



Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16 (Autonomous)
End Semester Examination: Oct. / Nov. 2024

Total No. of Questions: 3

Total No. of Pages: 4

FIRST YEAR (B. Sc. Blended)
24BLCH11101: Introductory and Organic Chemistry
(Semester I)

Program: B.Sc.Blended
Program Specific: B.Sc.Blended Chemistry
Course Type: DSC
Paper: I

Credits: 2
Time: 2 Hours
Max. Marks: 30
SET: A

Instructions to the candidate:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw a well labeled diagram wherever necessary.

Q1] Attempt ANY FIVE of the following:

[2 X 5 = 10]

- a) What is a buffer?
- b) Balance the following equation
$$\text{C}_3\text{O}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$$
- c) Explain any one real world example of thermodynamics.
- d) Write electronic configuration for Na and Xe.
- e) Define Saytzeff's rule.
- f) State the first law of thermodynamics.
- g) What are hydrocarbons? Give one example.

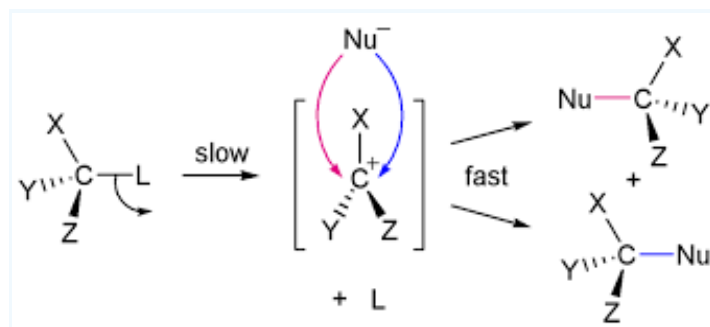
Q2) Attempt ANY THREE of the following:

[4 X 3 = 12]

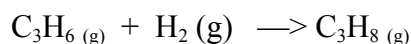
- a) An ethanoic acid/ethanoate buffer has a pH of 5.56.
What is the ratio of ethanoate (CH_3COO^-) to ethanoic acid (CH_3COOH) in the buffer solution? [$\text{pK}_a(\text{CH}_3\text{COOH}) = 4.76$]

$$\text{pK}_a = \text{pH} - \log \frac{[\text{CH}_3\text{COO}^-]}{[\text{CH}_3\text{COOH}]}$$

- b) Identify the following reaction mechanism and justify your answer.



- c) Compare the change in hybridization, planarity and bond angles of reactants and products in the following reaction

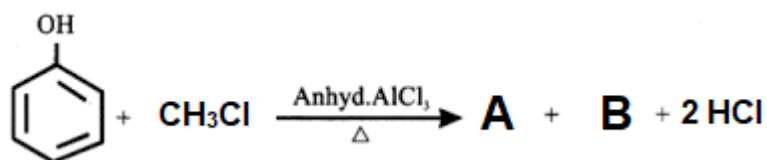


- d) Draw the outline of the periodic table, show the positions of s,p, f blocks and two properties of the elements in each block.
- e) What are alkanes? Give reactions of ethane with chlorine in presence of UV light.

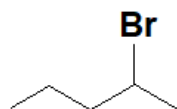
Q3) Attempt ANY TWO of the following:

[4 X 2 = 08]

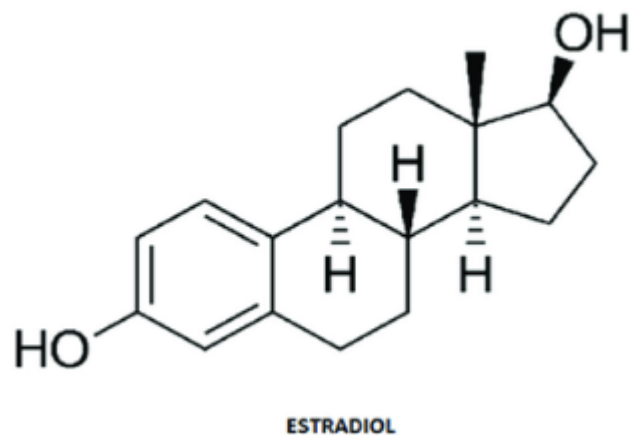
- a) Write the entire reaction mechanism of the following reaction and identify A and B. Justify which is the major product.



- b) Show the entire reaction mechanism and predict the product when alcoholic KOH reacts with the following molecule.



c) Answer the questions based on the following structure.



- i) Name the functional groups present.
- ii) How many asymmetric carbon centres are there?
- iii) How many sp^3 hybridised carbon atoms are present?
- iv) How many sp^2 hybridised carbon atoms are present?
- v) Is the molecule planar?

PERIODIC TABLE OF THE ELEMENTS

1																		2																	
1 H Hydrogen 1.008																		2 He Helium 4.003																	
3 Li Lithium 6.941		4 Be Beryllium 9.012																5 B Boron 10.811		6 C Carbon 12.011		7 N Nitrogen 14.007		8 O Oxygen 15.999		9 F Fluorine 18.998		10 Ne Neon 20.180							
11 Na Sodium 22.990		12 Mg Magnesium 24.305																13 Al Aluminum 26.982		14 Si Silicon 28.086		15 P Phosphorus 30.974		16 S Sulfur 32.065		17 Cl Chlorine 35.453		18 Ar Argon 39.948							
19 K Potassium 39.098		20 Ca Calcium 40.078		21 Sc Scandium 44.956		22 Ti Titanium 47.867		23 V Vanadium 50.942		24 Cr Chromium 51.996		25 Mn Manganese 54.938		26 Fe Iron 55.845		27 Co Cobalt 58.933		28 Ni Nickel 58.693		29 Cu Copper 63.546		30 Zn Zinc 65.380		31 Ga Gallium 69.723		32 Ge Germanium 72.640		33 As Arsenic 74.922		34 Se Selenium 78.960		35 Br Bromine 79.904		36 Kr Krypton 83.801	
37 Rb Rubidium 85.468		38 Sr Strontium 87.620		39 Y Yttrium 88.906		40 Zr Zirconium 91.224		41 Nb Niobium 92.906		42 Mo Molybdenum 95.938		43 Tc Technetium 98.000		44 Ru Ruthenium 101.070		45 Rh Rhodium 102.905		46 Pd Palladium 106.420		47 Ag Silver 107.868		48 Cd Cadmium 112.411		49 In Indium 114.818		50 Sn Tin 118.710		51 Sb Antimony 121.760		52 Te Tellurium 127.603		53 I Iodine 126.905		54 Xe Xenon 131.294	
55 Cs Cesium 132.905		56 Ba Barium 137.327		57-71 Lanthanides		72 Hf Hafnium 178.490		73 Ta Tantalum 180.948		74 W Tungsten 183.840		75 Re Rhenium 186.207		76 Os Osmium 190.230		77 Ir Iridium 192.222		78 Pt Platinum 195.084		79 Au Gold 196.967		80 Hg Mercury 200.590		81 Tl Thallium 204.383		82 Pb Lead 207.200		83 Bi Bismuth 208.980		84 Po Polonium 209.000		85 At Astatine 210.000		86 Rn Radon 222.000	
87 Fr Francium 223.000		88 Ra Radium 226.000		89-103 Actinides		104 Rf Rutherfordium 261.000		105 Db Dubnium 262.000		106 Sg Seaborgium 266.000		107 Bh Bohrium 264.000		108 Hs Hassium 277.000		109 Mt Meitnerium 276.000		110 Ds Darmstadtium 281.000		111 Rg Roentgenium 282.000		112 Cn Copernicium 285.000		113 Nh Nihonium 284.000		114 Fl Flerovium 289.000		115 Mc Moscovium 288.000		116 Lv Livermorium 293.000		117 Ts Tennessine 294.000		118 Og Oganesson 294.000	
57 La Lanthanum 138.905		58 Ce Cerium 140.116		59 Pr Praseodymium 140.908		60 Nd Neodymium 144.240		61 Pm Promethium 145.000		62 Sm Samarium 150.360		63 Eu Europium 151.964		64 Gd Gadolinium 157.250		65 Tb Terbium 158.925		66 Dy Dysprosium 162.500		67 Ho Holmium 164.930		68 Er Erbium 167.259		69 Tm Thulium 168.934		70 Yb Ytterbium 173.054		71 Lu Lutetium 174.967							
89 Ac Actinium 227.000		90 Th Thorium 232.038		91 Pa Protactinium 231.036		92 U Uranium 238.029		93 Np Neptunium 237.000		94 Pu Plutonium 244.000		95 Am Americium 243.000		96 Cm Curium 247.000		97 Bk Berkelium 247.000		98 Cf Californium 251.000		99 Es Einsteinium 252.000		100 Fm Fermium 257.000		101 Md Mendelevium 258.000		102 No Nobelium 259.000		103 Lr Lawrencium 262.000							