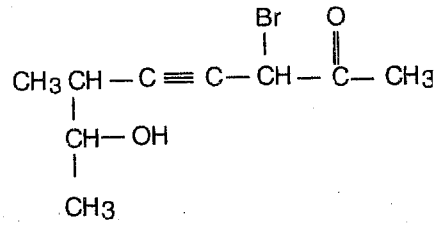
Multiple choice questions (2 marks x15 = 30 marks)

Instructions –
Choose the most correct answer to each question and mark a cross over the appropriate cage on the answer sheet.
Use a **pen** (not a pencil) to mark your answers.
Each **correct answer** will carry 2 marks. 1/3 rd of a mark will be deducted for each **incorrect answ**
Questions with more than one answer will not be counted for grading.

Questions 1 and 2 are based on the following compound.



1. The **parent hydrocarbon chain along with the main functional group** of this compound is na according to the IUPAC system as

(1) 4-octyn-2-ol (2) 4-octyn-2-one (3) 4-octyne
(4) 3-octynol (5) None of the above

2. The **substituents present** in the above compound with the carbon number are

(1) 6-bromo-2- hydroxyl-3-methyl (2) 6-bromo-3- methyl-7-oxo
(3) 3-bromo-7- hydroxy-6- methyl (4) 3- bromo-6 methyl-2-oxo
(5) 3-bromo-7- hydroxy-6- methyl- 4- yne.

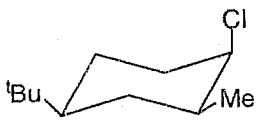
3. Racemic mixture is best explained as:

(1) an equimolar mixture of two isomers.
(2) a mixture of enantiomers.
(3) a mixture of two diasteroisomers.
(4) an equimolar mixture of enantiomers.
(5) an equimolar mixture of two diastereoisomers.

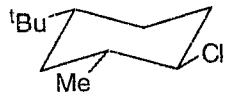
4. Which of the following is a correctly balanced oxidation/reduction reaction?

(1) $Fe^{2+} + Au^{3+} <=> Fe^{3+} + Au$
(2) $2\ Fe^{2+} + Au^{3+} <=> 2\ Fe^{3+} + Au$
(3) $Fe^{2+} + 3\ Au^{3+} <=> Fe^{3+} + 3\ Au$
(4) $3\ Fe^{2+} + Au^{3+} <=> 3\ Fe^{3+} + Au$
(5) The correct response is not given.

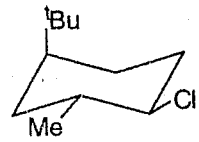
5. Consider the statements (a) to (d) regarding the structures A,B and C.



A



B



C

(a) The most stable structure is A (b) The most unstable structure is C
(c) A and B are conformational isomers (d) A and C are configurational isomers

Correct statements are:
(1) (a) and (b) (2) (a and (c) (3) (b) and (c) (4) (b) and (d) (5) (a) and (d)

6. When a copper wire placed in a solution of silver nitrate ($AgNO_3$), over a period of time, a spontan reaction takes place in which the solution turned blue and silvery needles formed on the copper wi Which of the following statements must be **true** about this process?

(1) $\Delta G > 0$ and $E_{cell} < 0$
(2) $\Delta G = 0$ and $E_{cell} > 0$
(3) $\Delta G < 0$ and $E_{cell} = 0$
(4) $\Delta G = 0$ and $E_{cell} = 0$
(5) $\Delta G < 0$ and $E_{cell} > 0$

7. Which of the following statements about the standard hydrogen electrode is **true**?

(1) Hydrogen gas is bubbled through the electrode at a pressure of 2.0 atm.
(2) The electrode contains a copper wire that serves as a chemically inert surface for oxidation – reduction reactions to occur.
(3) The electrode contains a platinum wire that serves as a chemically inert surface for oxidation reduction reactions to occur.
(4) The standard hydrogen electrode is assigned a half-cell potential of 1.0 V.
(5) None of the above statements are true.

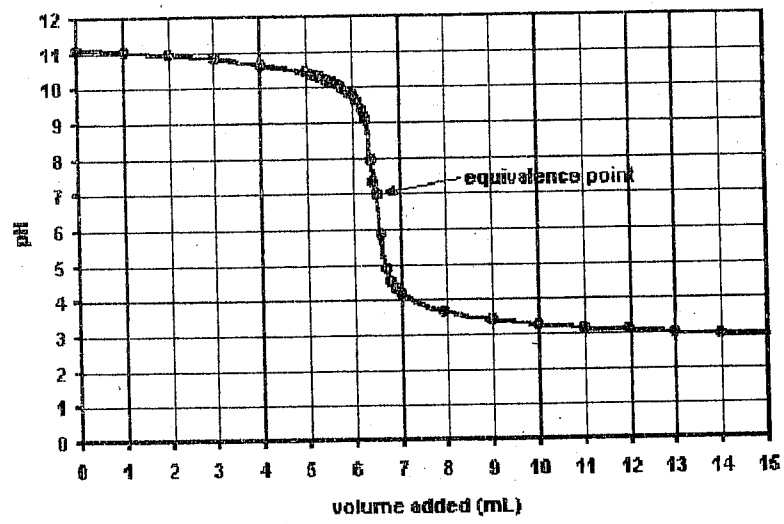
8. Consider the following standard reduction potentials,

$Ni^{2+}(aq) + 2e^- <==> Ni(s)$ - 0.23
$Fe^{2+}(aq) + 2e^- <==> Fe(s)$ - 0.41
$Mn^{2+}(aq) + 2e^- <==> Mn(s)$ - 1.03
$Co^{2+}(aq) + 2e^- <==> Co(s)$ - 0.28
$Cr^{3+}(aq) + 3e^- <==> Cr(s)$ - 0.74

Which of the following metals could be used successfully to galvanize steel?

(1) Ni only (2) Ni and Co (3) Fe only (4) Mn only (5) Mn and Cr

9. Consider the titration curve shown below.



The titration curve represents the titration of:

(1). a strong acid (flask) with a strong base (burette).
(2). a weak acid (flask) with a strong base (burette).
(3). a strong base (flask) with a strong acid (burette).
(4). a weak base (flask) with a strong acid (burette).
(5). None of these.

10. Which of the following statements best describes what will happen when magnesium metal is a to an aqueous solution containing 1.0 mol dm^{-3} ferric ion (Fe^{3+}) at 25°C?

half reaction	**E^o, V**
$Mg^{2+}(aq) + 2e^- \rightarrow Mg(s)$	- 2.375
$Fe^{3+}(aq) + 3e^- \rightarrow Fe(s)$	- 0.036

(1). Mg(s) will be oxidized; $Fe^{3+}(aq)$ will be reduced; the standard cell potential will be 2.339 V
(2). Mg(s) will be oxidized; $Fe^{3+}(aq)$ will be reduced; the standard cell potential will be - 2.339
(3). $Fe^{3+}(aq)$ will be oxidized; Mg(s) will be reduced; the standard cell potential will be - 2.339
(4). $Fe^{3+}(aq)$ will be oxidized; Mg(s) will be reduced; the standard cell potential will be 2.339 V
(5). There is not enough information given to answer the question.

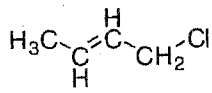
11. Salts of Cu^+ disproportionate in water to form Cu^{2+} salts and Cu metal,

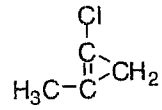
$$2\ Cu^+(aq) \rightarrow Cu^{2+}(aq) + Cu(s)$$

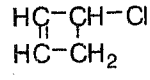
Which species is **oxidized** and which species is **reduced** in this reaction, respectively?

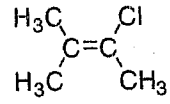
(1) $Cu^+(aq)$ and $Cu^+(aq)$. (2) $Cu^+(aq)$ and $Cu^{2+}(aq)$. (3) $Cu^+(aq)$ and Cu (s)
(4) $Cu^{2+}(aq)$ and Cu (s). (5) This is not a reduction-oxidation reaction.

12. Which of the following formulae represent a pair of isomers


(a)


(b)


(c)

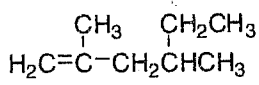

(d)

(1) a and b (2) a and c (3) a and d (4) b and d (5) b and c

13. What are the oxidation states of the Na, Cr and O atoms, respectively, in sodium dichromate, $Na_2Cr_2O_7$?

(1) +2, +2, -2 (2) +1, +3, -2 (3) +2, +6, +2 (4) +1, +6, -2 (5) -1, +3, -1

14. The IUPAC name of the compound,



(1) 2-methyl-4-ethyl-pentene
(2) 2,4-dimethyl-1-hexene
(3) 2,5-dimethyl-5-hexene
(4) 4-ethyl-2-methyl-1-pentene
(5) none of the above

15. Which of the following statements about strong acids is **true**?

(1) The percentage dissociation of a strong acid in water is assumed to be 100%.
(2) Strong acids have large acid-dissociation constants (K_a).
(3) Strong acids react better with strong bases than do weak acids.
(4) (1) and (2) are true.
(5) (1), (2) and (3) are true.