முழுப் பதிப்புரிமையுடையது / All Rights Reserved]

MORA E-TAMILS 2018 | Tamil Students, Faculty of Engineering, University of Moratuwa MORA E-TAMILS 2018 | Tamil Students, Faculty of Engineering, University of Moratuwa
மொறட்டுவைப் பல்கலைக்கழக பொறியியற் பீட தமிழ் மாணவர்கள்
Tamil Students, Faculty of Engineering, University of Moratuwa MORA E-TAMILS 2018 | Tamil Students, Faculty of Engineering, University of Moratuwa | MORA E-TAMILS 2018
பொறியியற் பீட தமிழ் மாணவர்கள்,மொறட்டுவைப் பல்கலைக்கழக
MORA E-TAMILS 2018 | Tamil Students, Faculty of Engineering, University of Moratuwa MORA E-TAMILS 2018 | Tamil Students, Faculty of Engineering, University of Moratuwa
மொறட்டுவைப் பல்கலைக்கழக பொறியியற் பீட தமிழ் மாணவர்கள்
Tamil Students, Faculty of Engineering, University of Moratuwa MORA E-TAMILS 2018 | Tamil Students, Faculty of Engineering, University of Moratuwa | MORA E-TAMILS 2018

மொறட்டுவைபல்கலைக்கழகபொறியியற்பீடதமிழ்மாணவர்கள்
நடாத்தும்கபொத உயர்தரமாணவர்களுக்கான 7வது முன்னோடிப் பரீட்சை- 2016

கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர) முன்னோடிப் பரீட்சை - 2016
General Certificate of Education (Adv.Level) Pilot Examination - 2016

இரசாயனவியல் I Chemistry I	02	E	I	இரண்டு மணித்தியாலம் Two hours

- This paper consists of **11** pages.
- Answer **all** the questions.
- **Use of calculator is not allowed.**
- **Write your index number** in the space provided in the answer sheet.
- In each of the questions **1** to **50**, pick one of the alternatives from (1), (2), (3), (4), (5) which is **correct** or **most appropriate** and **mark your response on the answer sheet with a cross (X) in accordance with the instructions given on the back of the answer sheet**.

Universal gas constant $R = 8.314\ J\ K^{-1}\ mol^{-1}$
Avogadro constant $N_A = 6.022 \times 10^{23}\ mol^{-1}$

01. The scientist who is ***not*** related with the hydrogen spectrum is,

(1) J.J.Balmer (2) Peter Siemen (3) Linus Pauling
(4) Theodore Lyman (5) Niels Bohr

02. The correct increasing order of first ionization energy of the atoms/ions Na^+, F, Al, Cl^-, C and N is,

(1) $Na^+ < Al < C < N < F < Cl^-$ (2) $Al < C < N < F < Na^+ < Cl^-$
(3) $C < N < F < Al < Na^+ < Cl^-$ (4) $Cl^- < Al < C < N < F < Na^+$
(5) $Cl^- < Al < Na^+ < C < N < F$

03. The IUPAC name of the compound $CH_3 - CH_2 - O - \overset{O}{\overset{\|}{C}} - C \equiv C - \underset{NH_2}{\overset{|}{CH}} - \overset{O}{\overset{\|}{C}} - CH_3$ is,

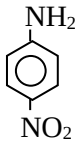
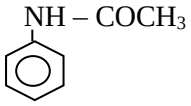
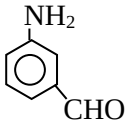
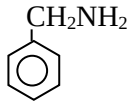
(1) 4-amino-1-ethoxy-5-oxohex-1-one
(2) ethyl 4-amino-5-oxohex-2-ynoate
(3) 3-amino-6-ethoxy-6-oxo-hex-4-yn-2-one
(4) ethyl 4-amine-5-formyl-2-hexyonate
(5) ethoxy 4-amino-5-oxohexanote.

04. Which of the following statements is ***false*** regarding the elements from Na to Cl in the third period?

(1) Their maximum valencies increases gradually along the period.
(2) Most of these elements have a higher negative electron affinity when compared to the elements which belong to the same group in the second period.
(3) The ability of these elements to form covalent bond increases along the period.
(4) When the stable ions are considered aluminium and silicon have the respective lowest and highest ionic sizes
(5) MgO has the highest melting point among the oxides of these elements.

[see page two

05. Consider the following nitrogen compounds.

(a)  (b)  (c)  (d) 

Their basic strength ***decreases*** in the order of,

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

06. In which of the following pairs of molecules London dispersion forces contribute highly for the change in their boiling points?

(1) CH_3OH, H_2O (2) NH_3, PH_3 (3) Br_2, ICl
(4) HCl, HBr (5) HCHO, CO_2

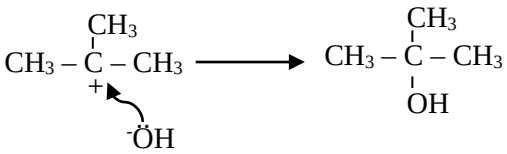
07. In a 125 cm^3 solution of $AgNO_{3(aq)}$, all the Ag^+ ions are precipitated as Ag by passing a steady current of 5A for 9.65 minutes using graphite electrodes. The concentration of $AgNO_{3(aq)}$ solution is, (Faraday constant = 96500 $Cmol^{-1}$)

(1) 0.12$moldm^{-3}$ (2) 0.03$moldm^{-3}$ (3) 0.24$moldm^{-3}$
(4) 0.18$moldm^{-3}$ (5) 0.06$moldm^{-3}$

08. $BaSO_4$ gets precipitated when V volume of excess $BaCl_{2(aq)}$ solution of concentration C_1 $moldm^{-3}$ is mixed with V volume of C_2 $moldm^{-3}$ $H_2SO_{4(aq)}$ solution so that the volume of the resultant solution becomes 2V. If the solubility product of $BaSO_4$ at the considered temperature is K_{sp}, its solubility at this temperature in $moldm^{-3}$ is,

(1) $(K_{sp})^{1/2}$ (2) $\frac{(C_1+C_2)K_{sp}}{2}$ (3) $\frac{2K_{sp}}{C_1+C_2}$ (4) $\frac{2K_{sp}}{C_1-C_2}$ (5) $\left(\frac{2K_{sp}}{C_1+C_2}\right)^{1/2}$

09. Given below is a step in the mechanism of a certain reaction in the organic chemistry.



(A) One of the steps in the mechanism of the reaction between 2-methylpropene and diluted H_2SO_4 is shown above.
(B) One of the steps in the mechanism of reaction between 2-chloro-2-methylpropane and $NaOH_{(aq)}$ is shown above.
(C) The stability of $(CH_3)_3$- C^+ shown here is greater than the stability of CH_2 =CH – CH_2^+.
(D) $(CH_3)_3 - C^+$ is an intermediate product in the reaction between 2-methylpropene and diluted H_2SO_4.

Which of the above statements are true?
(1) A and C (2) A, B and D (3) A, C and D (4) A and D (5) B and D

10. An aqueous solution contains Mg^{2+}, Al^{3+} and Zn^{2+} ions. Which of the following set of reagents can be used to distinguish each of these ions separately?
(1) H_2SO_4, NaOH (2) HCl, NH_4OH (3) H_2SO_4, NH_4OH
(4) NH_4OH, NaOH (5) HCl, NaOH

[see page three

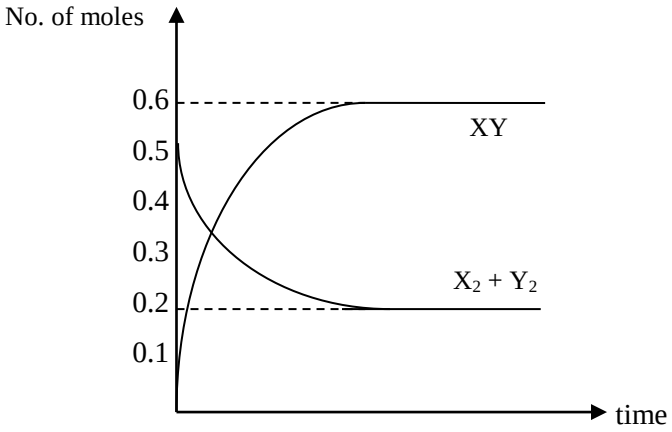
11. Which row gives the correct details about N in dinitrogen difluoride (N_2F_2) in the following table?

	Oxidation state	Charge	Hybridization	Electron pair geometry	N-F bond nature
(1)	+1	0	sp	Angular	N (sp h.o) + F (2p a.o)
(2)	+1	0	sp^2	Angular	N (sp^2 h.o) + F (2p a.o)
(3)	+1	0	sp^2	Trigonal planar	N (sp^2 h.o) + F (2p a.o)
(4)	+2	0	sp^2	Trigonal planar	N (sp^2 h.o) + F (2p a.o)
(5)	+1	+1	sp^2	Trigonal planar	N (sp^2 h.o) + F (2p a.o)

12. Two diatomic gases X_2 and Y_2 react with each other as follows.

$$X_{2(g)} + Y_{2(g)} \rightleftharpoons 2XY_{(g)}$$

Mixture A in a closed vessel contains $X_{2(g)}$ and $Y_{2(g)}$, 0.5mol of each. The mixture is heated to carry out the reaction and allowed to attain equilibrium at a particular temperature. A graph representing the change in number of moles with time during the equilibrium is given below.



What is its K_c value during the equilibrium at that particular temperature?
(1) 1.5 (2) 3 (3) 6 (4) 9 (5) 18

13. Which of the following statements is true regarding Li?

(1) Though Li reacts with steam, it does not react with hot water.
(2) Li reacts with excess air at high temperature and produces Li_3N, Li_2O_2 and LiO_2.
(3) Li_2CO_3 is thermally stable.
(4) $LiHCO_3$ cannot be obtained at solid state.
(5) Thermal decomposition of $LiNO_3$ produces $LiNO_2$ and O_2.

14. The IUPAC name of $[Co(NH_3)_5(OH)]NO_2$ is,

(1) Pentaamminehydroxidocobalt(II) nitrate
(2) Pentaaminehydroxidocobalt(III) nitrite
(3) Pentaamminehydroxidocobalt(II) nitrite
(4) penta amminehydroxidocobalt(I) nitrite
(5) penta amine hydroxide cabalt(II) nitrite

[see page four

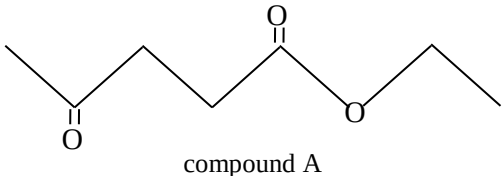
15. At temperatures below 13°C, Grey Sn, which is an allotropic form of tin can be produced from white Sn, which is also another allotropic form.

	ΔH^{θ}_f / kJmol^{-1}	S^{θ} / JK^{-1}mol^{-1}
White Sn	0	51.4
Grey Sn	-2.09	44.1

Which of the following correctly represents the change in the Gibb's free energy change ΔG when white Sn changes to grey Sn at 12°C?

(1) ΔG = - 2.09 – 285 (-7.3) (2) ΔG = - 2.09 – 12(+7.3)
(3) ΔG = - 2090 – 12(+7.3) (4) ΔG = - 2090 – 285 (-7.3)
(5) ΔG = - 2090 – 298 (+7.3)

16. Compound A is a diesel fuel additive which reduces the amount of soot formed when the fuel burns.



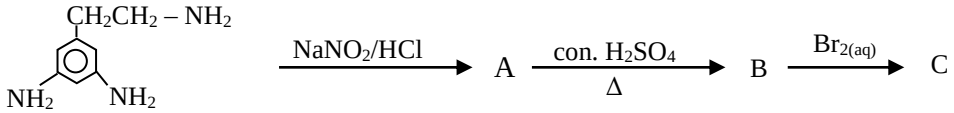
compound A

The number of moles of oxygen gas required for the complete combustion of 1 mol of compound A is,

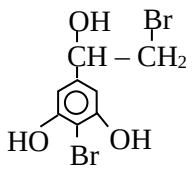
(1) 8 (2) 8.5 (3) 9 (4) 9.5 (5) 10

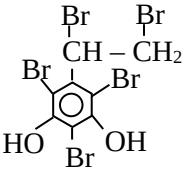
17. When a 100cm^3 of a monobasic weak acid HA of concentration 0.15moldm^{-3} is mixed and shaken with 100cm^3 of CCl_4 layer and allowed to attain the equilibrium, the pH of the aqueous layer was found to be 3. What is the partition coefficient between water and CCl_4 at the considered temperature?
(K_a(HA) = 1x10^{-5} moldm^{-3})

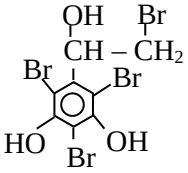
(1) 2 (2) 4 (3) 3 (4) 8 (5) 5

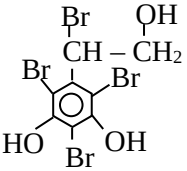
18. 

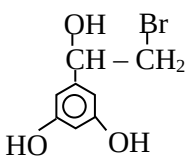
Which of the following is the suitable product C, when B is treated with aqueous Br_2 according to the above reaction scheme?

(1) 

(2) 

(3) 

(4) 

(5) 

[see page five

19. Gaseous state reactant molecules X and Y react with each other to form a gaseous product Z.

$$X_{(g)} + Y_{(g)} \rightarrow Z_{(g)}$$

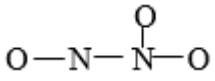
The following table contains the concentrations of X and Y with the rate of formation of Z.

Experiment	[X]/moldm^{-3}	[Y]/moldm^{-3}	Initial rate of formation of $Z_{(g)}$ / moldm^{-3}s^{-1}
1	0.3	0.2	4×10^{-4}
2	0.6	0.4	1.6×10^{-3}
3	0.6	0.8	6.4×10^{-3}

When the concentrations of X and Y are 1.2moldm^{-3} each, what is the rate of formation of Z in moldm^{-3}s^{-1}?

(1) 1.44×10^{-2} (2) 9.6×10^{-2} (3) 1.24×10^{-2} (4) 3.2×10^{-3} (5) 4.8×10^{-3}

20. What is the total number of resonance structures that can be drawn to N_2O_3? (skeletal structure of the molecule is given)



(1) 2 (2) 3 (3) 4 (4) 5 (5) 6

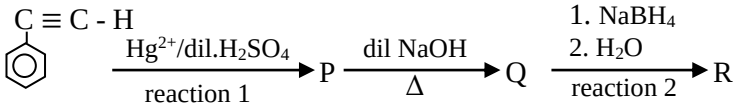
21. An electro chemical cell is formed by connecting two redox electrodes $Pt_{(s)}/Fe^{3+}_{(aq)}$, $Fe^{2+}_{(aq)}$ and $Pt_{(s)}/Sn^{4+}_{(aq)}$, $Sn^{2+}_{(aq)}$. Their standard electrode potentials are given below.

$$E^{\theta}Sn^{4+}_{(aq)}/Sn^{2+}_{(aq)} = +0.15V$$
$$E^{\theta}\ Fe^{3+}_{(aq)}/Fe^{2+}_{(aq)} = +0.77V$$

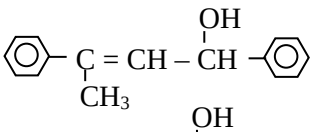
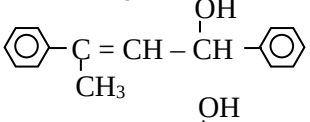
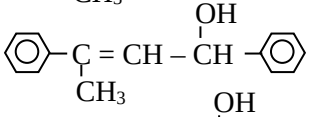
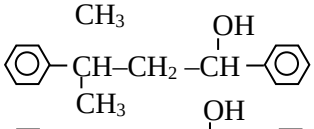
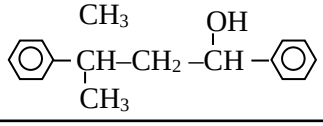
Which of the following statements is ***false*** regarding this cell?

(1) $Pt_{(s)}/Sn^{4+}_{(aq)}, Sn^{2+}_{(aq)}$ electrode functions as a negative electrode.
(2) Reducing the concentration of $Sn^{2+}_{(aq)}$ makes the electrode potential of $Pt(s)/Sn_{aq)}^{4+}$, $Sn^{2+}_{(aq)}$ electrode more positive.
(3) Increase in the concentration of $Fe^{3+}_{(aq)}$ makes the electrode potential of $Pt_{(s)}/Fe^{3+}_{(aq)}$, $Fe^{2+}_{(aq)}$ electrode more positive.
(4) Temperature rise increases the amount of current flowing in the external circuit.
(5) When the cell is functioning, the positive ions move towards the cathodic chamber.

22.



Which of the following correctly represents the reaction types of reaction 1 and reaction 2 and the product R in the above reaction scheme?

(1)	Nucleophilic addition	Nucleophilic addition	
(2)	Electrophilic addition	Nucleophilic addition	
(3)	Electrophilic addition	Electrophilic addition	
(4)	Nucleophilic addition	Nucleophilic addition	
(5)	Electrophilic addition	Nucleophilic addition	

[see page six

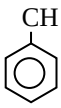
23. $[Ag(NH_3)_2]^+_{(aq)} \rightleftharpoons Ag^+_{(aq)} + 2NH_{3(aq)}$

1 mol of $[Ag(NH_3)_2]^+_{(aq)}$ complex and 2 moles of $NH_{3(aq)}$ are dissolved in distilled water and made as $1dm^3$ solution. If the value of equilibrium constant K_c at this temperature is $5x10^{-8}$ mol^2dm^{-6}, what is the concentration of $Ag^+_{(aq)}$ in the equilibrium solution?

(1) $1x10^{-8}$ $moldm^{-3}$ (2) 5×10^{-8} $moldm^{-3}$ (3) 1.25×10^{-8} $moldm^{-3}$
(4) 2×10^{-8} $moldm^{-3}$ (5) 2.5×10^{-8} $moldm^{-3}$

24. The two liquids P and Q form an ideal solution with each other. When the number of moles of P and Q in an equilibrium mixture formed inside a closed vessel are 2 mol and 4 mol respectively, the vapour pressure of the solution is $200x10^3$ Pa. When the number of moles of P and Q are made to 4 mol each by adding P to the solution, equilibrium pressure is 180×10^3 Pa. What is the molar ratio of P and Q in the vapour phase of the above equilibrium mixture?

(1) 1:2 (2) 2:1 (3) 1:3 (4) 4:1 (5)1:4

25. 

When the given compound is reduced by excess $LiAlH_4$ and then hydrolyzed, the reduction in molecular mass is, (Cl - 35.5, H-1,O-16)

(1) 32.5 (2) 18.5 (3) 29.5 (4) 34.5 (5) 31.5

26. The following experiments are made with the solution containing dipositive cation of a 3d transition element X.

1. Gave a precipitate with NH_4OH which dissolves in excess reagent.
2. When the solution formed by the dissolution in excess reagent in 1 is exposed to air, a colour change occurred, which is clearly observable.
3. Gave a blue coloured solution with excess con. HCl

The element X which is suitable for the above observations is,

(1) Cu (2) Ni (3) Ag (4) Co (5) Cr

27. $A_{(g)} + B_{(g)} \rightarrow C_{(g)}$ is an elementary reaction. n mol of A and n mol of B are taken and x mol of A reacted in t seconds. Rate constant related to this reaction is k. If the pressure and volume of the system at second t (instantaneous) are P and V respectively, what is the instantaneous rate of reaction at second t?

(1) $k\left[\frac{P}{RT} - \frac{n}{V}\right]^2$ (2) $k\left[\frac{P}{RT}\right]^2$ (3) $k\left[\frac{P}{RT} - \frac{x}{V}\right]^2$

(4) $k\left[\frac{PV}{RT} - n\right]^2$ (5) $k\left[\frac{PV}{RT} - x\right]^2$

28. Which of the following statements is ***false***?

(1) When MnO_2 solid is added to KCl solid and con. H_2SO_4 is added, Cl_2 gas is obtained.
(2) $Na_2S_4O_6$ is obtained as the product when Cl_2 gas is passed through $Na_2S_2O_3$.
(3) Many metals give their stable higher oxidation state chlorides with Cl_2 gas.
(4) H_2S acts as a reducing agent with H^+/MnO_4^-, $H^+/Cr_2O_7^{2-}$, H^+/AsO_4^{2-}, $FeCl_3$ and SO_2
(5) H_2O_2 acts as a reducing agent with H^+/MnO_4^-, $H^+/Cr_2O_7^{2-}$, H^+/MnO_2, Ag_2O and Cl_2.

[see page seven

29. The product obtained by treating the organic compound X with CH_3MgCl followed by hydrolysis showed optical isomerism. When the product is dehydrated with conc. H_2SO_4, a compound showing diasteriomerism is obtained as the product. Compound X is,

(1) $CH_3CH_2-\overset{O}{\overset{\|}{C}}-CH_3$ (2) $CH_3\underset{CH_3}{\underset{|}{C}}H-\overset{O}{\overset{\|}{C}}-CH_2CH_3$ (3) $CH_3\underset{CH_3}{\underset{|}{C}}H-CH_2-CHO$

(4) $(CH_3CH_2)_2CH-\overset{O}{\overset{\|}{C}}-CH_3$ (5) $CH_3-\underset{CH_3}{\underset{|}{C}}(CH_3)-\overset{O}{\overset{\|}{C}}-\underset{CH_3}{\underset{|}{C}}H-CH_3$

30. Which of the following can be used to identify $[Cu(NH_3)_4]SO_4$ aqueous and $[Ni(NH_3)_6]SO_4$ aqueous?

(1) $H_2S_{(g)}$ (2)conc. HCl (3) $BaCl_2$

(4) $H_2O_{(l)}$ (5)$(CH_3COO)_2Pb$

For each questions **31** to **40,** one or more responses out of the four responses (a), (b), (c), (d) given is/are correct response/responses. In accordance with the instructions given on your answer sheet, mark

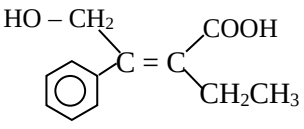
(1) if only (a) and (b) are correct.
(2) if only (b) and (c) are correct.
(3) if only (c) and (d) are correct.
(4) if only (d) and (a) are correct.
(5) if **any other** number or combination of responses is correct.

(1)	(2)	(3)	(4)	(5)
Only (a) and (b) are correct	Only (b) and (c) are correct	Only (c) and (d) are correct	Only (d) and (a) are correct	**Any other** number of combination of responses is correct

31. Which of the following statement/statements is/are true regarding electrolysis?

(a) In electrolysis, the pH of the electrolyte reduces with time, if water acts as a reactant only in the anode.
(b) Net energy is conserved in electrolysis.
(c) In the hydrolysis of $CuSO_{4(aq)}$ by using graphite electrodes, the number of copper ions getting precipitated on it in a unit time increases with the increase of the surface area of the cathode.
(d) Mass of the element which gets precipitated or released in the cathode or anode during electrolysis increases with the increase in concentration of ions which are reduced in those electrodes.

32.



Which of the following statement/statements is/are true regarding the given molecule?

(a) Maximum 6 atoms lie in the same plane in this molecule.
(b) The product obtained when this compound is allowed to react with $LiAlH_4$ followed by hydrolysis, does not show geometrical isomerism.
(c) It can undergo both electrophilic addition and nucleophilic substitution.
(d) The product obtained in the reaction with Br_2 gas prevails in four stereo isomeric forms.

[see page eight

33. Which of the following is/are true regarding the production of $NaHCO_3$ of by using Solvay process?

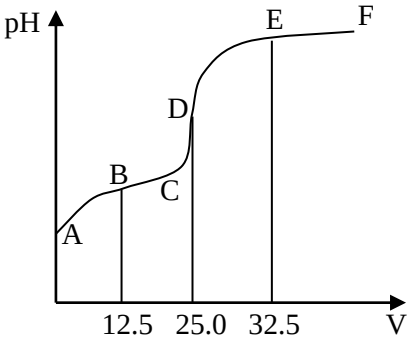
(a) By keeping the temperatures of the towers high, the rate of reaction is increased and higher amount of product is obtained.

(b) NH_3 is recycled by the reaction of initial byproduct with CaO.

(c) $CaSO_4$ is obtained when the final byproduct is treated with mother solution after removing table salt.

(d) Since $KHCO_3$ has higher ionic character than $NaHCO_3$, $KHCO_3$ can be produced easily than $NaHCO_3$.

34. The following graph shows the variation of pH of the solution when 0.1moldm^{-3} $CH_3COOH_{(aq)}$ solution is titrated with 0.1moldm^{-3} NaOH.



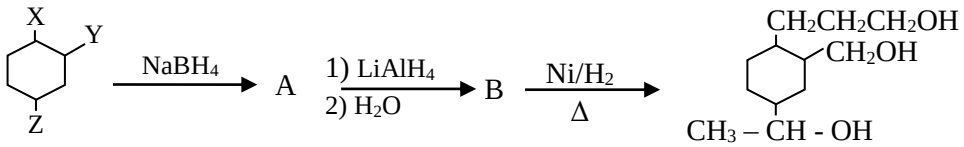
(a) By considering the resultant solutions from A to C, as the added amount of NaOH increases, ionization of $CH_3COOH_{(aq)}$increases in the resultant solution.

(b) The resultant solution at the instance B shows good buffer action against both acid and base.

(c) Hydrolysis of $CH_3COO^-_{(aq)}$ ion is responsible for the pH at the equivalent state.

(d) When few drops of $HCl_{(aq)}$ is added to the solution at instance F, H^+ ions are removed by CH_3COO^- ions.

35.



The above organic conversion is carried out by producing two different products A and B. Which of the following correctly gives the possible structures of X, Y and Z?

(a) - CH = CH – CHO, -COOH, - C(=O)(CH$_3$)

(b) - CH = CH – CHO, -CHO, - C(=O)(CH$_3$)

(c) - CH = CH – COOH, – $CONH_2$, - CH(CH$_3$) – CHO

(d) - CH = CH – COOH, – COCl, - C(=O)(CH$_3$)

36. Which of the following statement / statements is/are ***false*** regarding principal quantum number (n), azimuthal quantum number (ℓ), magnetic quantum number (m_ℓ) and the spin quantum number (m_s)?

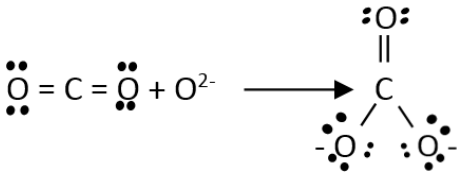
(a) An element containing a valence electron with n = 3 and m_ℓ = -1 should belong to the p block.

(b) Sodium should contain the valence electron with n=3 and m_s = +½

(c) An element containing a valence electron with n = 3 and ℓ = 0 should belong to the s block.

(d) A sub energy level with n + ℓ = 4 could be either 3p or 4s.

[see page nine

37. 

Which of the following statement/statements is/are true regarding the above conversion?

(a) Hybridization of C changes from sp^2 to sp^3.

(b) C – O bond length increases.

(c) All 3 C-O bonds are similar to each other and the angle between them is 120^o in the formed CO_3^{2-}.

(d) Oxidation state of C atom is changed.

38. Which of the following statement / statements is/are true regarding gases?

(a) Volume ratio of two ideal gases of equal masses which have the same mean speed at the same temperature is inversely proportional to their pressure ratio.

(b) Boyle's temperature of He is greater than H_2

(c) A real gas will not satisfy the ideal gas equation at any conditions.

(d) Speed of a gas molecule is directly proportional to the thermo dynamic temperature.

39. An ideal solution is prepared by mixing two components X and Y. The number of moles used to produce the solutions are given below. Vapour pressure of pure X is greater than that of Y.

Solution	A	B	C	D	E	F	G	H	I
No. of moles of X	1	2	3	4	5	6	7	8	9
No. of moles of Y	9	8	7	6	5	4	3	2	1

Which of the following statement/statements is/are true regarding the above solutions and solution preparations?

(a) The enthalpy change in the solution process increases from A to E and then decreases.

(b) The entropy change in the solution process increases from A to E and then decreases.

(c) When the solution are allowed to attain equilibrium in a closed system, vapour pressure increases from A to E and then decreases.

(d) Gibb's free energy change in the solution process decreases from A to E and then increases.

40. Solutions A and B are formed by adding CH_3COONa and HCOONa to CH_3COOH aqueous and HCOOH aqueous respectively which have the same pH at a certain temperature. The number of moles of CH_3COONa and HCOONa added are equal to that of CH_3COOH and HCOOH in the aqueous solution. Which of the following statement/statements is/are true regarding these solutions?

(a) Buffer strength of A is greater than that of B.

(b) As the concentration of acids fall down when diluted with water, their pH values drop to a considerable level.

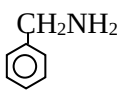
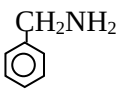
(c) Solution B contains ions in a higher concentration than solution A.

(d) pH of solution A is greater than that of solution B.

[see page ten

In questions No. **41** to **50** two statements are given in respect of each question. From the Table given below, select the response out of the responses (1), (2), (3), (4) and (5) that best fits the two statements and mark appropriately on your answer sheet.

Response	First statement	Second statement
(1)	True	True, and correctly explains the first statement
(2)	True	True, but does **not** correctly explains the first statement
(3)	True	False
(4)	False	True
(5)	False	False

	Statement One	Statement Two
41	Oxidizing ability of Sn^{2+} in the aqueous state is higher than that of aqueous state Ag^{+}.	Oxidizing ability of an ion depends on the number of electrons it can accept.
42.	$CH_2=CH_2$ easily involves to electrophilic addition when compared to	Electro negativity of C atom in $CH_2=CH_2$ is greater than that in
43.	If a coloured gas evolution occurs when diluted HCl is added to an aqueous solution, presence of NO_2^- is the only conclusion that can be made.	NO_2^- is an anion of a weak acid.
44.	All the atoms in propynenitrile (HC≡C-CN) lie in a straight line.	Carbon and nitrogen atoms in propynenitrile molecule are in sp hybridization.
45.	The bond length between O atoms in O_2^{2-} is greater than the bond length in O_2^-	Oxidation state of O in O_2^{2-} is higher than that in O_2^-
46.	When H_2 and D_2 molecules with same mean speed are considered, the temperature of D_2 molecules should be greater than that of H_2 molecules.	Mean speed distribution of gas molecules depend on the molecular mass and temperature.
47.	The increase in the rate of forward reaction of an exothermic equilibrium is higher than the rate of the backward reaction with the increase of temperature.	Activation energy of the forward reaction of an exothermic equilibrium reaction is greater than that of backward reaction.
48.	is an aromatic primary amine but  is an aliphatic primary amine.	gives diazonium salt with nitrous acid at low temperatures but  does not give diazonium salt with nitrous acid at low temperatures.
49.	The degree of dissociation of the equilibrium reaction $2AB_{3(g)} \rightleftharpoons A_{2(g)} + 3B_{2(g)}$ depends only on temperature.	K_p of the equilibrium reaction $2AB_{3(g)} \rightleftharpoons A_{2(g)} + 3B_{2(g)}$ depends only on temperature.
50.	Formation of photo chemical smog can be controlled by attaching a catalytic converter to the vehicle silencers.	NO_2 and hydrocarbons which are emitted from vehicles are the primary pollutants for the formation of photochemical smog.

[see page eleven

PERIODIC TABLE OF THE ELEMENTS

1 IA												13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1 H 1.008	2 IIA																2 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.1	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.30	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8	9 VIIIB	10	11 IB	12 IIB	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 59.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.75	52 Te 127.60	53 I 126.91	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	57 *La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.21	76 Os 190.2	77 Ir 192.2	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.02	89 †Ac 227.03	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (271)	111 Rg (272)							

*Lanthanide Series	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.4	63 Eu 151.97	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 169.93	70 Yb 173.04	71 Lu 174.97
†Actinide Series	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 X (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

-This page is intentionally left blank-