

# COMMON ENTRANCE TEST - 2011

DATE	SUBJECT	TIME
28-04-2011	CHEMISTRY	02.30 PM to 03.50 PM

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
60	80 MINUTES	70 MINUTES

MENTION YOUR CET NUMBER	QUESTION BOOKLET DETAILS	
	VERSION CODE	SERIAL NUMBER
	<b>B - 2</b>	<b>731750</b>

**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 2<sup>nd</sup> Bell, i.e., after 02.30 p.m.
3. The Serial Number of this question booklet should be entered on the OMR answer sheet.
4. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should be shaded completely.
5. Compulsory 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.
2. The 3<sup>rd</sup> Bell rings at 02.40 p.m. till then;
  - 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 one statement and four distracters (four different options / choices).
2. After the 3<sup>rd</sup> 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 distracters (options/choices) given under each question/statement.
  - 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 :**



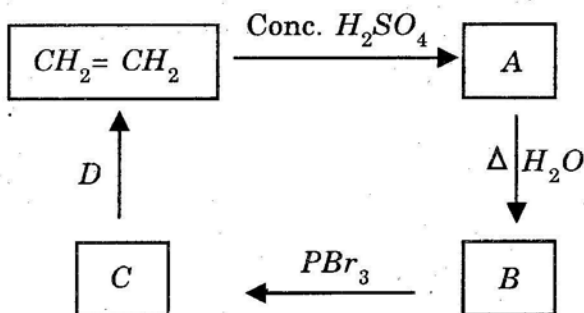
4. Please note that even a minute unintended ink dot on the OMR sheet will also be recognized and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
5. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
6. 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.
7. Hand over the OMR answer sheet to the room Invigilator as it is.
8. 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.

## CHEMISTRY

1. The IUPAC name of the complex  $[Co(NH_3)_4Cl_2]Cl$  is .....
- 1) tetraammine dichloro cobalt (II) chloride
  - 2) tetraammine dichloro cobalt (IV) chloride
  - 3) dichloro tetraammine cobalt (III) chloride
  - 4) tetraammine dichloro cobalt (III) chloride
2. Excess of silver nitrate solution is added to 100 ml of 0.01 M Pentaqua chloro chromium (III) chloride solution. The mass of silver chloride obtained in grams is .....  
[Atomic mass of silver is 108].
- 1)  $143.5 \times 10^{-2}$
  - 2)  $287 \times 10^{-2}$
  - 3)  $287 \times 10^{-3}$
  - 4)  $143.5 \times 10^{-3}$
3. The following data were obtained during the first order decomposition of  $2A_{(g)} \rightarrow B_{(g)} + C_{(g)}$  at a constant volume and at a particular temperature.
- | Sr. No. | Time                 | Total pressure in Pascal |
|---------|----------------------|--------------------------|
| 1       | At the end of 10 min | 300                      |
| 2       | After completion     | 200                      |
- The rate constant in  $\text{min}^{-1}$  is .....
- 1) 6.93
  - 2)  $6.93 \times 10^{-4}$
  - 3) 0.0693
  - 4) 69.3
4. The time required for 100% completion of a zero order reaction is .....
- 1)  $\frac{a}{k}$
  - 2)  $\frac{2k}{a}$
  - 3)  $ak$
  - 4)  $\frac{a}{2k}$
5. The activation energy of a reaction at a given temperature is found to be  $2.303 RT \text{ J mol}^{-1}$ . The ratio of rate constant to the Arrhenius factor is .....
- 1) 0.02
  - 2) 0.001
  - 3) 0.01
  - 4) 0.1

(Space for Rough Work)

6. Identify *B* and *D* in the following sequence of reactions.



- 1) Ethyl hydrogen sulphate and aqueous *KOH*
  - 2) Ethanol and alcoholic *KOH*
  - 3) Methanol and bromoethane
  - 4) Ethyl hydrogen sulphate and alcoholic *KOH*
7. The compound which gives turbidity immediately with Lucas reagent at room temperature is .....
- 1) 2-methyl propan-2-ol
  - 2) 2-methyl propan-1-ol
  - 3) butan-1-ol
  - 4) butan-2-ol
8. Ethyl benzene CANNOT be prepared by .....
- 1) Friedel-Crafts reaction
  - 2) Clemmensen reduction
  - 3) Wurtz reaction
  - 4) Wurtz-Fittig reaction
9. 1.2 g of organic compound on Kjeldahlization liberates ammonia which consumes 30 cm<sup>3</sup> of 1 N *HCl*. The percentage of nitrogen in the organic compound is .....
- 1) 46.67
  - 2) 20.8
  - 3) 30
  - 4) 35
10. Carbon cannot reduce  $\text{Fe}_2\text{O}_3$  to *Fe* at a temperature below 983 K because .....
- 1) carbon has higher affinity towards oxygen than iron
  - 2) iron has higher affinity towards oxygen than carbon
  - 3) free energy change for the formation of *CO* is more negative than that of  $\text{Fe}_2\text{O}_3$
  - 4) *CO* is thermodynamically more stable than  $\text{Fe}_2\text{O}_3$

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(Space for Rough Work)



16. The yellow precipitate formed during the chromyl chloride test is chemically .....
- 1) lead acetate
  - 2) sodium chromate
  - 3) chromic acid
  - 4) lead chromate
17. One gram of silver gets distributed between 10 cm<sup>3</sup> of molten zinc and 100 cm<sup>3</sup> of molten lead at 800°C. The percentage of silver still left in the lead layer is approximately .....
- 1) 3
  - 2) 1
  - 3) 2
  - 4) 5
18. Which one of the following is true?
- 1) Manganous hydroxide is soluble in excess of *NaOH* solution.
  - 2) *NaOH* solution does not react with *Cl<sub>2</sub>*.
  - 3) *NaOH* is used in the concentration of bauxite ore.
  - 4) *NaOH* is a primary standard in volumetric analysis.
19. In Ramsay and Rayleigh's isolation of noble gases from air, the nitrogen of the air is finally converted into .....
- 1) *NaNO<sub>3</sub>* only
  - 2) *NaNO<sub>2</sub>* and *NaNO<sub>3</sub>*
  - 3) *NaNO<sub>2</sub>* only
  - 4) *NO* and *NO<sub>2</sub>*
20. The spin only magnetic moment of *Fe<sup>2+</sup>* ion (in BM) is approximately .....
- 1) 5
  - 2) 6
  - 3) 4
  - 4) 7

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(Space for Rough Work)



26. pH value of which one of the following is NOT equal to one?
- 1) 0.05 M  $H_2SO_4$
  - 2) 50 cm<sup>3</sup> 0.4 M  $HCl$  + 50 cm<sup>3</sup> 0.2 M  $NaOH$
  - 3) 0.1 M  $CH_3COOH$
  - 4) 0.1 M  $HNO_3$
27. A buffer solution contains 0.1 mole of sodium acetate dissolved in 1000 cm<sup>3</sup> 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 .....
- 1)  $pK_a - \text{Log } 2$
  - 2)  $pK_a + \text{Log } 2$
  - 3)  $pK_a$
  - 4)  $pK_a + 2$
28.  $H_2S$  is passed into one dm<sup>3</sup> of a solution containing 0.1 mole of  $Zn^{2+}$  and 0.01 mole of  $Cu^{2+}$  till the sulphide ion concentration reaches  $8.1 \times 10^{-19}$  moles. Which one of the following statements is true?  
[ $K_{sp}$  of  $ZnS$  and  $CuS$  are  $3 \times 10^{-22}$  and  $8 \times 10^{-36}$  respectively]
- 1) Only  $CuS$  precipitates
  - 2) No precipitation occurs
  - 3) Only  $ZnS$  precipitates
  - 4) Both  $CuS$  and  $ZnS$  precipitate
29.  $E_1$ ,  $E_2$  and  $E_3$  are the emfs of the following three galvanic cells respectively :
- (i)  $Zn(s) | Zn^{2+}(0.1M) || Cu^{2+}(1M) | Cu(s)$
  - (ii)  $Zn(s) | Zn^{2+}(1M) || Cu^{2+}(1M) | Cu(s)$
  - (iii)  $Zn(s) | Zn^{2+}(1M) || Cu^{2+}(0.1M) | Cu(s)$
- Which one of the following is true?
- 1)  $E_3 > E_1 > E_2$
  - 2)  $E_3 > E_2 > E_1$
  - 3)  $E_2 > E_1 > E_3$
  - 4)  $E_1 > E_2 > E_3$
30. 0.023 g of sodium metal is reacted with 100 cm<sup>3</sup> of water. The pH of the resulting solution is .....
- 1) 9
  - 2) 12
  - 3) 10
  - 4) 8

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(Space for Rough Work)

31. Which one of the following statements is FALSE?
- 1) Calcination of ore is carried out in the absence of any blast of air.
  - 2) The concentrated zinc blende is subjected to calcination during its extraction by pyrometallurgy.
  - 3) During roasting, moisture is removed from the ore.
  - 4) The ore is freed from almost all nonmetallic impurities.
32. Which one of the following sets of quantum numbers represents the highest energy level in an atom?
- 1)  $n = 3, l = 2, m = -2, s = +\frac{1}{2}$
  - 2)  $n = 3, l = 0, m = 0, s = +\frac{1}{2}$
  - 3)  $n = 4, l = 0, m = 0, s = +\frac{1}{2}$
  - 4)  $n = 3, l = 1, m = 1, s = +\frac{1}{2}$
33. When  $O_2$  is converted into  $O_2^+$ ; .....
- 1) paramagnetic character increases
  - 2) paramagnetic character decreases and the bond order increases
  - 3) both paramagnetic character and bond order increase
  - 4) bond order decreases
34. In chromite ore, the oxidation number of iron and chromium are respectively .....
- 1) +2, +6
  - 2) +2, +3
  - 3) +3, +2
  - 4) +3, +6
35. The number of naturally occurring p-block elements that are diamagnetic is .....
- 1) 5
  - 2) 7
  - 3) 18
  - 4) 6

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(Space for Rough Work)



41. A solution of two liquids boils at a temperature more than the boiling point of either of them. Hence, the binary solution shows .....

- 1) no deviation from Raoult's law
- 2) positive or negative deviation from Raoult's law depending upon the composition
- 3) negative deviation from Raoult's law
- 4) positive deviation from Raoult's law

42. Which one of the nitrogen atoms in  $H_2N - NH - \overset{\overset{O}{||}}{C} - NH_2$  is the most nucleophilic?

I      II      III

- 1) II
- 2) All three nitrogen atoms are equally strong nucleophilic centers
- 3) III
- 4) I

43. The maximum number of possible optical isomers in 1-bromo-2-methyl cyclobutane is ...

- |      |       |
|------|-------|
| 1) 8 | 2) 16 |
| 3) 4 | 4) 2  |

44. Which one of the following is the most energetic conformation of cyclohexane?

- |          |                 |
|----------|-----------------|
| 1) Chair | 2) Half chair   |
| 3) Boat  | 4) Twisted boat |

45. Which one of the following is an intermediate in the reaction of benzene with  $CH_3Cl$  in the presence of anhydrous  $AlCl_3$ ?

- |             |  |
|-------------|--|
| 1) $CH_3^+$ | 2)  |
| 3) $Cl^+$   | 4) $CH_3^-$  |

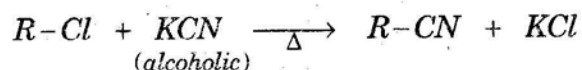
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(Space for Rough Work)

46. Which one of the following is NOT TRUE for the hydrolysis of *t*-butyl bromide with aqueous  $\text{NaOH}$ ?

- 1) Rate of the reaction doubles when the concentration of alkali is doubled.
- 2) Rate of the reaction doubles when the concentration of *t*-butyl bromide is doubled.
- 3) Reaction occurs through the  $\text{S}_{\text{N}}1$  mechanism.
- 4) The intermediate formed is a carbocation.

47. Following is the substitution reaction in which  $-\text{CN}$  replaces  $-\text{Cl}$ .



To obtain propanenitrile,  $\text{R-Cl}$  should be .....

- 1) chloromethane
- 2) 2-chloropropane
- 3) chloroethane
- 4) 1-chloropropane

48. The conversion of *m*-nitrophenol to resorcinol involves respectively .....

- 1) hydrolysis, reduction and diazotization
- 2) reduction, diazotization and hydrolysis
- 3) hydrolysis, diazotization and reduction
- 4) diazotization, reduction and hydrolysis

49. Formic acid is a stronger acid than acetic acid. This can be explained using .....

- 1) +I effect
- 2) -M effect
- 3) +M effect
- 4) -I effect

50. The reagent with which both acetaldehyde and acetone react is .....

- 1) Tollens' reagent
- 2) Carbonic acid
- 3) Fehling's solution
- 4)  $\text{I}_2 / \text{NaOH}$

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(Space for Rough Work)

51. Which of the following gives an aldehyde on dry distillation?

- 1) Calcium acetate
- 2) Calcium benzoate
- 3) Calcium formate + calcium acetate
- 4) Calcium acetate + calcium benzoate

52.  $\alpha$ -maltose consists of .....

- 1) two  $\beta$ -D-glucopyranose units with 1-4 glycosidic linkage
- 2) two  $\alpha$ -D-glucopyranose units with 1-4 glycosidic linkage
- 3) one  $\alpha$ -D-glucopyranose unit and one  $\beta$ -D-glucopyranose unit with 1-2 glycosidic linkage
- 4) two  $\alpha$ -D-glucopyranose units with 1-2 glycosidic linkage

53. Which one of the following DOES NOT correctly match with each other?

- |                   |                    |
|-------------------|--------------------|
| 1) Butter-fat     | 2) Oxytocin-enzyme |
| 3) Silk-polyamide | 4) Lipase-enzyme   |

54. In an alkaline medium, glycine predominantly exists as/in a/an .....

- |               |                  |
|---------------|------------------|
| 1) zwitterion | 2) covalent form |
| 3) cation     | 4) anion         |

55. The IUPAC name of  is .....

- |                      |                      |
|----------------------|----------------------|
| 1) pent-4-enoic acid | 2) prop-2-enoic acid |
| 3) but-3-enoic acid  | 4) but-1-enoic acid  |

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(Space for Rough Work)

