



विद्या सर्वार्थ साधिका

ANANDALAYA  
PRACTICE TEST  
Class : XII

Subject: Chemistry  
Date: 18/12/2019

M.M : 70  
Time : 3 Hours

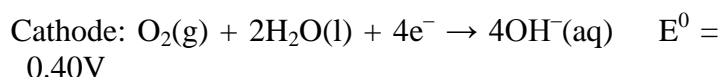
**General Instructions**

- All questions are compulsory.
- Section A: Q.no. 1 to 20 are very short answer questions (objective type) and carry 1 mark each.
- Section B: Q.no. 21 to 27 are short answer questions and carry 2 marks each.
- Section C: Q.no. 28 to 34 are long answer questions and carry 3 marks each.
- Section D: Q.no. 35 to 37 are also long answer questions and carry 5 marks each.
- There is no overall choice. However an internal choice has been provided in two questions of two marks, two questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
- Use log tables if necessary, use of calculators is not allowed.

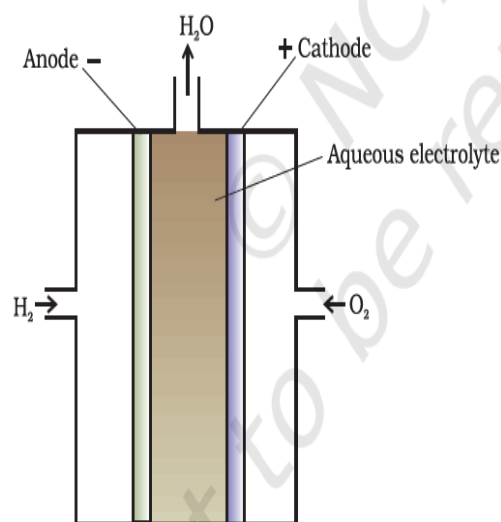
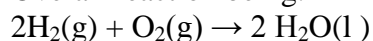
SECTION A

Read the given passage and answer the questions 1-5 that follow.

Conventional batteries supply electrical energy from the chemical reactants stored within them; when these reactants are consumed, the battery is dead". An alternative approach would be to feed the reactants into the cell as they are required, so as to permit the cell to operate continuously. In this case the reactants can be thought of as fuel" to drive the cell, hence the term *fuel cell*.



Overall reaction being:



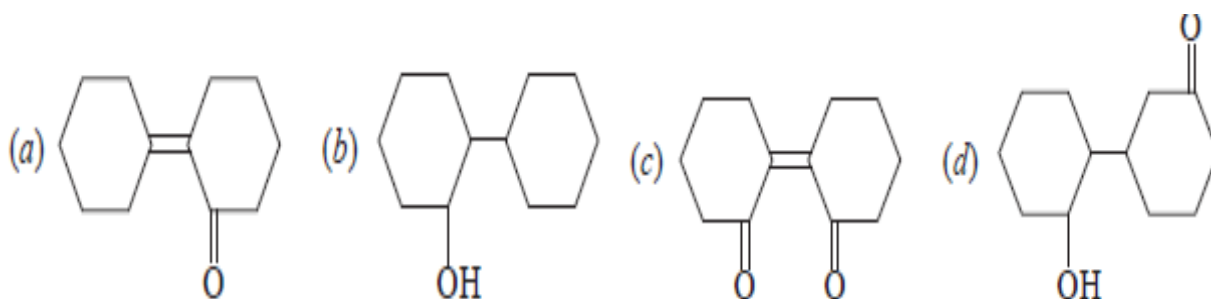
- Which type of reaction undergoes in fuel cell? (1)
- What will happen if supply of oxygen is stopped in hydrogen-oxygen fuel cell? (1)
- Which type of energy is produced by hydrogen-oxygen fuel cell? (1)
- If the cell voltage of hydrogen-oxygen fuel cell is 1.23 V, and the potential for the half cell reaction at cathode is 0.40 V as indicated, then what is the  $E^0$  for the half reaction:  
$$2\text{H}_2\text{O}(\text{l}) + 2\text{e}^- \rightarrow 2\text{H}_2(\text{g}) + 4\text{OH}^-(\text{aq})$$
 (1)
- How many litres of gaseous  $\text{H}_2$  when combined with excess  $\text{O}_2$  in the fuel cell at  $25^\circ\text{C}$  and 1.00 atm are needed to produce 23.7 kJ of work under ideal conditions? (1)

Questions 6-10 are one word answers:

6. Name the temperature above which the formation of micelles takes place. (1)
7. Which component of starch is a branched polymer of D-glucose and insoluble in water? (1)
8. Name the test used to distinguish between Acetaldehyde and Benzaldehyde. (1)
9. Write the name of linkage joining two amino acids. (1)
10. Name the monomers of Nylon 6,6 polymer (1)

Questions 11-15 are multiple choice questions

11. The compounds  $[\text{Co}(\text{SO}_4)(\text{NH}_3)_5]\text{Br}$  and  $[\text{Co}(\text{SO}_4)(\text{NH}_3)_5]\text{Cl}$  represent (1)  
(a) linkage isomerism  
(b) ionisation isomerism  
(c) coordination isomerism  
(d) no isomerism
12. The shapes of  $[\text{Cu}(\text{NH}_3)_4]^{2+}$  and  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$  are (1)  
(a) square planar, tetrahedral  
(b) tetrahedral, square planar  
(c) square planar, square planar  
(d) tetrahedral, tetrahedral
13. Which of the following undergoes nucleophilic substitution exclusively by  $\text{S}_{\text{N}}1$  mechanism? (1)  
(a) Benzyl chloride  
(b) Ethyl chloride  
(c) Chlorobenzene  
(d) Isopropyl chloride
14. Of the following which is the product formed when cyclohexanone undergoes aldol condensation followed by heating? (1)



15. Caprolactum is used for preparation of (1)  
(a) Nylon-6  
(b) Nylon-6, 6  
(c) Nylon 6, 10  
(d) Nylon-2 – Nylon-6

Questions 16 to 20 :

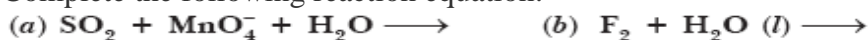
- (A) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.  
(B) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.  
(C) Assertion is correct, but reason is wrong statement.  
(D) Assertion is wrong, but reason is correct statement.
16. Assertion: HI cannot be prepared by the reaction of KI with concentrated  $\text{H}_2\text{SO}_4$  (1)  
Reason: HI has lowest H–X bond strength among halogen acids.
17. Assertion: Toxic metal ions are removed by the chelating ligands. (1)  
Reason: Chelate complexes tend to be more stable
18. Assertion: KCN reacts with methyl chloride to give methyl isocyanide. (1)  
Reason:  $\text{CN}^-$  is an ambident nucleophile.
19. Assertion: Bond angle in ethers is slightly less than the tetrahedral angle. (1)  
Reason: There is a repulsion between the two bulky (—R) groups.
20. Assertion: Formaldehyde is a planar molecule. (1)  
Reason: It contains  $\text{sp}^2$  hybridised carbon atom

### SECTION B

21. Write the difference between physisorption and chemisorption with respect to the following: (2)  
(i) Specificity (ii) Temperature dependence (iii) Reversibility and (iv) Enthalpy change
22. What is Van't Hoff factor? What types of values can it have if in forming the solution the solute molecules undergo (i) Dissociation, (ii) Association? (2)
23. Write the reagent used in the following reaction: (2)  
(i)  $\text{C}_6\text{H}_5\text{COCH}_3 \xrightarrow{?} \text{C}_6\text{H}_5\text{CH}_2\text{CH}_3$  (ii)  $\text{CH}_3\text{COOH} \xrightarrow{?} \text{CH}_3\text{COCl}$
24. (i) If half-life period of a first order reaction is x and  $\frac{3}{4}$  th life period of same reaction is y, how are x and y related to each other? (2)  
(ii) In some cases, it is found that a large number of colliding molecules have energy more than threshold energy but yet the reaction is slow. Why?
25. How would you account for the following: (2)  
(i) Enthalpy of dissociation for  $\text{F}_2$  is much less than that for  $\text{Cl}_2$ .  
(ii) Sulphur in vapour state exhibits paramagnetism

**OR**

Complete the following reaction equation:



26. Write the role of the following: (2)  
(i) CO in the purification of nickel  
(ii) Graphite rod in the electrometallurgy of aluminium.

**OR**

Why is the extraction of copper from pyrites more difficult than that from its oxide ore through reduction?

27. How are the following conversions carried out? (Write the reactions and conditions in each case) : (2)
- (i) Ethanol to 2-propanol  
(ii) Phenol to Acetophenone

### SECTION C

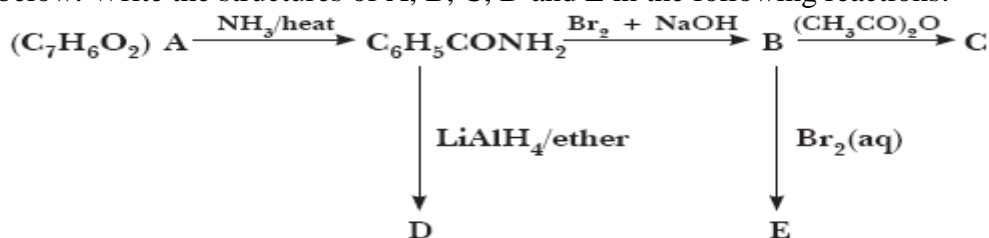
28. (a) Which poisonous gas is evolved when white phosphorus is heated with Conc. NaOH solution? (3)  
Write the chemical equation.  
(b) Write the formula of first noble gas compound prepared by N. Bartlett. What inspired N. Bartlett to prepare this compound?  
(c) Write one use of chlorine gas.
29. Account for the following: (3)
- (i)  $\text{PCl}_5$  is more covalent than  $\text{PCl}_3$ .  
(ii) Iron on reaction with HCl forms  $\text{FeCl}_2$  and not  $\text{FeCl}_3$ .  
(iii) The two O—O bond lengths in the ozone molecule are equal.
30. (i) Define Antihistamine with an example. (3)  
(ii) Which one of the following drugs is an antibiotic  
Morphine, Equanil, Chloramphenicol, Aspirin  
(iii) Why is use of aspartame limited to cold food and drink?
31. Vapour pressure of water at  $20^\circ\text{C}$  is 17.5 mm Hg, Calculate the vapour pressure of water at  $20^\circ\text{C}$  (3)  
when 15 g of glucose (molecular weight  $180\text{ g mol}^{-1}$ ) is dissolved in 150 g of water.
32. How long will it take an electric current of 0.15 A to deposit all the copper from 500 mL of 0.15 M (3)  
copper sulphate solution?
33. (a) Why are alkyl halides insoluble in water? (3)  
(b) Why is Butan-1-ol optically inactive but Butan-2-ol is optically active?  
(c) Although chlorine is an electron withdrawing group, yet it is ortho-, para- directing in electrophilic aromatic substitution reaction. Why?

OR

- (a) Write a chemical test to distinguish between :  
(i) Chlorobenzene and Benzyl chloride.  
(ii) Chloroform and Carbon tetrachloride.  
(b) Why is methyl chloride hydrolysed more easily than chlorobenzene?
34. Write one chemical equation for each, to illustrate the following reactions: (3)
- (i) Rosenmund reduction  
(ii) Cannizzaro reaction  
(iii) Fischer esterification

### SECTION D

35. An aromatic compound 'A' of molecular formula  $\text{C}_7\text{H}_6\text{O}_2$  undergoes a series of reactions as shown (5)  
below. Write the structures of A, B, C, D and E in the following reactions:



**OR**

- (a) Write the structures of main products when benzene diazonium chloride reacts with the following reagents:
- $\text{H}_3\text{PO}_2 + \text{H}_2\text{O}$
  - $\text{CuCN/KCN}$
  - $\text{H}_2\text{O}$
- (b) Arrange the following in the increasing order of their basic character in an aqueous solution:  
 $\text{C}_2\text{H}_5\text{NH}_2$ ,  $(\text{C}_2\text{H}_5)_2\text{NH}$ ,  $(\text{C}_2\text{H}_5)_3\text{N}$
- (c) Give a simple chemical test to distinguish between the following pair of compounds:  
 $\text{C}_6\text{H}_5\text{—NH}_2$  and  $\text{C}_6\text{H}_5\text{—NH—CH}_3$
36. (a) State Faraday's first law of electrolysis. How much charge in terms of Faraday is required for the reduction of 1 mol of  $\text{Cu}^{2+}$  to Cu? (5)
- (b) Calculate emf of the following cell at 298 K:  
 $\text{Mg(s)} \mid \text{Mg}^{2+} (0.1 \text{ M}) \parallel \text{Cu}^{2+} (0.01) \mid \text{Cu(s)}$  [Given  $E^\circ_{\text{cell}} = + 2.71 \text{ V}$ ,  $1 \text{ F} = 96500 \text{ C mol}^{-1}$ ]

**OR**

- (a) How many moles of mercury will be produced by electrolysing 1.0 M  $\text{Hg}(\text{NO}_3)_2$  solution with a current of 2.00 A for 3 hours ? [ $\text{Hg}(\text{NO}_3)_2 = 200.6 \text{ g mol}^{-1}$ ]
- (b) A voltaic cell is set up at 25° C with the following half-cells  $\text{Al}^{3+}$  (0.001 M) and  $\text{Ni}^{2+}$  (0.50 M). Write an equation for the reaction that occurs when the cell generates an electric current and determine the cell potential.
- (Given;  $E^\circ_{\text{Ni}^{2+}/\text{Ni}} = - 0.25 \text{ V}$ ,  $E^\circ_{\text{Al}^{3+}/\text{Al}} = - 1.66 \text{ V}$ )

37. (a) Complete the following equations: (5)
- $\text{Cr}_2\text{O}_7^{2-} + 2\text{OH}^- \rightarrow$
  - $\text{MnO}_4^- + 4\text{H}^+ + 3 \text{e}^- \rightarrow$
- (b) Account for the following:
- Zn is not considered a transition element.
  - Transition metals form a large number of complexes.
  - The  $E^\circ$  value for the  $\text{Mn}^{3+}/\text{Mn}^{2+}$  couple is much more positive than that for  $\text{Cr}^{3+}/\text{Cr}^{2+}$  couple.

**OR**

- (a) Complete the following chemical equations:
- $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{H}_2\text{S}(\text{g}) + \text{H}^+(\text{aq}) \longrightarrow$
  - $\text{Cu}^{2+}(\text{aq}) + \text{I}^-(\text{aq}) \longrightarrow$
- (b) How would you account for the following?
- The oxidising power of oxoanions are in the order  
 $\text{VO}_2^+ < \text{Cr}_2\text{O}_7^{2-} < \text{MnO}_4^-$
  - The third ionization enthalpy of manganese ( $Z = 25$ ) is exceptionally high.
  - $\text{Cr}^{2+}$  is a stronger reducing agent than  $\text{Fe}^{2+}$ .