CHEM1904 Example Multiple Choice Questions

The following multiple choice questions are provided to *illustrate* the type of questions used in this section of the paper and to provide you with extra practice.

It is *not* a sample quiz. The questions in the paper will be in the style of these questions but may well cover different topics.

In the exam, the answer should be indicated by clearly circling the letter next to the choice you make **and** by filling in the corresponding box on the computer-marked sheet provided. The marks for each correct answer are given beside each question.

Instructions for use of the computer sheet. Draw a **thick** line through the **centre** and crossing both edges of each box selected, as in this example.

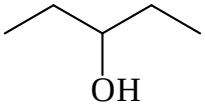
Use a **dark** lead pencil so that you can use an eraser if you make an error. Errors made in ink cannot be corrected – you will need to ask the examination supervisor for another sheet. Boxes with faint or incomplete lines or not completed in the prescribed manner may not be read. Be sure to complete the SID and name sections of the sheet.

Your answer as recorded on the sheet will be used in the event of any ambiguity.

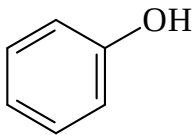
There is only one correct choice for each question.

Negative marks will not be awarded for any question.

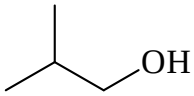
In answering questions 1 - 5, choose from compounds **A - E**.



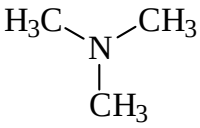
A



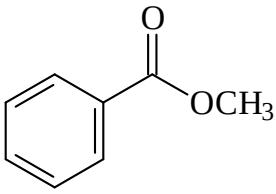
B



C



D



E

Marks

1. Which one of the compounds **A - E** is a primary alcohol? **A B C D E** — **1**

2. Which one of the compounds **A - E** will react with NaOH in an acid-base reaction? **A B C D E** — **1**

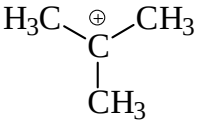
3. Which one of the compounds **A - E** will react with HCl to form a quaternary ammonium salt? **A B C D E** — **1**

4. Which one of the compounds **A - E** will react with dimethylamine, $(CH_3)_2NH$, to give an amide? **A B C D E** — **1**

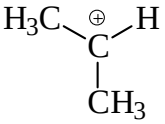
5. Which one of the compounds **A - E** will form a carboxylic acid upon treatment with acidified $Na_2Cr_2O_7$ solution? **A B C D E** — **1**

6. Which one of the following is the most stable carbocation? — **1**

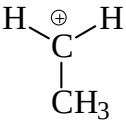
A



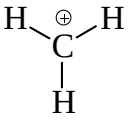
B



C



D

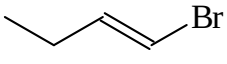
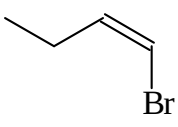


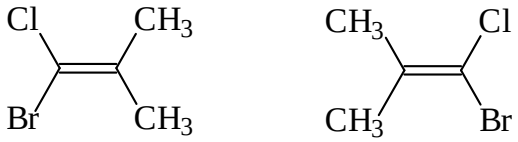
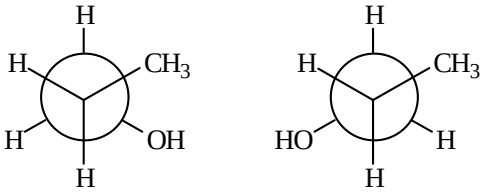
E

For questions 7 - 11, choose from **A - E** the term that best describes the relationship between each of the following pairs of compounds.

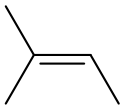
A. Conformational Isomers **B.** Constitutional Isomers **C.** Enantiomers

D. Diastereomers **E.** Identical Compounds

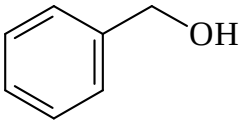
7.   **A B C D E** — **1**

		Marks
8. 	**A B C D E**	**1**
9. 	**A B C D E**	**1**
10. 	**A B C D E**	**1**
11. 	**A B C D E**	**1**

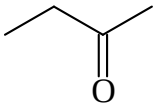
In answering questions 12 - 17, choose from the molecules **A - E**.



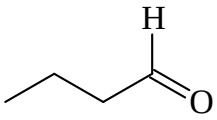
A



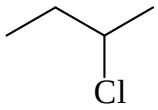
B



C



D

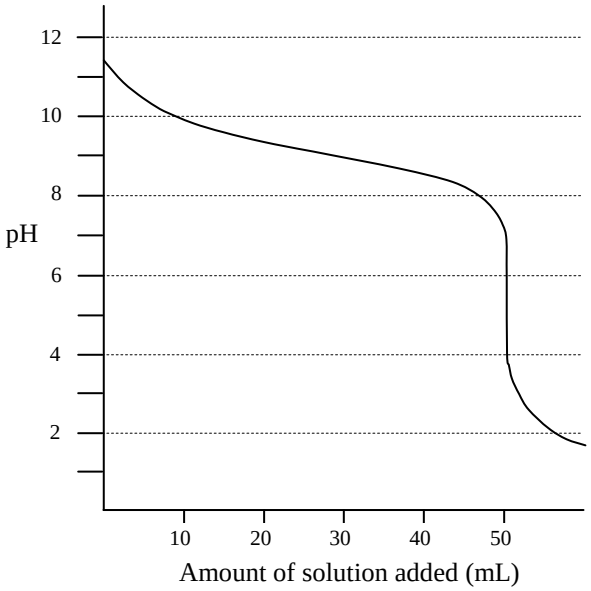


E

			Marks
12.	Which one of compounds **A - E** can react with HCl in an electrophilic addition reaction?	**A B C D E**	**1**
13.	Which one of compounds **A - E** will be formed upon the oxidation of 2-butanol?	**A B C D E**	**1**
14.	Which one of compounds **A - E** will react with $NaBH_4$ followed by aqueous acid to give a primary alcohol?	**A B C D E**	**1**
15.	Which one of compounds **A - E** undergoes an elimination reaction on treatment with hot alcoholic potassium hydroxide solution?	**A B C D E**	**1**

		Marks
16.	Which one of compounds **A - E** is an example of a conjugated molecule? **A B C D E**	**1**
17.	Which one of compounds **A - E** will form 2-methyl-2-bromobutane upon treatment with HBr? **A B C D E**	**1**
18.	Rank the following series of atoms in order of INCREASING electronegativity. N O F P As **A** N < O < F < P < As **B** F < O < N < P < As **C** As < P < N < O < F **D** As < P < N < F < O **E** F < N < O < As < P	**1**

In answering questions 19 - 20, consider the following titration curve.



19.	Which one of the following combinations does the titration curve represent? **A** Addition of a strong base to a weak acid **B** Addition of a weak base to a strong acid **C** Addition of a weak acid to a strong base **D** Addition of a strong acid to a strong base **E** Addition of a strong acid to a weak base	**1**

Marks

20. What is the value of the pK_a that can be obtained from this titration curve? **1**

A 11.3
B 10.0
C 9.3
D 5.3
E 1.8

21. Which intermolecular forces are present in phenol, $C_6H_5OH(s)$? **1**

A London dispersion only
B Dipole-dipole only
C Hydrogen-bonding only
D London dispersion and dipole-dipole
E London dispersion, dipole-dipole and hydrogen bonding

22. A catalyst speeds up a chemical reaction by **1**

A changing the stoichiometry.
B increasing the activation energy.
C providing an alternative reaction mechanism of lower activation energy.
D shifting the equilibrium towards the side of the product(s).
E increasing the reaction enthalpy.

23. Which of the following gases can be liquefied at 25 °C? **1**

Gas	**Critical point**
CH_3Cl	144 °C, 66 atm
SO_2	158 °C, 78 atm
CH_4	–82 °C, 46 atm

A SO_2 only
B CH_4 only
C CH_3Cl and SO_2
D all of them
E none of them

		Marks
24.	A solid has a very high melting point, is very hard, and its liquid is non-conducting. The compound is **A** a molecular solid. **B** a metallic solid. **C** a covalent network solid. **D** an ionic solid. **E** an amorphous solid.	**1**
25.	When one mole of ice melts to liquid at 0 °C, **A** the entropy of the system decreases. **B** the entropy of the system remains the same. **C** the entropy of the system increases. **D** the order of the system increases. **E** None of the above	**1**
26.	The entropy of a chemical system will usually increase when **A** a molecule is broken down into two or more smaller fragments. **B** a reaction occurs that results in an increase in the moles of gas. **C** a solid changes to a liquid. **D** a liquid changes into a gas. **E** All of the above	**1**
27.	Arrange the common unit cells of metals from the least dense packing to the most dense packing. **A** body-centred cubic < face-centred cubic < simple cubic **B** body-centred cubic < simple cubic < face-centred cubic **C** face-centred cubic < simple cubic < body-centred cubic **D** simple cubic < body-centred cubic < face-centred cubic **E** simple cubic < face-centred cubic < body-centred cubic	**1**
28.	How many atoms are there in the face-centred cubic unit cell of iron? **A** # atoms = $\frac{1}{8}(8) = 1$ **B** # atoms = $1 + \frac{1}{8}(8) = 2$ **C** # atoms = $\frac{1}{2}(6) = 3$ **D** # atoms = $\frac{1}{2}(6) + \frac{1}{8}(8) = 4$ **E** # atoms = $1 + \frac{1}{2}(6) + \frac{1}{8}(8) = 5$	**1**

		Marks
29.	The normal boiling point of a liquid is **A** the only temperature at which there can be equilibrium between the liquid and gas states. **B** the temperature above which the substance cannot exist as a liquid regardless of the pressure. **C** the temperature at which the entropy of the liquid is equal to zero. **D** the temperature at which the vapour pressure of the liquid equals the ambient atmospheric pressure. **E** the temperature at which the vapour pressure of the liquid equals 1 atm.	**1**
30.	What is the geometry of the $[Cr(OH_2)_6]^{3+}$ ion? **A** tetrahedral **B** trigonal bipyramidal **C** square planar **D** octahedral **E** linear	**1**
31.	What is the ground state electronic configuration of Fe^{3+}? **A** [Ar] $3s^2\ 3p^6$ **B** [Ar] $4s^2\ 3d^4$ **C** [Ar] $4s^2\ 3d^3$ **D** [Ar] $4s^0\ 3d^8\ 4p^2$ **E** [Ar] $4s^0\ 3d^5$	**1**
32.	Which of the following species exist as isomers? $[Co(NH_3)_6]^{3+}$, $[PtCl_2(NH_3)_2]$, $[Co(OH_2)_6]Cl_3$, $[Co(OH_2)_6]^{2+}$, $[CdI_4]^{2-}$ **A** $[PtCl_2(NH_3)_2]$ and $[Co(OH_2)_6]Cl_3$ **B** $[PtCl_2(NH_3)_2]$ only **C** $[CdI_4]^{2-}$ only **D** $[Co(NH_3)_6]^{3+}$ and $[Co(OH_2)_6]^{2+}$ **E** $[Co(OH_2)_6]Cl_3$ and $[Co(OH_2)_6]^{2+}$	**1**

Answers

Question	1	2	3	4	5	6	7	8	9	10
Answer	C	B	D	E	C	B	D	E	C	B

Question	11	12	13	14	15	16	17	18	19	20
Answer	A	A	C	D	E	B	A	C	E	C

Question	21	22	23	24	25	26	27	28	29	30
Answer	E	C	C	C	C	E	D	D	E	D

Question	31	32
Answer	E	A