COMMON ENTRANCE TEST - 2010

DATE	SUBJECT	TIME
29-04-2010	CHEMISTRY	02.30 PM to 03.50 PM
MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
60	80 MINUTES	70 MINUTES

MENTION YOUR		QUESTION BOOKLET DETAILS			
	CET NUMBER	VERSION CODE	SERIAL NUMBER		
		A - 1	715377		

DOs:

- 1. Check whether the CET No. has been entered and shaded in the respective circles on the OMR answer sheet.
- 2. This Question Booklet is issued to you by the Invigilator after the 2nd Bell, i.e., after 02.30 p.m.
- 3. The Serial Number of this question booklet should be entered on the OMR answer sheet.
- The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
- 5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts:

- 1. THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED/MUTILATED/SPOILED.
- Until the 3rd Bell is rung at 02.40 p.m.:
 - Do not remove the seal/staple present on the right hand side of this question booklet.
 - · Do not look inside this question booklet.
 - · Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

- 1. This question booklet contains 60 questions and each question will have four different options / choices.
- After the 3rd Bell is rung at 02.40 p.m., remove the seal/staple present on the right hand side of this question booklet and start answering on the OMR answer sheet.
- 3. During the subsequent 70 minutes:
 - Read each question carefully.
 - Choose the correct answer from out of the four available options / choices given under each question.
 - Completely darken/shade the relevant circle with a BLUE OR BLACK INK BALLPOINT PEN
 against the question number on the OMR answer sheet.

CORRECT METHOD OF SHADING THE CIRCLE ON THE OMR SHEET IS AS SHOWN BELOW: (1) (2) (4)

- Please note that even a minute unintended ink dot on the OMR sheet will also be recognized and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
- Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
- After the last bell is rung at 03.50 p.m., stop writing on the OMR answer sheet and affix your LEFT HAND THUMB IMPRESSION on the OMR answer sheet as per the instructions.
- Hand over the OMR ANSWER SHEET to the room Invigilator as it is.
- After separating and retaining the top sheet (KEA Copy), the Invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
- 9. Preserve the replica of the OMR answer sheet for a minimum period of ONE year.

SR - 49 Turn Over



CHEMISTRY

- 1. In the electrolytic refining of Zinc,
 - 1) the impure metal is at the cathode.
 - 2) graphite is at the anode.
 - 3) acidified zinc sulphate is the electrolyte.
 - 4) the metal ion gets reduced at the anode.

1)
$$n = 10$$
 to $n = 1$

2)
$$n = 3$$
 to $n = 1$

3)
$$n = 2$$
 to $n = 1$

4)
$$n = 9 \text{ to } n = 1$$

3. Consider the following gaseous equilibria with equilibrium constants K_1 and K_2 respectively.

$$SO_{2(g)} + \frac{1}{2}O_{2(g)} \rightleftharpoons SO_{3(g)}$$

$$2SO_{3(g)} \rightleftharpoons 2SO_{2(g)} + O_{2(g)}$$

The equilibrium constants are related as

1)
$$2K_1 = K_2^2$$

$$2) \quad K_1^2 = \frac{1}{K_2}$$

3)
$$K_2^2 = \frac{1}{K_1}$$

4)
$$K_2 = \frac{2}{K_1^2}$$

- - 1) -100

2) -44

3) +100

- 4) +441
- 5. Which one of the following conversions involve change in both hybridization and shape?
 - 1) $NH_3 \longrightarrow NH_4^+$

2) $CH_4 \longrightarrow C_2H_6$

3) $H_2O \longrightarrow H_3O$

4) $BF_3 \longrightarrow BF_4$



- 6. In chromite ore, the oxidation number of iron and chromium are respectively
 - 1) +3, +6

2) +3, +2

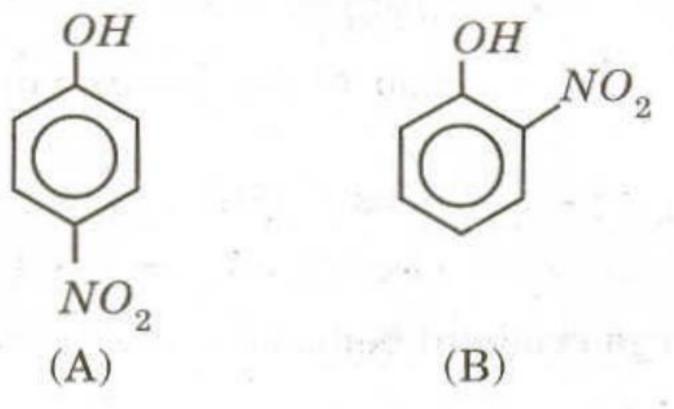
3) +2, +3

- 4) +2, +6
- 7. For the reversible reaction

$$A_{(g)} + B_{(g)} = C_{(g)} + D_{(g)} : \Delta G^0 = -350 \text{ kJ.}$$

Which one of the following statements is true?

- 1) Equilibrium constant is greater than one.
- 2) The entropy change is negative.
- 3) The reaction is thermodynamically not feasible.
- 4) The reaction should be instantaneous.



- 1) lower than that of (A)
- 2) higher than that of (A)
- 3) same as that of (A)
- 4) higher or lower than (A), depending on the size of the vessel.
- 9. The amount of heat evolved when 500 cm 3 of 0.1 M HCl is mixed with 200 cm 3 of 0.2 M NaOH is
 - 1) 1.292 kJ

2) 2.292 kJ

3) 3.392 kJ

- 0.292 kJ
- 10. During the adsorption of krypton on activated charcoal at low temperature,
 - 1) $\Delta H < 0$ and $\Delta S < 0$
- 2) $\Delta H > 0$ and $\Delta S < 0$
- 3) $\Delta H < 0$ and $\Delta S > 0$
- 4) $\Delta H > 0$ and $\Delta S > 0$

(Space for Rough Work)

11-1-1

13.50

1691

33 (

			5 A - 1
11.	The	set	of quantum numbers for the outermost electron for copper in its ground state
	1S	1)	$3, 2, 2, +\frac{1}{2}$ 2) $4, 1, 1, +\frac{1}{2}$
		3)	$4, 2, 2, +\frac{1}{2}$ $4, 0, 0, +\frac{1}{2}$
12.	Pero	xide	ion
	a)	is	diamagnetic.
	b)	has	s five completely filled antibonding molecular orbitals.
	c)	is	isoelectronic with neon.
	d)	ha	s bond order one.
	Whi	ch o	ne of these is correct?
		1)	a), b) and d) 2) d) and c)
		3)	a) and d) 4) a), b) and c).
13.	Whi	ch o	ne of these is NOT true for benzene?
		1)	There are three carbon-carbon single bonds and three carbon-carbon double bonds.
		2)	It forms only one type of monosubstituted product.
		3)	The bond angle between the carbon-carbon bonds is 120°.
		4)	The heat of hydrogenation of benzene is less than the theoretical value.
14.	A m	ixtu	re of $CaCl_2$ and $NaCl$ weighing 4.44 g is treated with sodium carbonate solution
	is he	eate	pitate all the Ca^{+2} ions as calcium carbonate. The calcium carbonate so obtained d strongly to get 0.56 g of CaO . The percentage of $NaCl$ in the mixture (atomic $Ca = 40$) is
		1)	30.6
	1 20	3)	69.4
15.	For	one	mole of an ideal gas, increasing the temperature from 10°C to 20°C
		4.4	

- 1) increases the rms velocity by $\sqrt{2}$ times.
- 2) increases the average kinetic energy by two times.
- 3) increases both the average kinetic energy and rms velocity, but not significantly.
- 4) increases the rms velocity by two times.

- - 1) Na and Mg

2) N and O

3) Be and B

4) Mg and Al

1) 10 cm³

2) 12 cm³

3) 10.5 cm^3

4) 25 cm³

18. In which one of the following, does the given amount of chlorine exert the least pressure in a vessel of capacity 1 dm³ at 273K?

1) 0.071 g

2) 0.0355 g

3) 0.02 mole

4) 6.023×10^{21} molecules

19. Based on the first law of thermodynamics, which one of the following is correct?

1) For an adiabatic process : $\Delta U = -w$

2) For an isochoric process : $\Delta U = -q$

3) For a cyclic process: q = -w

4) For an isothermal process: q = +w

20. For alkali metals, which one of the following trends is INCORRECT?

1) Ionization energy: Li > Na > K > Rb

2) Hydration energy: Li > Na > K > Rb

3) Atomic size: Li < Na < K < Rb

4) Density: Li < Na < K < Rb

21.	One gram of silver gets distributed between 10 cm ³ of molten zinc and 100 cm ³ of molter
	lead at 800°C. The percentage of silver in the zinc layer is approximately

1) 91

2) 89

3) 94

4) 97

1) Propan-1-ol

2) Propan-2-ol

3) methoxyethane

4) ethoxyethane

23. The IUPAC name of $K_2[Ni(CN)_4]$ is

- 1) Potassium tetracyanatonickelate (II)
- 2) Potassium tetracyanonickelate (II)
- 3) Potassium tetracyanonickel (III)
- 4) Potassium tetracyanatonickel (II)
- 24. The spin only magnetic moment of Mn^{+4} ion is nearly

1) 6 BM

2) 3 BM

3) 5 BM

4) 4 BM

25. In Kjeldahl's method, ammonia from 5 g of food neutralizes 30 cm³ of 0.1 N acid. The percentage of nitrogen in the food is

1) 8.4

2) 0.84

3) 1.68

4) 16.8

carbon has a higher affinity towards oxidation than iron.

Carbon can reduce ferric oxide to iron at a temperature above 983 K because

carbon monoxide formed is thermodynamically less stable than ferric oxide.

	3)	iron has a higher affini	ty towards ox	ygen than carbon.	
	4)	free energy change for that for ferric oxide.	the formation	n of carbon dioxide	is less negative than
27.		gen containing organic co ganic product with its mol			
	is				
	1)	a primary alcohol	2)	an aldehyde	
	3)	a ketone	4)	a secondary alcoho	ol
28.		pound obtained when ace		acts with dilute aque	
	1)	optical isomerism			
	2)	geometric isomerism			
	3)	both optical and geome			
	4)	neither optical nor geor	metric isomer	rism	
29.		tivation energy for a r TJ mol ⁻¹ . The ratio of the			
	1)	10^{-2}	2)	10^{-1}	
	3)	2×10^{-2}	4)	2×10^{-3}	
30.		mo derivative of an alk rbon. The derivative is		with sodium metal	to form an alicyclic
	1)	2, 2-dibromobutane	2)	1, 1-dibromopropa	ane
	3)	1, 4-dibromobutane	4)	1, 2-dibromoethan	ie
		(Spa	ace for Rough	Work)	



- Time required for 100 percent completion of a zero order reaction is
- 2) $\frac{2k}{a}$
- 3) ak

- 0.023 g of sodium metal is reacted with 100 cm3 of water. The pH of the resulting solution

2) 10

- Which one of the following is wrongly matched?

 - 1) $\left[Ni\left(CO\right)_{4}\right]$ neutral ligand 2) $\left[Cu\left(NH_{3}\right)_{4}\right]^{+2}$ square planar
 - 3) $\left[Co(en)_3 \right]^{+3}$ follows EAN rule 4) $\left[Fe(CN)_6 \right]^{-3} sp^3d^2$
- Which one of the following conformations of cyclohexane is the least stable?
 - Boat

Half-chair

Chair

- Twisted-boat
- Which one of the following is a molecular crystal?
 - Quartz

UB

C

2) Rock salt

Diamond

Dry ice

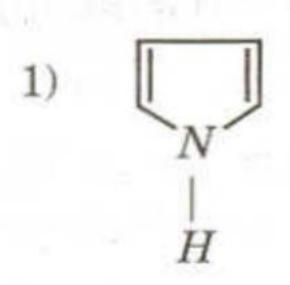


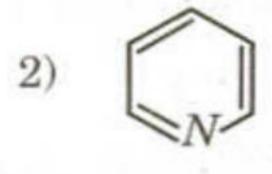
- 36. A buffer solution contains 0.1 mole of sodium acetate dissolved in 1000 cm³ of 0.1 M acetic acid. To the above buffer solution, 0.1 mole of sodium acetate is further added and dissolved. The pH of the resulting buffer is equal to
 - pK_a

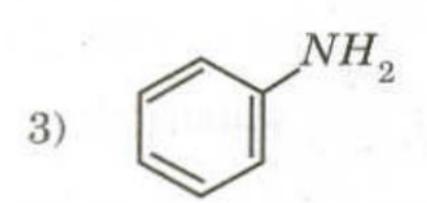
2) $pK_a - Log 2$

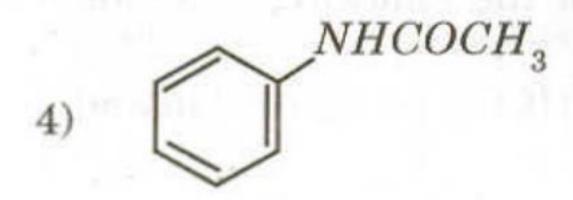
3) $pK_a + Log 2$

- 4) $pK_a + 2$
- 37. Which one of the following has the most nucleophilic nitrogen?









- 38. Chloroacetic acid is a stronger acid than acetic acid. This can be explained using
 - 1) -I effect
- 2) -M effect
- 3) +I effect
- 4) + M effect
- 39. The correct sequence of reactions to convert p-nitrophenol into quinol involves
 - 1) hydrolysis, diazotization and reduction
 - 2) reduction, diazotization and hydrolysis
 - 3) diazotization, reduction and hydrolysis
 - 4) hydrolysis, reduction and diazotization
- **40.** $CH_3CH_2Br \xrightarrow{Aq \ KOH} A \xrightarrow{KMnO_4/H^+} B \xrightarrow{NH_3} C \xrightarrow{Br_2} D$; "D" is
 - 1) CH₃CONH₂

2) CH_3Br

3) $CHBr_3$

4) CH₃NH₂

3)	covalent form	4)	cation	
1)	zwitterion	2)	anion	
In alkali	ine medium, alanine exists pred	omina	ntly as/in	
4)	Treatment of drinking water b	y pota	ash alum	
3)				
2)				
1)	Peptization			
Which o	ne of the following does NOT in	nvolve	coagulation?	
3)	1×10-5	4)	5 × 10 ⁻³	
1)	1×10^{-4}	2)	5×10^{-4}	
magnesi	um metal thus obtained is com	pletely	y converted into a Grignard reagen	
3)	S _N 2 mechanism	4)	inversion of configuration	
		2)		
		us sod		
4)	that it is a monosaccharide			
43		nirai c	carbon	
-				
	1) 2) 3) 4) Reaction 1) 3) 9.65 C of magnesis number 1) 3) Which of 1) 2) 3) 4) In alkali 1)	1) dextrorotatory 2) configuration at all chiral card 3) configuration at a particular of 4) that it is a monosaccharide Reaction of methyl bromide with aqueo 1) S _N 1 mechanism 3) S _N 2 mechanism 9.65 C of electric current is passed thromagnesium metal thus obtained is commumber of moles of the Grignard reagen 1) 1×10 ⁻⁴ 3) 1×10 ⁻⁵ Which one of the following does NOT in 1) Peptization 2) Formation of delta regions 3) Clotting of blood by the use of 4) Treatment of drinking water by In alkaline medium, alanine exists prediction	1) dextrorotatory 2) configuration at all chiral carbons 3) configuration at a particular chiral of that it is a monosaccharide Reaction of methyl bromide with aqueous social S _N 1 mechanism 2) 3) S _N 2 mechanism 4) 9.65 C of electric current is passed through formagnesium metal thus obtained is completed number of moles of the Grignard reagent obtained in the second s	3) configuration at a particular chiral carbon 4) that it is a monosaccharide Reaction of methyl bromide with aqueous sodium hydroxide involves



46.	The standard emf of a galvanic cell involving 3 moles of electrons in its redox reaction
	is 0.59 V. The equilibrium constant for the reaction of the cell is

 $1) 10^{20}$

2) 102

 $3) 10^{30}$

4) 1015

47. Benzaldehyde and acetone can be best distinguished using

1) sodium hydroxide solution

2) Fehling's solution

3) Tollens' reagent

4) 2, 4-DNPH

48. Which one of the following statements is true?

- 1) Drying of oil involves hydrolysis
- 2) Saponification of oil yields a diol.
- 3) Refining of oil involves hydrogenation
- 4) Addition of antioxidant to oil minimizes rancidity
- 49. The following data is obtained during the first order thermal decomposition of $2A_{(g)} \longrightarrow B_{(g)} + C_{(s)}$, at constant volume and temperature.

Sr. No. Time		Total pressure in Pascal	
1.	At the end of 10 minutes	300	
2.	After completion	200	

The rate constant in min⁻¹ is

1) 6.93

2) 0.0693

3) 69.3

- 4) 0.00693
- **50.** Phenol $X \to X$ forms a tribromo derivative. "X" is
 - 1) bromine in water
 - 2) bromine in benzene
 - bromine in carbon tetrachloride at 0°C.
 - 4) potassium bromide solution

- 51. The correct sequence of steps involved in the mechanism of Cannizzaro's reaction is

 1) transfer of H^- , transfer of H^+ and nucleophilic attack
 - 2) nucleophilic attack, transfer of H^- and transfer of H^+
 - 3) electrophilic attack by OH^- , transfer of H^+ and transfer of H^-
 - 4) transfer of H^+ , nucleophilic attack and transfer of H^-
- 52. Which one of the following is an example for homogeneous catalysis?
 - 1) Manufacture of ammonia by Haber's process
 - 2) Manufacture of sulphuric acid by contact process
 - 3) Hydrogenation of oil
 - 4) Hydrolysis of sucrose in presence of dilute hydrochloric acid
- - 1) $C_3H_6O_3$

2) $C_2H_4O_2$

3) $C_4H_8O_4$

- 4) $C_5H_{10}O_5$
- - 1) Na2S2O3, SO2, Cr2 (SO4)3
- 2) Na2SO3, SO2, Cr2 (SO4)3
- 3) Na2SO4, SO2, Cr2 (SO4)3
- 4) Na_2S , SO_2 , $Cr_2(SO_4)_3$
- 55. Molecules of a noble gas do not possess vibrational energy because a noble gas
 - 1) is chemically inert
- 2) is monoatomic

3) is diamagnetic

4) has completely filled shells



One dm³ solution containing 10^{-5} moles each of Cl^- ions and CrO_4^{-2} ions is treated with 10⁻⁴ mole of silver nitrate. Which one of the following observations is made?

$$\left[K_{SP} Ag_2 CrO_4 = 4 \times 10^{-12}\right]$$

$$K_{SP} AgCl = 1 \times 10^{-10}$$

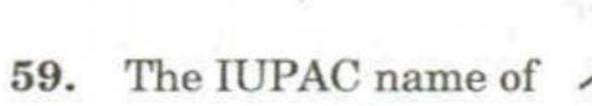
- Silver chromate gets precipitated first.
- Precipitation does not occur.
- Both silver chromate and silver chloride start precipitating simultaneously.
- Silver chloride gets precipitated first.
- 57. pH value of which one of the following is not equal to one?
 - 1) $0.05\,\mathrm{M}\,H_2SO_4$
 - $0.1\,\mathrm{M}~HNO_3$
 - 3) 50 cm³ of 0.4 M HCl + 50 cm³ of 0.2 M NaOH
 - 0.1 M CH₃COOH
- 58. E_1 , E_2 and E_3 are the emf values of the three galvanic cells respectively.
 - $Zn | Zn_{1M}^{+2} | | Cu_{0,1M}^{+2} | Cu$
 - $Zn |Zn_{1M}^{+2}| |Cu_{1M}^{+2}| |Cu|$
 - $Zn | Zn_{0.1M}^{+2} | | Cu_{1M}^{+2} | Cu$

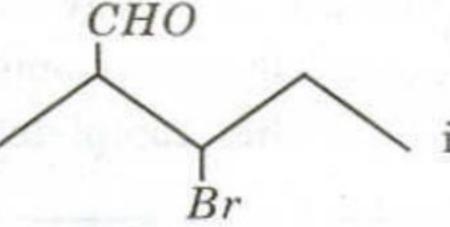
Which one of the following is true?

1) $E_3 > E_2 > E_1$

3) $E_1 > E_3 > E_2$

2) $E_2 > E_3 > E_1$. 4) $E_1 > E_2 > E_3$





- 3-bromo-2-methylbutanal
- 2-methyl-3-bromohexanal
- 3-bromo-2-methylpentanal
- 2-methyl-3-bromobutanal
- Which one of the following forms propanenitrile as the major product?
 - Propyl bromide + alcoholic KCN
 - Ethyl bromide + alcoholic KCN
 - Ethyl bromide + alcoholic AgCN
 - Propyl bromide + alcoholic AgCN