

**COMMON ENTRANCE TEST - 2006**

DATE	SUBJECT	TIME
10 - 05 - 2006	CHEMISTRY	2.30 PM to 3.50 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
	A - 1	12225

**IMPORTANT INSTRUCTIONS TO CANDIDATES**

(Candidates are advised to read the following instructions carefully, before answering on the OMR answer sheet.)

- Ensure that you have entered your Name and CET Number on the top portion of the OMR answer sheet.
- ENSURE THAT THE BAR CODES, TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET ARE NOT DAMAGED / MUTILATED / SPOILED.**
- This Question Booklet is issued to you by the invigilator after the 2<sup>nd</sup> Bell, i.e., after 2.35 p.m.
- Enter the Serial Number of this question booklet on the top portion of the OMR answer sheet.
- Carefully enter the Version Code of this question booklet on the bottom portion of the OMR answer sheet and SHADE the respective circle completely.
- As answer sheets are designed to suit the Optical Mark Reader (OMR) system, please take special care while filling and shading the Version Code of this question booklet.
- DO NOT FORGET TO SIGN ON BOTH TOP AND BOTTOM PORTION OF OMR ANSWER SHEET IN THE SPACE PROVIDED.**
- Until the 3<sup>rd</sup> Bell is rung at 2.40 p.m. :
  - Do not remove the 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.
- After the 3<sup>rd</sup> Bell is rung at 2.40 p.m., remove the staple present on the right hand side of this question booklet and start answering on the bottom portion of the OMR answer sheet.
- This question booklet contains 60 questions and each question will have four different options / choices.
- During the subsequent 70 minutes :
  - Read each question carefully.
  - Determine 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 :**



- Please note that even a minute unintended ink dot on the OMR sheet will also be recognised and recorded by the scanner. Therefore, avoid multiple markings of any kind.
- Use the space provided on each page of the question booklet for Rough work AND do not use the OMR answer sheet for the same.
- After the last bell is rung at 3.50 p.m., stop writing on the OMR answer sheet.
- Hand over the OMR ANSWER SHEET to the room invigilator as it is.
- After separating and retaining the top sheet (CET Cell Copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
- Preserve the replica of the OMR answer sheet for a minimum period of One year.**

**CHEMISTRY**

1. Which of the following is not an ore of magnesium ?
- 1) Carnallite
  - 2) Dolomite
  - 3) Calamine
  - 4) Sea water
2. The atomic numbers of *Ni* and *Cu* are 28 and 29 respectively. The electron configuration  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}$  represents
- 1)  $Cu^+$
  - 2)  $Cu^{2+}$
  - 3)  $Ni^{2+}$
  - 4) *Ni*
3. In the following, the element with the highest ionisation energy is
- 1)  $[Ne]3s^2 3p^1$
  - 2)  $[Ne]3s^2 3p^3$
  - 3)  $[Ne]3s^2 3p^2$
  - 4)  $[Ne]3s^2 3p^4$
4. In the conversion of  $Br_2$  to  $BrO_3^-$ , the oxidation number of *Br* changes from
- 1) zero to +5
  - 2) +1 to +5
  - 3) zero to -3
  - 4) +2 to +5
5. Among the alkali metals cesium is the most reactive because
- 1) its incomplete shell is nearest to the nucleus
  - 2) it has a single electron in the valence shell
  - 3) it is the heaviest alkali metal
  - 4) the outermost electron is more loosely bound than the outermost electron of the other alkali metals.

---

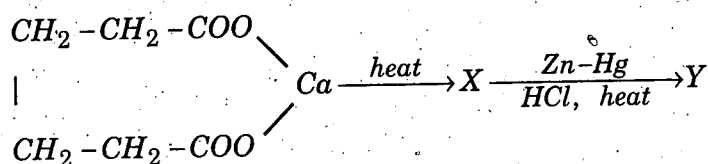
(Space for Rough Work)

6. Which of the following represents the Lewis structure of  $N_2$  molecule ?
- 1)  $\overset{\times}{N} \equiv N^{\times}$
  - 2)  $\overset{\times}{\times}N^{\times} \equiv N^{\times}_{\times}$
  - 3)  $\overset{\times}{\times}N^{\times} - N^{\times}_{\times}$
  - 4)  $\overset{\times}{\times}N^{\times} = N^{\times}_{\times}$
7. Hydrogen bond is strongest in
- 1)  $S - H \text{ ----- } O$
  - 2)  $O - H \text{ ----- } S$
  - 3)  $F - H \text{ ----- } F$
  - 4)  $O - H \text{ ----- } N$
8. The decomposition of a certain mass of  $CaCO_3$  gave  $11.2 \text{ dm}^3$  of  $CO_2$  gas at STP. The mass of  $KOH$  required to completely neutralise the gas is
- 1) 56 g
  - 2) 28 g
  - 3) 42 g
  - 4) 20 g
9. The density of a gas is  $1.964 \text{ g dm}^{-3}$  at 273 k and 76 cm Hg. The gas is
- 1)  $CH_4$
  - 2)  $C_2H_6$
  - 3)  $CO_2$
  - 4)  $Xe$
10. 0.06 mole of  $KNO_3$  solid is added to  $100 \text{ cm}^3$  of water at 298 k. The enthalpy of  $KNO_{3(aq)}$  solution is  $35.8 \text{ kJmol}^{-1}$ . After the solute is dissolved the temperature of the solution will be
- 1) 293 k
  - 2) 298 k
  - 3) 301 k
  - 4) 304 k

---

(Space for Rough Work)

11. 4 moles each of  $SO_2$  and  $O_2$  gases are allowed to react to form  $SO_3$  in a closed vessel. At equilibrium 25 % of  $O_2$  is used up. The total number of moles of all the gases present at equilibrium is
- 1) 6.5
  - 2) 7.0
  - 3) 8.0
  - 4) 2.0
12. An example for autocatalysis is
- 1) oxidation of  $NO$  to  $NO_2$
  - 2) oxidation of  $SO_2$  to  $SO_3$
  - 3) decomposition of  $KClO_3$  to  $KCl$  and  $O_2$
  - 4) oxidation of oxalic acid by acidified  $KMnO_4$
13. During the fusion of an organic compound with sodium metal, nitrogen of the compound is converted into
- 1)  $NaNO_2$
  - 2)  $NaNH_2$
  - 3)  $NaCN$
  - 4)  $NaNC$
14. Identify the product Y in the following reaction sequence



- 1) pentane
  - 2) cyclobutane
  - 3) cyclopentane
  - 4) cyclopentanone
15. The reaction  $C_2H_5ONa + C_2H_5I \rightarrow C_2H_5OC_2H_5 + NaI$  is known as
- 1) Kolbe's synthesis
  - 2) Wurtz's synthesis
  - 3) Williamson's synthesis
  - 4) Grignard's synthesis

---

(Space for Rough Work)

16.  $\Delta G^\circ$  Vs  $T$  plot in the Ellingham's diagram slopes downwards for the reaction
- 1)  $Mg + \frac{1}{2}O_2 \rightarrow MgO$
  - 2)  $2Ag + \frac{1}{2}O_2 \rightarrow Ag_2O$
  - 3)  $C + \frac{1}{2}O_2 \rightarrow CO$
  - 4)  $CO + \frac{1}{2}O_2 \rightarrow CO_2$
17. Which of the following reaction taking place in the Blast furnace is endothermic ?
- 1)  $CaCO_3 \rightarrow CaO + CO_2$
  - 2)  $2C + O_2 \rightarrow 2CO$
  - 3)  $C + O_2 \rightarrow CO_2$
  - 4)  $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$
18. Liquor ammonia bottles are opened only after cooling. This is because
- 1) it is a mild explosive
  - 2) it is a corrosive liquid
  - 3) it is a lachrymatory
  - 4) it generates high vapour pressure
19. The formation of  $O_2^+ [Pt F_6]^-$  is the basis for the formation of Xenon fluorides. This is because
- 1)  $O_2$  and  $Xe$  have comparable sizes
  - 2) both  $O_2$  and  $Xe$  are gases
  - 3)  $O_2$  and  $Xe$  have comparable ionisation energies
  - 4)  $O_2$  and  $Xe$  have comparable electronegativities
20. The highest magnetic moment is shown by the transition metal ion with the configuration
- 1)  $3d^2$
  - 2)  $3d^5$
  - 3)  $3d^7$
  - 4)  $3d^9$

---

(Space for Rough Work)

21. A transition metal ion exists in its highest oxidation state. It is expected to behave as
- 1) a chelating agent
  - 2) a central metal in a coordination compound
  - 3) an oxidising agent
  - 4) a reducing agent
22. In which of the following complex ion, the central metal ion is in a state of  $sp^3d^2$  hybridisation?
- 1)  $[CoF_6]^{3-}$
  - 2)  $[Co(NH_3)_6]^{3+}$
  - 3)  $[Fe(CN)_6]^{3-}$
  - 4)  $[Cr(NH_3)_6]^{3+}$
23. Which of the following can participate in linkage isomerism?
- 1)  $NO_2^-$
  - 2)  $H_2NCH_2CH_2NH_2$
  - 3)  $H_2O$
  - 4)  $:NH_3$
24. Which of the following has the highest bond order?
- 1)  $N_2$
  - 2)  $O_2$
  - 3)  $He_2$
  - 4)  $H_2$
25. Which of the following is diamagnetic?
- 1)  $H_2^+$
  - 2)  $O_2$
  - 3)  $Li_2$
  - 4)  $He_2^+$

---

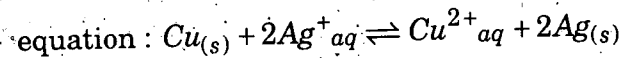
(Space for Rough Work)

26. The concentration of a reactant  $X$  decreases from  $0.1\text{ M}$  to  $0.025\text{ M}$  in 40 minutes. If the reaction follows I order kinetics, the rate of the reaction when the concentration of  $X$  is  $0.01\text{ M}$  will be
- 1)  $1.73 \times 10^{-4}\text{ M min}^{-1}$                       2)  $3.47 \times 10^{-4}\text{ M min}^{-1}$   
3)  $3.47 \times 10^{-5}\text{ M min}^{-1}$                       4)  $1.73 \times 10^{-5}\text{ M min}^{-1}$
27. Chemical reactions with very high  $E_a$  values are generally
- 1) very fast                                      2) very slow  
3) moderately fast                              4) spontaneous
28. Which of the following does not conduct electricity ?
- 1) fused  $\text{NaCl}$                                       2) solid  $\text{NaCl}$   
3) brine solution                                      4) Copper
29. When a quantity of electricity is passed through  $\text{CuSO}_4$  solution,  $0.16\text{ g}$  of Copper gets deposited. If the same quantity of electricity is passed through acidulated water, then the volume of  $\text{H}_2$  liberated at STP will be [Given At. Wt.  $\text{Cu} = 64$ ]
- 1)  $4.0\text{ cm}^3$                                       2)  $56\text{ cm}^3$   
3)  $604\text{ cm}^3$                                       4)  $8.0\text{ cm}^3$
30. Solubility product of a salt  $\text{AB}$  is  $1 \times 10^{-8}\text{ M}^2$  in a solution in which the concentration of  $\text{A}^+$  ions is  $10^{-3}\text{ M}$ . The salt will precipitate when the concentration of  $\text{B}^-$  ions is kept
- 1) between  $10^{-8}\text{ M}$  to  $10^{-7}\text{ M}$                       2) between  $10^{-7}\text{ M}$  to  $10^{-6}\text{ M}$   
3)  $> 10^{-5}\text{ M}$                                       4)  $< 10^{-8}\text{ M}$

---

(Space for Rough Work)

31. Which one of the following condition will increase the voltage of the cell represented by the



- 1) increase in the dimensions of  $\text{Cu}$  electrode
- 2) increase in the dimensions of  $\text{Ag}$  electrode
- 3) increase in the concentration of  $\text{Cu}^{2+}$  ions
- 4) increase in the concentration of  $\text{Ag}^+$  ions

32. The pH of  $10^{-8}$  M  $\text{HCl}$  solution is

- 1) 8
- 2) more than 8
- 3) between 6 and 7
- 4) slightly more than 7

33. The mass of glucose that should be dissolved in 50 g of water in order to produce the same lowering of vapour pressure as is produced by dissolving 1 g of urea in the same quantity of water is

- 1) 1 g
- 2) 3 g
- 3) 6 g
- 4) 18 g

34. Osmotic pressure observed when benzoic acid is dissolved in benzene is less than that expected from theoretical considerations. This is because

- 1) benzoic acid is an organic solute
- 2) benzoic acid has higher molar mass than benzene
- 3) benzoic acid gets associated in benzene
- 4) benzoic acid gets dissociated in benzene

35. For a reaction to be spontaneous at all temperatures

- 1)  $\Delta G$  and  $\Delta H$  should be negative
- 2)  $\Delta G$  and  $\Delta H$  should be positive
- 3)  $\Delta G = \Delta S = 0$
- 4)  $\Delta H < \Delta G$

---

(Space for Rough Work)



36. Which of the following electrolyte will have maximum flocculation value for  $Fe(OH)_3$  sol. ?
- 1)  $NaCl$
  - 2)  $Na_2S$
  - 3)  $(NH_4)_3PO_4$
  - 4)  $K_2SO_4$
37. For a reversible reaction :  $X_{(g)} + 3Y_{(g)} \rightleftharpoons 2Z_{(g)}$   
 $\Delta H = -40 \text{ kJ}$  the standard entropies of  $X$ ,  $Y$  and  $Z$  are 60, 40 and 50  $\text{JK}^{-1} \text{mol}^{-1}$  respectively.  
The temperature at which the above reaction attains equilibrium is about
- 1) 400 K
  - 2) 500 K
  - 3) 273 K
  - 4) 373 K
38. The radii of  $Na^+$  and  $Cl^-$  ions are 95 pm and 181 pm respectively. The edge length of  $NaCl$  unit cell is
- 1) 276 pm
  - 2) 138 pm
  - 3) 552 pm
  - 4) 415 pm
39. Inductive effect involves
- 1) displacement of  $\sigma$  electrons
  - 2) delocalisation of  $\pi$  electrons
  - 3) delocalisation of  $\sigma$  electrons
  - 4) displacement of  $\pi$  electrons
40. The basicity of aniline is less than that of cyclohexylamine. This is due to
- 1) +R effect of  $-NH_2$  group
  - 2) -I effect of  $-NH_2$  group
  - 3) -R effect of  $-NH_2$  group
  - 4) hyperconjugation effect

---

(Space for Rough Work)

41. Methyl bromide is converted into ethane by heating it in ether medium with
- 1)  $Al$
  - 2)  $Zn$
  - 3)  $Na$
  - 4)  $Cu$
42. Which of the following compound is expected to be optically active ?
- 1)  $(CH_3)_2CHCHO$
  - 2)  $CH_3CH_2CH_2CHO$
  - 3)  $CH_3CH_2CHBrCHO$
  - 4)  $CH_3CH_2CBr_2CHO$
43. Which cycloalkane has the lowest heat of combustion per  $CH_2$  group ?
- 1) cyclopropane
  - 2) cyclobutane
  - 3) cyclopentane
  - 4) cyclohexane
44. The catalyst used in the preparation of an alkyl chloride by the action of dry  $HCl$  on an alcohol is
- 1) anhydrous  $AlCl_3$
  - 2)  $FeCl_3$
  - 3) anhydrous  $ZnCl_2$
  - 4)  $Cu$
45. In the reaction
- $$R - X \xrightarrow[\text{KCN}]{\text{alcoholic}} A \xrightarrow[\text{HCl}]{\text{dilute}} B,$$
- the product  $B$  is
- 1) alkyl chloride
  - 2) aldehyde
  - 3) carboxylic acid
  - 4) ketone

---

(Space for Rough Work)

46. Which of the following compound would not evolve  $CO_2$  when treated with  $NaHCO_3$  solution ?
- 1) salicylic acid
  - 2) phenol
  - 3) benzoic acid
  - 4) 4-nitro benzoic acid
47. By heating phenol with chloroform in alkali, it is converted into
- 1) salicylic acid
  - 2) salicylaldehyde
  - 3) anisole
  - 4) phenyl benzoate
48. When a mixture of calcium benzoate and calcium acetate is dry distilled, the resulting compound is
- 1) acetophenone
  - 2) benzaldehyde
  - 3) benzophenone
  - 4) acetaldehyde
49. Which of the following does not give benzoic acid on hydrolysis ?
- 1) phenyl cyanide
  - 2) benzoyl chloride
  - 3) benzyl chloride
  - 4) methyl benzoate
50. Which of the following would undergo Hoffmann reaction to give a primary amine ?

- $O$   
 $||$
- 1)  $R-C-Cl$
  - 2)  $RCONHCH_3$
  - 3)  $RCONH_2$
  - 4)  $RCOOR$

---

(Space for Rough Work)

51. Glucose contains in addition to aldehyde group
- 1) one secondary *OH* and four primary *OH* groups
  - 2) one primary *OH* and four secondary *OH* groups
  - 3) two primary *OH* and three secondary *OH* groups
  - 4) three primary *OH* and two secondary *OH* groups
52. A distinctive and characteristic functional group of fats is
- 1) a peptide group
  - 2) an ester group
  - 3) an alcoholic group
  - 4) a ketonic group
53. At pH = 4 glycine exists as
- 1)  $H_3N^+ - CH_2 - COO^-$
  - 2)  $H_3N^+ - CH_2 - COOH$
  - 3)  $H_2N - CH_2 - COOH$
  - 4)  $H_2N - CH_2 - COO^-$
54. Insulin regulates the metabolism of
- 1) minerals
  - 2) amino acids
  - 3) glucose
  - 4) vitamins
55. The formula mass of Mohr's salt is 392. The iron present in it is oxidised by  $KMnO_4$  in acid medium. The equivalent mass of Mohr's salt is
- 1) 392
  - 2) 31.6
  - 3) 278
  - 4) 156

---

(Space for Rough Work)

56. The brown ring test for nitrates depends on
- 1) the reduction of nitrate to nitric oxide
  - 2) oxidation of nitric oxide to nitrogen dioxide
  - 3) reduction of ferrous sulphate to iron
  - 4) oxidising action of sulphuric acid
57. Acrolein test is positive for
- 1) polysaccharides
  - 2) proteins
  - 3) oils and fats
  - 4) reducing sugars
58. An organic compound which produces a bluish green coloured flame on heating in presence of copper is
- 1) chlorobenzene
  - 2) benzaldehyde
  - 3) aniline
  - 4) benzoic acid
59. For a reaction  $A + B \rightarrow C + D$  if the concentration of  $A$  is doubled without altering the concentration of  $B$ , the rate gets doubled. If the concentration of  $B$  is increased by nine times without altering the concentration of  $A$ , the rate gets tripled. The order of the reaction is
- 1) 2
  - 2) 1
  - 3)  $\frac{3}{2}$
  - 4)  $\frac{4}{3}$
60. Which of the following solutions will exhibit highest boiling point ?
- 1) 0.01 M  $Na_2SO_4$  (aq)
  - 2) 0.01 M  $KNO_3$  (aq)
  - 3) 0.015 M urea (aq)
  - 4) 0.015 M glucose (aq)

---

(Space for Rough Work)