemistry**	**CREDITS**	**4**
NAME OF FACULTY	**Dr. Arpit Sand**	**NAME OF COURSE COORDINATOR**	**Dr. Arpit Sand**

Note: Part A : All questions are compulsory. Questions will be of short answer type
Part B: All questions are compulsory. Questions will be of descriptive type or numerical.

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	A microscope using suitable photons is empioyed to locate an electron in an atom with in distance of 0.1Å. What is the uncertainty involved in the measurement of velocity? Mass of electron=9.1×10^{-31} kg. Planck's Constant (h)=6.626×10^{-34} J	5	CO1	BT3	1.3.1
	1(B)	Discuss Hook's law and write Hermit Second Order Differential equation	3+2	CO1	BT3 BT4	1.3.1
	1(C)	Explain Variation theorem & steps involves application of methods	6	CO2	BT3	1.3.2
	1(D)	Discuss VB method taking example of two atom system	4	CO2	BT4	1.3.3
PART-B	Q2(A)	The pure rotational spectrum of gaseous molecule CN consists of a series of equally spaced lines separated by 3.7987 cm^{-1}. Calculate the internuclear distance of the molecule The atomic masses are ^{12}C=12.011g mol^{-1} ^{14}N=14.007 g mol^{-1} h=6.626×10^{-26} Js	10	CO3	BT3	1.3.2
	Q2(B)	Explain selection Rule for P Q R branches of IR Spectra	5	CO4	BT4	1.3.3

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Q2(C)	Deduce expression for microwave spectra of diatomic molecule	5	CO4 CO3	BT4	1.3.1
Q3(A)	The inter nuclear distance (i.e., bond length) of carbon monoxide molecule is 1.13Å. Calculate the energy (in joules and eV) and angular velocity of this molecule in first excited rotational level. The atomic masses are $^{12}C=1.99\times10^{-26}$ kg $^{16}O=2.66\times10^{-26}$ kg h=6.626×10^{-26} Js	10	CO5	BT4	1.3.2
3(B)	Deduce expression for infrared spectra and concept on anharmonicity developed by Morse in 1929.	10	CO4	BT3 BT4	1.3.1
Q4(A)	Discuss the quantum mechanical concept of Raman Effect & origin of Rayleigh stokes and ant stokes lines expression & diagram	10	CO5	BT4	1.3.3
Q4(B)	What is the principal of NMR spectroscopy	5	CO5	BT3 BT4	1.3.1
Q4(C)	Short note on Franck-Condon principle and draw its diagram	5	CO4 CO5	BT3	1.3.1
Q5(A)	Discuss ESR Spectroscopy with its Spectra and Diagram	5	CO5	BT4	1.3.2
Q5(B)	Distinguish Raman Spectra and Infrared spectra minimum 7 points	5	CO5	BT5	1.3.3
Q6 (A)	Discuss the Significance if Chemical shift in NMR spectroscopy	5	CO5	BT4	1.3.2
Q6 (B)	Discuss Auxochromic groups with examples	5	CO5	BT4	1.3.2

********** END **********

MANAV RACHNA
Vidyanatarikshal

MANAV RACHNA UNIVERSITY
FORMERLY MANAV RACHNA COLLEGE OF ENGINEERING
NAAC ACCREDITED 'A' GRADE INSTITUTION
Declared as State Private University under section 21 of the UGC act, 1956

Career Development Centre
"End Semester Examination, Dec' -2021"

Roll No:-.....
Semester: V
Date of Exam: 31/12/2021
Branch: Physics/Chem/Maths
Time: 90 Minutes

Name:.....
Subject: Career Skills-II
Subject Code: CDO-303
Program: B.Sc
Max.Marks:50

Session - II

Instructions: All questions are compulsory. Each question carries multiple options. No negative marking. Calculator is not allowed. Answers are to be filled in the answer table only. Answers written outside the answer table won't be considered.

Answer Table:

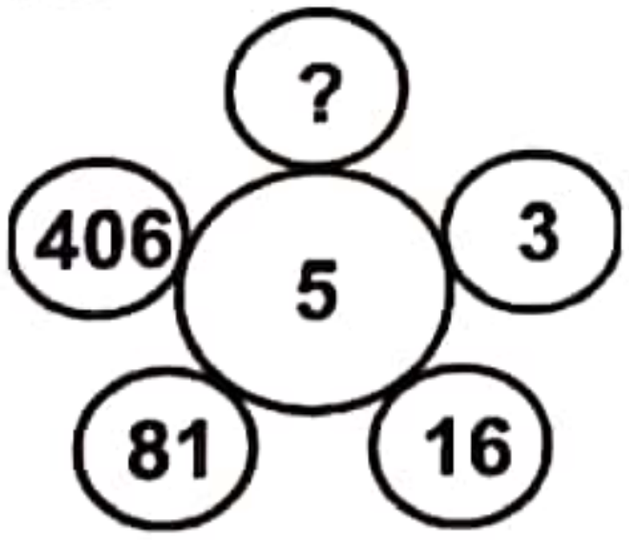
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

APTITUDE

Q1Find the area of the triangle formed by the vertices (4, 5), (10, 12) and (-3, 2)

A) 3 B) 4.5 C) 4 D) 3.5

Q2 Find the missing character in each of the following questions.



A)201 B) 731 C) 1625 D) 2031

Q3 The dimensions of a room are 25 feet * 15 feet * 12 feet. What is the cost of white washing the four walls of the room at Rs. 5 per square feet if there is one door of dimensions 6 feet * 3 feet and three windows of dimensions 4 feet * 3 feet each?

A) Rs. 4800 B) Rs. 3600 C) Rs. 3560 D) Rs. 4530

Q4 The volumes of two cones are in the ratio 1 : 10 and the radii of the cones are in the ratio of 1 : 2. What is the length of the wire?

A)2 : 5 B) 1 : 5 C) 3 : 5 D) 4 : 5

Q5. The ratio between the perimeter and the breadth of a rectangle is 5 : 1. If the area of the rectangle is 216 sq. cm, what is the length of the rectangle?

A)16 cm B) 18 cm C) 24 cm D) Data inadequate

Q6 A cube of side one meter length is cut into small cubes of side 10 cm each. How many such small cubes can be obtained?

A) 10 B) 100 C) 1000 D)10000

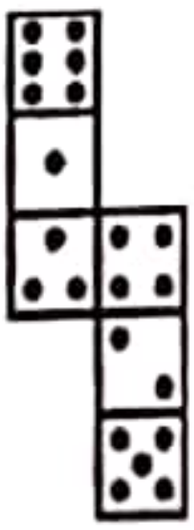
Q7 The volumes of two cones are in the ratio of 1 :10 and the radii of the cones are in the ratio of 1 : 2, what is the ratio of their vertical heights?

A)2:5 B) 1:5 C) 3:5 D) 4:5

Q8 If the radius of the circle is diminished by 10%, then its area is diminished by :

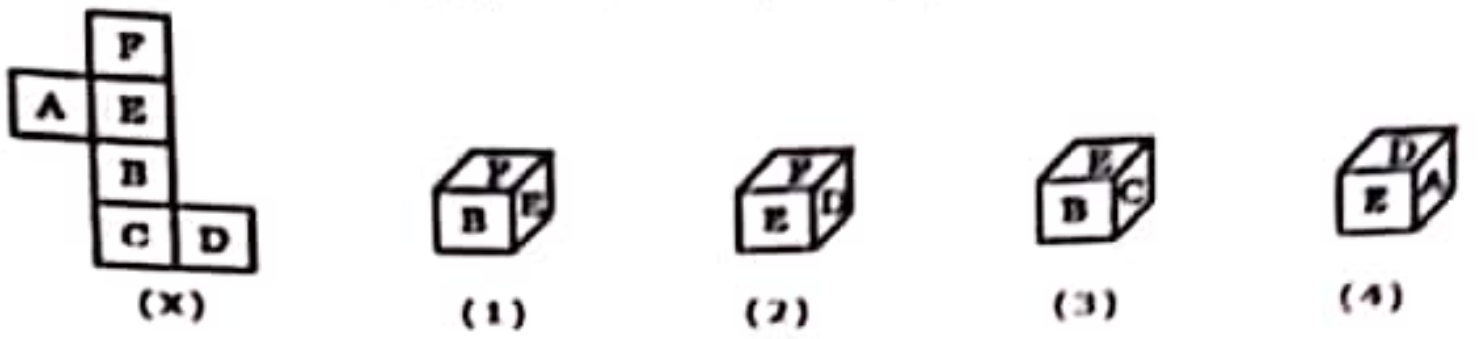
A)10% B) 19% C) 20% D) 36%

Q9 How many dots lie opposite to the face having three dots, when the given figure is folded to form a cube?



A)2 B) 4 C)5 D) 6

Q10 Choose the box that is similar to the box formed from the given sheet of paper (X).



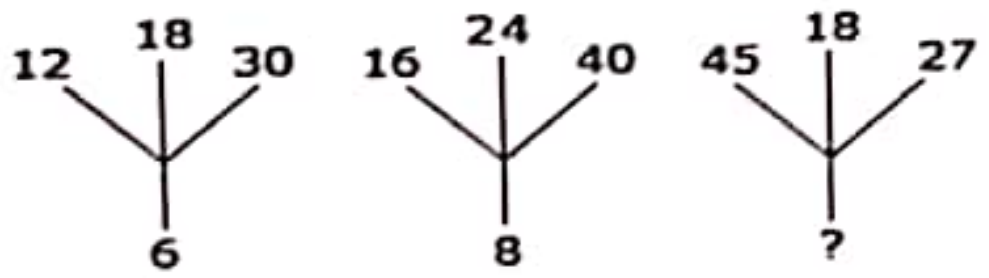
(X) (1) (2) (3) (4)

A)1 only B) 2 only C) 1 and 3 only D) 1,2,3 and 4 only

Q11 The sector of a circle has radius of 21 cm and central angle 135°. Find its perimeter?

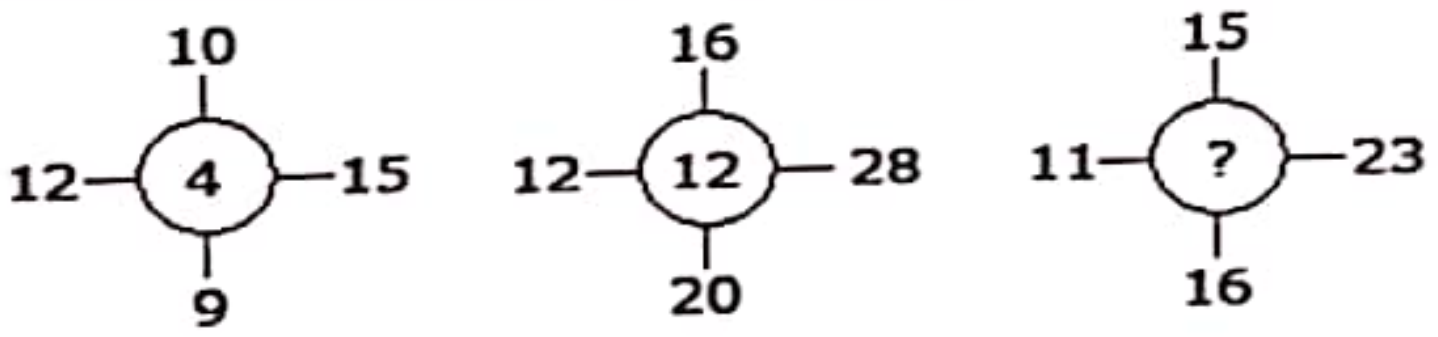
A)91.5 cm B) 93.5 cm C)92.5 cm D) 94.5 cm

Q12 Which one will replace the question mark ?



A)18 B) 12 C) 9 D) 6

Q13 Which one will replace the question mark?



A)11 B) 14 C) 10 D) 12

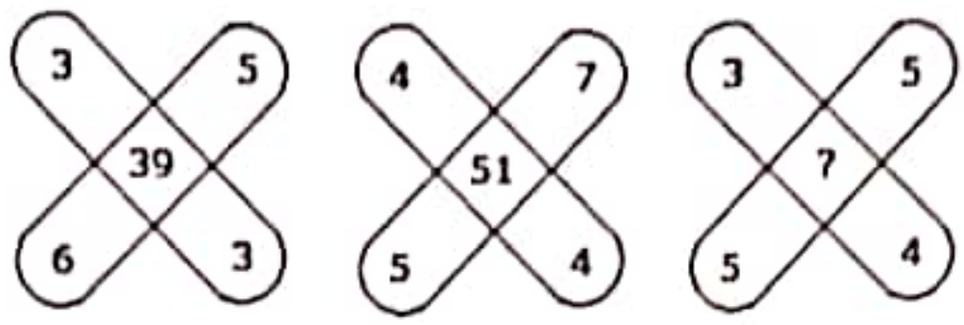
Q14 The edge of a cuboid are in the ratio 1:2:3 and its surface area is 88 sq. cm. The volume of cuboid is ?

A)24 cubic cm B) 48 cubic cm C) 64 cubic cm D) 120 cubic cm

Q15 The cone of a height 9cm with diameter of its base 18cm is carved out from a wooden solid sphere of radius 9cm. The percentage of the wood wasted is:

A)25% B) 30% C) 50% D) 75 %

Q16 Which one will replace the question mark ?



A)47 B) 45 C) 37 D) 35

Q17 A metallic sphere of radius 12 cm is melted and drawn into a wire, whose radius of cross section is 16 cm. What is the length of the wire?

A)45 CM B) 90 CM C) 18CM D) None of these

Q18 Which one will replace the question mark?

3	15	4
7	38	5
3	?	5

A)15 B) 19 C)20 D) 18

Q19 The radius of a wheel is 22.4 cm. What is the distance covered by the wheel in making 500 resolutions.

A)252 m B) 704 m C) 352 m D) 808 m

Q20 A dice is numbered from 1 to 6 in different ways.If 1 is adjacent to 2, 4 and 6, then which of the following statements is necessarily true?

A)2 is opposite to 6

B) 1 is adjacent to 3

C) 3 is adjacent to 5

D) 3 is opposite to 5

Q21 A dice is numbered from 1 to 6 in different ways.
If 1 is opposite to 5 and 2 is opposite to 3, then

A)4 is adjacent to 3 and 6

B) 2 is adjacent to 4 and 6

C) 4 is adjacent to 5 and 6

D) 6 is adjacent to 3 and 4

Q22 A metallic sheet is of rectangular shape with dimensions 48 m x 36 m. From each of its corners, a square is cut off so as to make an open box. If the length of the square is 8 m, the volume of the box (in m3) is:

A) 4830 B) 5120 C) 6420 D) 8960

Q23 The curved surface area of a cylindrical pillar is 264 m2 and its volume is 924 m3. Find the ratio of its diameter to its height.

A) 3 : 7 B) 7 : 3 C) 6 : 7 D) 7 : 6

Q24 An arc 30° in one circle is double an arc in a second circle, the radius of which is three times the radius of the first. Then the angle subtended by the arc of the second circle at its centre is:

A)3° B) 4° C) 5° D) 6°

Q25 At 3:40, the hour hand and the minute hand of a clock form an angle of:

A)120° B)125° C)130° D)135°

Q26 An accurate clock shows 8 o'clock in the morning. Through how may degrees will the hour hand rotate when the clock shows 2 o'clock in the afternoon?

A) 144° B) 150° C)168° D) 180°

Q27 A clock is set right at 5 a.m. The clock loses 16 minutes in 24 hours. What will be the true time when the clock indicates 10 p.m. on 4th day?

A) 11pm B)12pm C)1pm D)2pm

Q28 The area of the square formed on the diagonal of a rectangle as its side is 108 1/3 % more than the area of the rectangle. If the perimeter of the rectangle is 28 units, find the difference between the sides of the rectangle?

A)8 B) 12 C) 6 D) 2

Q29 How many times in a day are the hands of the clock at right angles?

A)22 B)44 C)24 D)46

Q30 The reflex angle between the hands of the clock at 9:30 is.

A)255° B)105° C)285° D)150°

Verbal Ability

Directions: In each of the following questions, find out which part of the sentence has an error:

Q31 A. In management, as you rise higher, B. the problems you face become unstructured and
C. you just can't fall back on D. the tools you have been taught.
E. No error

Q32. A. Remember that you are part of the team
B. and your success depends on the support
C. you are able to give and get D. from your team members
E. No error

Q33. A. The teacher promised B. that she would explain it
C. if they came D. before school the following day.
E. No error

Q34. A. My friend asked me B. if I can lend him my
C. Parker pen for a day D. No error

In the following questions, there is a sentence with jumbled up parts. Rearrange these parts, which are labelled a, b, c and d, to produce the correct sentence. Choose the proper sequence.

Q35. a. She wondered if b. work hard for a living c. he would ever d. because he was so rich.
A. abcd B.abdc C.acbd D.bcda

Q36.a.I was certain b. the management meeting.
c. be allowed to attend d. that subordinates would not
A.abcd B. abdc C.adcb D.bcda

Choose the right option
Q37.Weather report: "It's seven o'clock in Frankfurt and ..... ."
A. there is snow B. it's snowing C.it snows D. it snowed

Q38. What time .....
A. the train leaves? B.leaves the train?
C.is the train leaving? D.does the train leave?

Use the correct form of tenses from the options given below each question:

Q39. She _____ a maid by next month
A.Employs B.Employed C.Has employed D.Will have employed

Q40. He ____ never _____ since he nearly _____
A. Has, swum, drowned B.Had, swum, was drowning
C.Was, swimming, drowned D.Did, swum, had drowned

Pick out the most effective word(s) from the given words to fill in the blank to make the sentence meaningfully complete

Q41. He lives near a lovely _____ of countryside.
A. length B. piece C. section D. stretch

Q42. Owing to the power cut in the area, the companies are forced to _____ men.
A.throw away B. send off C. put off D. lay off

Q43.A sanguine outlook is associated with the _____.
A.Rationalist B. Socialist C. Optimist D. Philanthropist

Q44. The synonym for the word "WISE" is:
A. Momentous B. Pragmatic C. Judicious D. Delay

Q45. The antonym for the word "PERRENIAL" is
A.Frequent B. Regular C. Lasting D. Rare

Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

Q46. A. When they gathered together, the Buddha was completely silent & some speculated that perhaps the Buddha was tired or ill.
B. It is said that Gautam Buddha gathered his disciples one day for a Dharma talk.
C. One of the Buddha's disciples, Mahakasyapa, silently gazed at the flower & broke into a broad smile.
D. The origin of Zen Buddhism is ascribed to the Flower Sermon, the earliest source which comes from the 14th century.
E. The Buddha silently held up & twirled a flower and twinkled his eyes, several of his disciples tried to interpret what this meant though none of them was correct.
A. CEBDA B. DBAEC C. DBCEA D. CADBE

Q47. A. Last March, I was invited to present a paper on the topic of whether the mistakes of the 20th century would be repeated in the 21st century as well.
B. The economic crisis hadn't become grave then.
C. But today the world is in the midst of the biggest economic crisis since 1929.

D. The key difference between then and now is that the old power structures have finally disappeared.

E. Now even the US is pleading for financial help from China.

A. BCADE B. ABCDE C. CDEAB D. DEABC

Q48. Which of the following is not true w.r.t. resume writing?

A. While drafting the resume, keep busy readers in mind

B. While editing, do a triple check

C. All the headings should be of one font style

D. A good qualification, from a good institute is the only thing that the recruiters are interested in.

Q49. A resume should be:

A.As lengthy as you want it to be

B. A colorful and visually attractive

C. A carefully crafted document not exceeding one side of an A-4 sheet.

D. None of the above

Q50. Your appearance shows:

A. Your level of sophistication B. Your professionalism

C. Your credibility D. All of the above

P Ghaghara
25/11/2021
Head CDC

MANAV RACHNA UNIVERSITY
Declared as State Private University vide Haryana Act 26 of 2014

DEPARTMENT OF CHEMISTRY

"T3 Examination, December-2021"

SEMESTER	**V**	**DATE OF EXAM**	**06/12/2021**
SUBJECT NAME	**Biochemistry & Natural Products**	**SUBJECT CODE**	**CHH 302 BT**
BRANCH	**Chemistry**	**SESSION**	**II**
TIME	**1:00PM-4:00 PM**	**MAX. MARKS**	**100**
PROGRAM	**B.Sc. (H) Chemistry**	**CREDITS**	**4**
NAME OF FACULTY	**Dr. Megha Bansal**	**NAME OF COURSE COORDINATOR**	**Dr. Megha Bansal**

Note: All questions are compulsory.

Bloom's Level: L1-Remembering; L2-Understanding; L3-Applying; L4-Analyzing; L5-Evaluating; L6-Creating

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Discuss the characteristics shared by both adenine and cytosine bases.	2.5	CO1	L3	1.1.2
	1(B)	Compare and contrast structural and functional properties of purines and pyrimidines.	2.5	CO1	L3	1.1.1
	1(C)	How uridine can be converted to thymidine. Write suitable chemical reaction.	2.5	CO1	L2	1.2.1
	1(D)	Discuss important functions of different types of RNA.	2.5	CO1	L2	1.2.2
	1(E)	Write the name and structure of two amino acids containing nonpolar, aliphatic R groups.	2.5	CO2	L2	1.2.1
	1(F)	Explain the structure of alanine at pH 2 and pH 10.	2.5	CO2	L3	1.1.1
	1(G)	Consider the abbreviation Gly-Ala-Ser for a tripeptide. Describe N-terminal and C-terminal amino acid.	2.5	CO2	L2	1.2.2
	1(H)	Briefly discuss primary structure of protein.	2.5	CO2	L3	4.1.2

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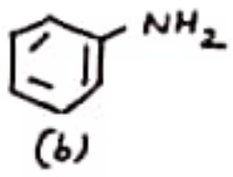
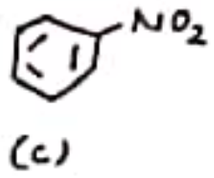
PART-B	Q2(A)	There are four stereoisomeric aldotetroses. (a) Draw all four and arrange them in pairs of enantiomers. (b) Identify which stereoisomers are d sugars and which are l sugars.	5	CO3	L3	5.2.1
	2(B)	Draw and name the structure of the aldohexose that is epimeric with D-glucose at each of the following positions: (a) C2 (b) C3 (c) C4	5	CO3	L4	4.1.2
	2 (C)	What is the basis of cyclic structure of D(+) glucose and L(-) glucose. Establish ring structure of glucose D and L both forms.	10	CO3	L4	4.1.2
	Q 3(A)	Explain following observations: (a) D-glucose epimerizes in base but D-glucitol does not (b) $NaBH_4$ reduction of D-fructose gives two alditols, but the same reduction of D-glucose gives only one	5	CO3	L4	4.1.2
	3(B)	Discuss how D-glucose can be converted to D-arabinose.	5	CO3	L5	7.2.1
	3 (C)	What is glycosidic linkage. Discuss the structure of sucrose and lactose. Comment upon the reducing properties of both disaccharides.	10	CO3	L5	7.2.1
	Q 4(A)	On the basis of molecular orbital theory explain why benzene is colorless while p-nitro phenol is colored.	5	CO4	L2	7.2.1
PART-C	4(B)	Which one of the following has highest λmax and why (a)  (b)  (c)  (d) 	5	CO4	L3	5.2.1
	4 (C)	Write short notes on: (a) Direct dyes (b) Mordant Dyes (c) Disperse dyes	10	CO4	L3	5.2.1
	5(A)	Discuss the synthesis of Safranine. Elaborate its mode of application and uses.	5	CO4	L3	11.2.1
	5 (B)	How is Congo red prepared. Classify this dye on the basis of structure and application.	5	CO4	L4	11.2.1
	5 (C)	How are phenolphthalein and fluorescein prepared. What happens when excess alkali is added to phenolphthalein.	10	CO4	L4	11.2.1

********** END **********

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DEPARTMENT OF Chemistry

"T3 Examination, Dec 2021"

SEMESTER	**V**	**DATE OF EXAM**	**8.12.2021**
SUBJECT NAME	**ENVIRONMENT AND SUSTAINABLE DEVELOPMENT**	**SUBJECT CODE**	**CHS234**
BRANCH	**ME & CST**	**SESSION**	**II**
TIME	**1.5 HRS**	**MAX. MARKS**	**40**
PROGRAM	**B.TECH.**	**CREDITS**	**2**
NAME OF FACULTY	**Dr. Meena Kapahi**	**NAME OF COURSE COORDINATOR**	**Dr. Meena Kapahi**

Note: Attempt all questions. Word limit for questions with 2 and 3 marks - min. 200 words. Word limit for questions with 7 marks - min. 450 words

Q. NO.	QUESTIONS	MARKS	CO	BL	PI
1	Indigenous knowledge is the knowledge unique to a given culture. Would you defend or disprove "Growing gender gap may interfere with its transmission". Justify.	3	4	5	
2	Explain the need of integrating sustainability throughout all engineering disciplines and the role engineers have in this.	3	1	2	
3	The 17 SDGs are supported by the 169 "Targets" which are specific objectives and 230+ "indicators". What is the requirement of such a large number of indicators?	3	1	2	
4	Which of the following is not a suitable strategy for sustainable development? Comment indicating the reason. A) Rely more on organic farming B) Promoting public transport C) Safeguarding the habitats for indigenous communities, flora and fauna D) Not compromising on the needs of present and future generations	3	2	2	
5	World Tourism Organization (WTO) has pointed out the vast developmental potential of tourism, particularly with reference to the developing nations, like India. A fundamental trait of the tourism sector is its ability to link the economic, social, cultural and environmental aspects of sustainability and to act as a driving force for their mutual enhancement. Justify how sustainable	7	4	5	

	tourism can be an important tool in achieving SDGs? Explain with respect to three SDGs as examples.				
6	How are SDGs different from MDGs?	7	1	1	
7	As head of the Corporate Social Responsibility division of your company, what factors would you consider while preparing a sustainability report of your organization?	7	3	4	
8	As the world population continues to grow, much more effort and innovation will be urgently needed in order to sustainably increase agricultural production, improve the global supply chain, decrease food losses and waste, and ensure that all have access to nutritious food. The SDGs include a significant number of interconnected objectives related to agriculture and food. SDG 2 focuses explicitly on food by seeking to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture", but multiple other goals relate to challenges in the food system. Explain with respect to two SDGs as examples	7	4	3	

MANAV RACHNA UNIVERSITY

DEPARTMENT OF Chemistry

"T3 Examination, Dec-2021"

SEMESTER	**VTH**	**DATE OF EXAM**	**9-12-2021**
SUBJECT NAME	**ANALYTICAL CHEMISTRY & SPECTROSCOPY**	**SUBJECT CODE**	**CHH303B T**
BRANCH	**Chemistry**	**SESSION**	**Evening**
TIME	**1:00pm-4:00pm**	**MAX. MARKS**	**100**
PROGRAM	**B.Sc.(H)**	**CREDITS**	**4**
NAME OF FACULTY	**Dr. Priti Gupta**	**NAME OF COURSE COORDINATOR**	**Dr. Priti Gupta**

Note: All questions are compulsory.

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Calculate the formula weight of $PdCl_2$ to correct number of significant figures.	2	CO1	BT2	
	1(B)	Calculate molarity of a solution containing 50 g of NaCl in 500 g of solution and having density 0.936 g/cm^3.	2	CO1	BT2	
	1(C)	Distinguish between relative and absolute error. How is relative error expressed?	3	CO1	BT2	
	1(D)	Discuss the role of Analytical Chemistry in Pharmaceutical industries.	3	CO1	BT3	
	1(E)	Describe the range of the electromagnetic radiations useful for Ultraviolet and Infrared spectroscopy.	2	CO2	BT4	
	1(F)	What is the effect of Ultraviolet or visible light on organic compounds?	2	CO2	BT2	
	1(G)	When a UV light is passed through the given solution ,the radiant power is reduced to 50%, Calculate the absorbance.	2	CO2	BT2	
	1(H)	Discuss the effects of polar solvents on: 1) $n \rightarrow \pi^*$ 2) $\pi \rightarrow \pi^*$	4	CO2	BT3	
PART-B	2(A)	Define the following: a)Chelate extraction b) Extraction involving ion pair formation	8	CO3	BT2	

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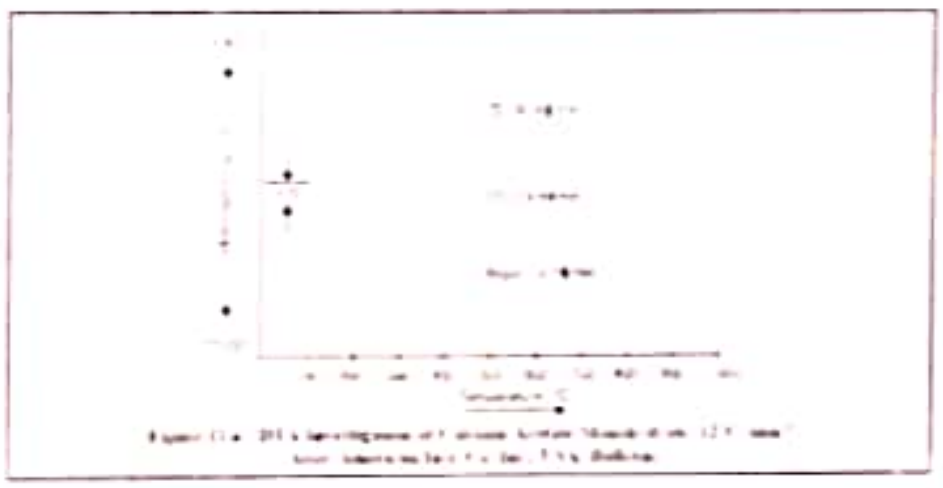
	2(B)	Discuss basic principle of Solvent extraction technique and discuss about two factors influence the Extraction Efficiency.	7	CO3	BT3
	2(C)	How column efficiency in chromatography is calculated? Why the efficiency of a chromatographic column does increases with an increasing number of theoretical plates?	8	CO3	BT4
	2(D)	What is meant by the term R_f value ? On what factors does the value of Rf depends?	5	CO3	BT2
	3(A)	Discuss the principle of Thin –Layer Chromatography. In what way it is superior to paper chromatography?	6	CO3	BT2
	3(B)	Write brief notes on : i. Partition chromatography ii. Retention factor iii. Retention time	6	CO3	BT2
PART-C	4(A)	Discuss in detail the applications of TGA.	6	CO4	BT3
	4(B)	Define the term Thermogravimetry and classify it into various techniques	6	CO4	BT2
	5(A)	With the schematic diagram describe the various components and their function in DSC apparatus	8	CO4	BT3
	5(B)	Depicts the differential thermal analysis investigation of calcium acetate monohydrate at a uniform programmed heating rate of 12°C/minute 	6	CO4	BT4
	6(A)	Discuss in details the following Conductrometric titrations: 1)Strong acid with a weak base 2)Weak acid with a weak base	8	CO4	BT2
	6(B)	A mixture of CaO and CaCO3 is analysed by TGA. The result indicates that mass of the sample decreases from 250.6 mg to 190.8 mg only between 600°C and 900°C. Calculate the percentage of calcium carbonate in the mixture.	6	CO4	BT3

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MANAV RACHNA UNIVERSITY

DEPARTMENT OF CHEMISTRY

"T3 Examination, Dec-2021"

SEMESTER	**VII**	**DATE OF EXAM**	**03/12/21**
SUBJECT NAME	**Spectroscopy, Natural Products and Heterocyclics**	**SUBJECT CODE**	**CHH 315-T**
BRANCH	**Education**	**SESSION**	**I**
TIME	**9:00 to 12:00 Noon**	**MAX. MARKS**	**80**
PROGRAM	**BSc BEd**	**CREDITS**	
NAME OF FACULTY	**Dr. Shilpa Sharma**	**NAME OF COURSE COORDINATOR**	**Dr. Shilpa Sharma**

Note: All questions are compulsory.

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Calculate the concentration in (microgram/ ml) of a solution of organic compound (MM= 211.2) in 0.11M HCl giving an absorption at its λmax 281nm of 0.612 in 4cm cell. The molar absorptivity at 281mm is 5372.	6	CO1	BT3	
	1(B)	Define the term 'Chromophore'. How will you detect the presence of carbonyl group in aldehydes and ketones.	4	CO1	BT2	
PART-B	Q2(A)	Why are amino acids are called amphoteric compounds? Write the structure of alanine at pH 2 and pH 10.	2	CO2	BT2	
	2(B)	Explain isoprene rule and its significance.	2	CO2	BT2	
	Q3(A)	How can we know the hydroxyl groups in alkaloids (a) Write the reaction (oxidation of alcohols) (b) differentiate between primary secondary and tertiary alcoholic group	2	CO3	BT3	
	3(B)	Portrait the Haworth and Fischer projection Glucose and Lactose	4	CO3	BT2	
RT-	Q4(A)	Explain various theories of color and constitution	6	CO4	BT1	

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PART-C	Q5(A)	Ibuprofen is an anti-inflammatory drug. Explain the mechanism of ibuprofen drug in the body.	6	CO4	BT3
	5(B)	Explain in detail the malarial infection phenomenon in our body and give some antimalarial drugs for its treatment	5	CO4	BT3
	Q6(A)	What is the structure of terylene, nylon 6 and nylon 6,6. How are they manufactured? Show the process through which the molecular chains are held together in nylon 6,6 and nylon 6.	6	CO5	BT2
	6(B)	Discuss the initiation, propagation and termination steps in free radical polymerization of polythene. What is the role of inhibitors in free radical polymerization	7	CO5	BT3
PART-D	Q7(A)	Discuss the mechanism of some typical electrophilic substitution reactions of pyrrole, furan and thiophene. What is the order of reactivity of these heterocycles towards electrophiles?	7	CO6	BT3
	7(B)	Why pyridine is more basic than pyrrole while benzene is less basic than pyrrole.	7	CO6	BT4
	Q8(A)	What happens when pyrrole is treated with methyl iodide?	3	CO6	BT3
	8(B)	Explain the synthesis of furan, pyrrole and thiophene by Paal Knorr synthesis?	6	CO6	BT2
	Q9(A)	Justify the following statements: (a) Thiophene is more aromatic in nature than furan (b) Furan is not stable in acids although it has aromatic character (c) Furan undergoes Diels Alder reaction but thiophene doesn't.	7	CO6	BT3

********** **END** **********