BOARD-Q.PAPER 2 PAPER

BOARD QUESTION PAPER-2
MARCH 2018 (052) (E)

Stanard-12 CHEMISTRY Part-1 & 2

PART-A

Time: 1 Hour] [Maximum marks : 50

Instructions : (1) There are 50 objective type (M.C.Q) questions in Part – A and all questions are compulsory.
(2) The questions are serially numbered from 1 to 50 and each carries 1 mark.
(3) Read each question carefully, select proper alternative and answer in the O.M.R. sheet.
(4) The OMR sheet is given for answering the questions. The answer of each question is represented by (A) ◯, (B) ◯, (C) ◯, (D) ◯. Darken the circle ● of the correct answer with ball-pen.
(5) Rough work is to be done in the space provided for this purpose in the Test Booklet only.
(6) Set No. of Question Paper printed on the upper-most right side of the Question Paper is to be written in the column provided in the OMR sheet.
(7) Use of simple calculator and log table is allowed, if required.

1. Which of the following disease is caused by the deficiency of α-Tocopherol?
(A) Scurvy (B) Bone-deformation (C) Sterility (D) Beri Beri

2. Which glycosidic linkage is present in Maltose?
(A) β – D – (+) – glucose $(C_1) - O - (C_4)$ – D – (+) – glucose
(B) α – D – (+) – glucose $(C_1) - O - (C_4)$ – D – (+) – glucose
(C) α – D – (+) – glucose $(C_1) - O - (C_2)$ – β – D – (–) – glucose
(D) β – D – (+) – glucose $(C_1) - O - (C_4)$ – D – (–) – glucose

3. Which monomer is responsible for the flexibility property in PHBV?
(A) $HO - \underset{\displaystyle CH_2 - CH_3}{\underset{|}{CH}} - CH_2 - COOH$ (B) $HO - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_2 - COOH$
(C) $HO - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - COOH$ (D) $HO - \underset{\displaystyle CH_2 - CH_3}{\underset{|}{CH}} - CH_2 - CHO$

4. Which of the following is not a homopolymer?
(A) Neoprene (B) Natural rubber (C) Butyl rubber (D) Nitrile rubber

5. Which of the following is used as a food preservative?
(A) Sucralose (B) Salts of sorbic acid (C) Citric acid (D) Ascorbic acid

6. Which of the following solution is used as washing solution for eyes to free them from microorganisms?
(A) 2-3% Iodine solution (B) 0.2% Phenol solution
(C) 1 % Phenol solution
(D) Dilute aqueous solution of Boric acid

7. What is the number of atoms in end centered unit cell?
(A) 4 (B) 1 (C) 2 (D) 6

8. Which of the following ion is paramagnetic?
(A) Zn^{2+} (B) O_2^{2-} (C) Cu^{+} (D) Cr^{3+}

9. A compound is formed of two elements 'A' and 'B'. The atoms of element 'A' forms face centered cubic close packing and atoms of 'B' occupies all the tetrahedral voids. What will be the formula of the compound?
(A) AB_2 (B) AB_8 (C) A_4B (D) A_2B

10. An element possess cubic close packing structure. Calculate the radius (r) of the atom in the unit cell. (The edge length of unit cell is a = 252 nm)
(A) 152 nm (B) 89.36 nm (C) 126 nm (D) 109.1 nm

11. Which of the following aqueous solution has the highest boiling point having concentration 0.050 m?
(A) NaCl (B) Urea (C) $K_3[Fe(CN)_6]$ (D) Na_2SO_4

12. What is the concentration of solution in ppm when 5.0×10^{-5} CO_2 is dissolved in 100 ml solution.
(A) 500 (B) 0.5 (C) 5 (D) 5.0×10^{-5}

13. Which of the following is an example for interstitial solid solution.
(A) Tic (B) Li_2C_2 (C) Sic (D) Al_4C_3

14. Which gas is evolved at the anode during the electrolysis of KHF_2 in anhydrous HF?
(A) H_2 (B) O_2 (C) F_2 (D) H_2 and O_2

15. The electronic conductivity does not depend on
(A) The nature of the solvent and its viscosity
(B) The size of the ions produced and their hydration
(C) Nature of the added electrolyte
(D) The number of electrons in the valence shell of atoms of metal

16. If one mole electrons are passed through solutions of $CuSO_4$, $AgNO_3$ and $FeCl_3$, what will be the mole ratio of metals Cu, Ag and Fe deposited at the electrodes?
(A) 3:6:2 (B) 2:1:3 (C) 1:2:3 (D) 2:6:3

17. The limiting molar conductivity and molar conductivity of acetic acid are 390.5 $s \cdot cm^2 . mol^{-1}$ and 48.15 $s \cdot cm^2 . mol^{-1}$ respectively. Calculate the degree of dissociation of the weak acid?
(A) 12.33 (B) 0.1233 (C) 1.233 (D) 0.01233

18. Which method is used in the refining of Titanium metal?
(A) Mond carbonyl (B) Frasch (C) Zone refining (D) Van Arkel

19. Which of the following two substances react to produce blister copper?
(A) $Cu_2O_{(s)}$ and $FeS_{(s)}$ (B) $Cu_2S_{(s)}$ and $O_{2(g)}$
(C) $Cu_2S_{(s)}$ and $Cu_2O_{(s)}$ (D) Cu $Cu_2S_{(s)}$ and $FeS_{2(s)}$

20. What is the molecular formula of Marshall's acid?
(A) $H_2S_2O_8$ (B) H_2SO_4 (C) H_2SO_5 (D) $H_2S_2O_7$

21. Which of the following is the correct order of basicity of hydride compounds.
(A) $PH_3 < AsH_3 < NH_3 < SbH_3$ (B) $SbH_3 < AsH_3 < PH_3 < NH_3$
(C) $NH_3 < PH_3 < AsH_3 < SbH_3$ (D) $SbH_3 < PH_3 < AsH_3 < NH_3$

22. Which among the following Halic (II) acid can be formed?
(A) $HBrO_2$ (B) HFO_2 (C) $HClO_2$ (D) HIO_2

23. How many σ and π bonds are present in the structure of D.D.T respectively?
(A) 17, 6 (B) 20, 6 (C) 21, 6 (D) 29, 6

24. Which substance is used to extinguish fire in substances like oil, fat and petrol?
(A) $CHCl_3$ (B) CH_2Cl_2 (C) CH_3Cl (D) CCl_4

25. Which of the following compound is optically inactive?
(A) Glyceraldehyde (B) Lactic acid (C) Propanoic acid (D) Glucose

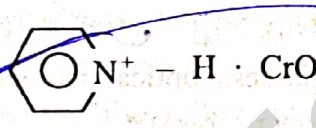
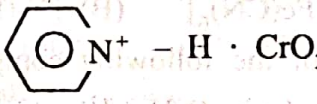
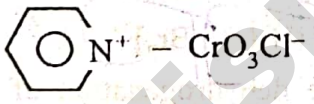
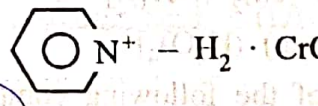
26. Name the product obtained in the following reaction?

$$CH_3 - CH_2 - CH_2 - CH = CH_2 \xrightarrow[H_2O_2/OH^-]{(BH_3)_2} ?$$

Pent - 1 - ene

(A) Pentan - 3 - ol (B) Pentan - 2 - ol
(C) Pentan - 1 – ol (D) 2-methyl butan - 2 - ol

27. Give the IUPAC name of the product obtained when Phenol is oxidized by chromic acid. ($Na_2Cr_2O_7$ + Conc. H_2SO_4).
(A) Cyclohexa - 2, 5 - diene - 1, 4 - dione (B) Cyclohexa - 1, 4 - dione
(C) Cyclohexanone (D) Cyclohexa - 1, 4 - diene - 2, 5 - dione

28. Identify Pyridinium chlorochromate from the following.
(A)  (B) 
(C)  (D) 

29. For the reaction $2A + B \rightarrow$ product, $-\frac{d[A]}{dt} = K[A]^2[B]$.
What will be the rate equation for $-\frac{d[B]}{dt}$?
(A) $K[A][B]^2$ (B) $K[2A]^2[B]$ (C) $\frac{1}{2}K[A]^2[B]$ (D) $K[A][B]^{1/2}$

30. For a reaction, the value of slope of a plot in $\ln K \rightarrow \frac{1}{T}$ = _____.
(A) – Ea (B) $-\frac{Ea}{2.303}$ (C) $-\frac{Ea}{R}$ (D) $-\frac{Ea}{2.303R}$

31. Which of the following relation is correct for zero order reaction?
(A) $t_{1/2} \propto \frac{1}{[R]_0^2}$ (B) $t_{1/2} \propto \frac{1}{[R]_0}$
(C) $t_{1/2} \propto [R]_0$ (D) $t_{1/2}$ is independent of $[R]_0$

32. Which equation of Langmuir adsorption isotherm will apply at high pressure?

(A) $\frac{x}{m} = \frac{1}{a \cdot p}$ (B) $\frac{x}{m} = a \cdot p$ (C) $\frac{x}{m} = \frac{b}{a}$ (D) $\frac{x}{m} = \frac{a}{b}$

33. Which of the following will form a reversible sol?

(A) Sulphur sol (B) Rubber sol

(C) Gold sol (D) Arsenious sulphide sol

34. Which of the following gases can be absorbed in more proportion?

(A) CO_2 (B) O_2 (C) N_2 (D) H_2

35. Which of the following metals are present in German Silver?

(A) Germanium, Silver and Copper (B) Nickel, Silver and Copper

(C) Zinc, Silver and Copper (D) Zinc, Nickel and Copper

36. Which of the following statements is incorrect?

(A) $Ce(OH)_3$ is the least basic among the hydroxides of Lanthanoids

(B) The ionic size decreases as we move from Ce^{3+} to Lu^{3+}

(C) The atomic radius decreases as we move from Ce to Lu

(D) The stable oxidation state of all Lanthanoids is (+3)

37. Which of the following ion has the maximum theoretical magnetic moment?

(A) Cr^{3+} (B) Ti^{3+} (C) V^{3+} (D) Co^{3+}

38. Which among the following elements is radioactive?

(A) Tin (B) Pm (C) La (D) Pr

39. Which of the following complex has spa hybridization?

(A) $K_4[Fe(CN)_6]$ (B) $[Ni(NH_3)_2 Cl_2]$ (C) $K_2[Ni(CN)_4]$ (D) $K_4[Ni(CN)_4]$

40. Which of the following complex ions does not possess optical isomerism?

(A) $[Co\ (en)_2\ (NH_3)_2]^{2+}$ (B) $[Co(CO)_4\ (en)]^{3+}$

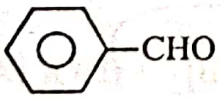
(C) $[Co(en)\ (H_2O)_4]^{2+}$ (D) $Co[(H_2O)_3\ Br_3]^{3+}$

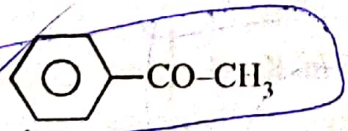
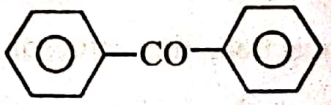
41. Which of the following complex is useful in the dehydrogenation of alkanes?

(A) $[(Ph_3P)_3\ Rh_2\ Cl]$ (B) $[(Ph_3P)_3\ Rh\ Cl]$

(C) $[(Ph_3P)\ Rh\ Cl]$ (D) $(Ph_3P)_3\ Rh\ Cl_2]$

42. Which of the following compounds undergo aldol condensation?

(A)  (B) H–CHO

(C)  (D) 

43. What is the final product 'C' in the following reaction?

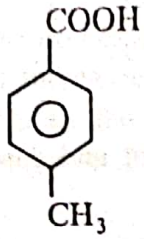
$CH_3CHO \xrightarrow{HCN}$ 'A' $\xrightarrow{H_3O^+}$ 'B' $\xrightarrow{\text{soda lime}}$ 'C'

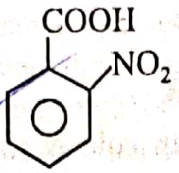
(A) Propanol (B) Ethanol (C) Propane (D) Propanoic acid

44. What is the IUPAC name of 'Acrolein' ?

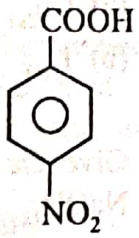
(A) Pentanal (B) 3-methoxy propanal (C) But-2-enal (D) Prop-2-enal

45. Which of the following compound has highest acidic strength?

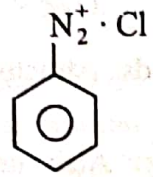
(A) 

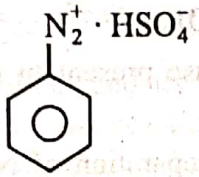
(B) 

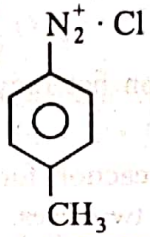
(C) 

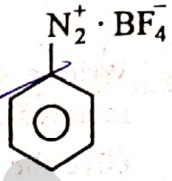
(D) 

46. Which of the following Diazonium salt is stable at room temperature?

(A) 

(B) 

(C) 

(D) 

47. Which of the following reaction gives secondary amine?
(A) Reduction of carbylamine (B) Reduction of nitro compound
(C) Reduction of amide (D) Hoffmann reduction

48. What is the final product obtained in the reaction between ethane nitrile and ethyl magnesium bromide?
(A) Butanamine (B) Butan - 2 - one (C) Methoxy propane (D) Pent - 2 - one

49. Give the correct order of proportion of products obtained by nitration of aniline.
(A) o-nitroaniline > p-nitroaniline > m-nitroaniline
(B) m-nitroaniline > o-nitroaniline > p-nitroaniline
(C) m-nitroaniline > p-nitroaniline > o-nitroaniline
(D) p-nitroaniline > m-nitroaniline > o-nitroaniline

50. Which of the following amino acid is neutral?
(A) Lysine (B) Glycine (C) Aspartic acid (D) Arginine

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PART-B : March 2018

Time : 2 Hours] **052 (G)** **[Maximum Marks : 50**

Instructions : (1) Write in clear ligible handwriting.
(2) There are three sections in Part-B of the question paper and total 1 to 18 questions are there.
(3) All the questions.
(4) The numbers at right side represent the marks of question.
(5) Start new section on new page.
(6) Maintain sequence.
(7) Use of simple calculator and log table is allowed, if required.

SECTION-A

- **Answer the Mowing Q. No. 1– 8 in brief. 2 marks for each question.** **[16]**

1. What is meant by ferrimagnetism? Give any two examples.
2. Explain the leaching process of silver and gold using chemical reactions?

3. Complete the following reaction and balance it.

(a) $Cu_{(s)} + HNO_{3\ (dil,\ aq)} \rightarrow$

(b) $I_{2(s)} + HNO_{3(l)} \rightarrow$

OR

Give the reaction of dichlorine gas with cold & dilute and hot and concentrated $NaOH_{(aq)}$.

4. Write any four applications of 'f' - block elements.

5. What are tetrasaccharides? Give its general formula and an example.

OR

Write a short note on heterocyclic base present in nucleic acids. (structure is not required).

6. Give the chemical reaction for the preparation of Nitrile rubber. Also mention its two properties and two uses.

7. What are biodegradable and non-biodegradable polymers? Give two examples each.

8. Write the chemical equation for saponification. Also give the limitations of soap.

SECTION-B

- **Answer the following 9-14 questions in detail. Each question carries 3 marks.** **[18]**

9. The potential of the given following cell is 0.092 volt at 298 K temperature. Calculate the pH of HCl solution $\left(E^{\circ}_{Sn|Sn^{2+}} = +0.14 \text{ volt}\right)$

$^{\ominus}Sn\,|\,Sn^{2}\ (0.05M)\,||\,H^{x}\ (xM)\,|\,H_{2(g)}\,(1\,bar)\,|\,Pt$

OR

How many spoons can be electroplated by silver when 7 ampere current is passed through electrolyte cell of $AgNO_3$ for 1.93 hours? 0.01 gm Ag layer is deposited on each spoon. (Ag = 108 $g.mol^{-1}$)

10. Write the molecular formula and structural formula of the following substances.
    (a) Phosphinic acid.
    (b) Oleum.
    (c) Perbromic acid.

11. Give any one reaction of Swartz, Wurtz and Finkelstein reaction of alkyl halides.

12. What is coagulation? Explain the Hardy and Schulze rules.

13. Explain :
    (a) Clemmensen's reduction of aldehydes and ketones.
    (b) Tollen's test of aldehydes.

14. Give the diazotisation reaction of aniline. Also give the chemical reaction involved in the preparation of red azo dye and light yellow azo dye.

SECTION-C

- **Answer the following 15-18 essay type questions in detail. Each question carries 4 marks.** **[16]**

15. State and prove Raoult's law for non-volatile solute in volatile solvent. Also give any two limitations of Raoult's law.

16. Explain the industrial production of phenol of high purity and less production cost and also explain the bromination of phenol.

17. The rate constant of a reaction at 300 K is 5.0×10^{-4} minute^{-1}. The temperature was increased by 20 K and the value of rate constant 'K' increased three times. Calculate the energy of activation of the reaction? What will be the value of rate constant at 37°C? [R = 1.987 calori. Kelvin^{-1}. mol^{-1}]

OR

The decomposition of N205 dissolved in carbontetrachloride occurs as follows.

$$N_2O_{5(Solution)} \rightleftharpoons 2NO_{2(Solution)} + \frac{1}{2}O_{2(g)}$$

This reaction is of first order and its rate constant is 5.0×10^{-4} sec^{-1}. If initial concentration of N205 for this reaction is 0.50 mole litre^{-1}, then

(a) What will be the initial reaction rate?

(b) What will be half life period of this reaction?

(c) What will be the concentrations of N_2O_5 and NO_2 at the end of 50 minutes after the starting of reaction?

18. What is meant by complex compound? Describe the main points of Werner's theory.

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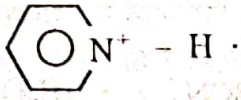
BOARD Q. PAPER-2 : MARCH 2018 : SOLUTION

PART-A

1. (C) Sterility
2. (D) β–D–(+)–glucose (C_1)–O–(C_4) –D–(–)–glucose
3. (A) HO – CH – CH_2 – COOH
   |
   CH_2 – CH_3
4. (D) Nitrile rubber
5. (B) Salts of sorbic acid
6. (D) Dilute aqueous solution of Boric acid
7. (C) 2
8. (D) Cr^{3+}
9. (A) AB_2
10. (B) 89.36 nm
11. (C) $K_3[Fe(CN)_6]$
12. (B) 0.5
13. (A) Tic
14. (C) F_2
15. (D) The number of electrons in the valence shell of atoms of metal
16. (A) 3:6:2
17. (B) 0.1233
18. (D) Van Arkel
19. (C) $Cu_2S_{(s)}$ and $Cu_2O_{(s)}$
20. (A) $H_2S_2O_8$
21. (B) $SbH_3 < AsH_3 < PH_3 < NH_3$
22. (C) $HClO_2$
23. (D) 29, 6
24. (D) CCl_4
25. (C) Propanoic acid
26. (C) Pentan - 1 – ol
27. (C) Cyclohexanone
28. (A)  – H · CrO_3Cl^-
29. (C) $\frac{1}{2}K\,[A]^2\,[B]$
30. (C) $-\frac{Ea}{R}$
31. (C) $t_{1/2} \propto [R]_0$

32. (D) $\frac{x}{m} = \frac{a}{b}$

33. (B) Rubber sol

34. (A) CO_2

35. (D) Zinc, Nickel and Copper

36. (A) $Ce(OH)_3$ is the least basic among the hydroxides of Lanthanoids

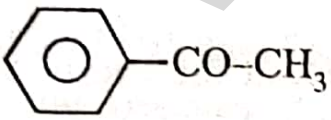
37. (D) Co^{3+}

38. (B) Pm

39. (D) $K_4[Ni(CN)_4]$

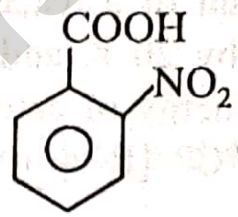
40. (D) $Co\ (H_2O)_3\ Br_3]^{3+}$

41. (B) $[(Ph_3\ P)_3\ Rh\ Cl]$

42. (C) 

43. (B) Ethanol

44. (D) Prop-2-enal

45. (B) 

46. (D) 

47. (A) Reduction of carbylamine

48. (B) Butan - 2 - one

49. (D) p-nitroaniline > m-nitroaniline > o-nitroaniline

50. (B) Glycine