

## COMMON ENTRANCE TEST-2016

| DATE                    | SUBJECT        | TIME                       |
|-------------------------|----------------|----------------------------|
| DAY-2                   | CHEMISTRY      | 02.30 P.M. TO 03.50 P.M.   |
| MAXIMUM MARKS           | TOTAL DURATION | MAXIMUM TIME FOR ANSWERING |
| 60                      | 80 MINUTES     | 70 MINUTES                 |
| MENTION YOUR CET NUMBER |                | QUESTION BOOKLET DETAILS   |
|                         |                | VERSION CODE               |
|                         |                | A - 1                      |
|                         |                | SERIAL NUMBER              |
|                         |                | 782417                     |

### 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 2.30 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 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.
2. The 3<sup>rd</sup> Bell rings at 2.40 p.m., till then;
  - Do not remove the paper seal 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 2.40 p.m., remove the paper seal on the right hand side of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item 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 BALL POINT PEN** against the question number on the OMR answer sheet.

Correct Method of shading the circle on the OMR answer sheet is as shown below :



4. Please note that even a minute unintended ink dot on the OMR answer sheet will also be recognised 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 3.50 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 the top sheet (Our 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.



1. The half-life period of a 1<sup>st</sup> order reaction is 60 minutes. What percentage will be left over after 240 minutes ?
- (1) 6.25% (2) 4.25%  
(3) 5% (4) 6%
2. Which of the following is not a colligative property ?
- (1) Osmotic pressure (2) Optical activity  
(3) Depression in Freezing point (4) Elevation in Boiling point
3. The contribution of particle at the edge centre to a particular unit cell is,
- (1)  $\frac{1}{2}$  (2)  $\frac{1}{4}$   
(3) 1 (4)  $\frac{1}{8}$
4. When an electrolyte is dissociated in solution, the van't Hoff's factor (i) is,
- (1) >1 (2) <1  
(3) = 0 (4) = 1
5. Which of the following is incorrect in a galvanic cell ?
- (1) Oxidation occurs at anode.  
(2) Reduction occurs at cathode.  
(3) The electrode at which electrons are gained is called cathode.  
(4) The electrode at which electrons are lost is called cathode.

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Space For Rough Work

6. A secondary cell is one

- (1) can be recharged.
- (2) can be recharged by passing current through it in the same direction.
- (3) can be recharged by passing current through it in the opposite direction.
- (4) can not recharged.

7. Osmotic pressure of the solution can be increased by,

- (1) increasing the temperature of the solution.
- (2) decreasing the temperature of the solution.
- (3) increasing the volume of the vessel.
- (4) diluting the solution.

8. The amount of current in Faraday is required for the reduction of 1 mol of  $\text{Cr}_2\text{O}_7^{--}$  ions to  $\text{Cr}^{3+}$  is,

- |         |         |
|---------|---------|
| (1) 1 F | (2) 2 F |
| (3) 6 F | (4) 4 F |

9. For a chemical reaction,

$m\text{A} \rightarrow x\text{B}$ , the rate law is  $r = k[\text{A}]^2$ .

If the concentration of A is doubled, the reaction rate will be,

- |                          |                |
|--------------------------|----------------|
| (1) Doubled              | (2) Quadrupled |
| (3) Increases by 8 times | (4) Unchanged  |

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10. Schottky defect in a crystal is observed when,

- (1) Unequal number of cations and anions are missing from the lattice.
- (2) Equal number of cations and anions are missing from the lattice.
- (3) An ion leaves its normal site and occupies an interstitial site.
- (4) No ion is missing from its lattice site

11.  $3A \longrightarrow 2B$ , rate of reaction  $+\frac{d[B]}{dt}$  is equal to

- |                                    |                                    |
|------------------------------------|------------------------------------|
| (1) $-\frac{3}{2} \frac{d[A]}{dt}$ | (2) $-\frac{2}{3} \frac{d[A]}{dt}$ |
| (3) $+2 \frac{d[A]}{dt}$           | (4) $-\frac{1}{3} \frac{d[A]}{dt}$ |

12. The activation energy of a chemical reaction can be determined by,

- (1) evaluating rate constants at two different temperatures.
- (2) changing the concentration of reactants.
- (3) evaluating the concentration of reactants at two different temperatures.
- (4) evaluating rate constant at standard temperature.

13. Which of the following statements is incorrect w.r.t. Physisorption ?

- (1) The forces involved are van der Waal's forces.
- (2) More easily liquifiable gases are adsorbed easily.
- (3) Under high pressure it results into Multi-molecular layer on adsorbent surface.
- (4)  $\Delta H_{\text{adsorption}}$  is low and +Ve.

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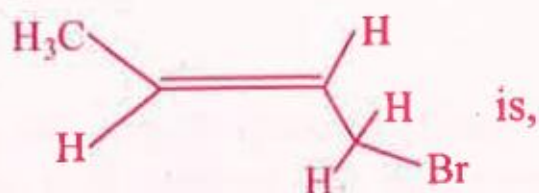
14. Sulphur sol contains

- (1) Discrete S-atoms
- (2) Discrete S-molecules
- (3) Large aggregates of S-molecules
- (4) Water dispersed in Solid Sulphur

15. Reactions in Zeolite catalyst depend on,

- (1) Pores
- (2) Apertures
- (3) Size of cavity
- (4) All of these

16. IUPAC name of the compound



- (1) 1-Bromo but-2-ene
- (2) 2-Bromo-2-butene
- (3) Bromo butene
- (4) 1-Bromo but-3-ene

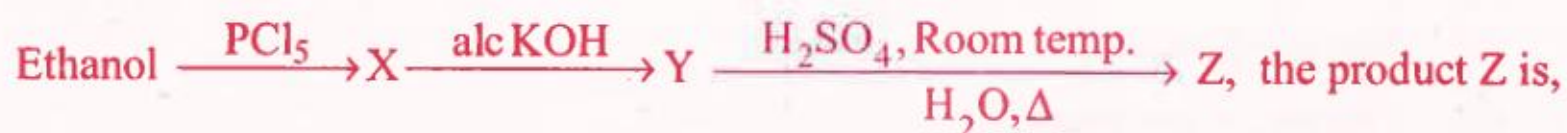
17. Replacement of Cl of Chlorobenzene to give phenol requires drastic conditions, but Cl of 2, 4 – dinitro chlorobenzene is readily replaced. This is because,

- (1)  $-\text{NO}_2$  group makes the ring electron rich at ortho and para positions.
- (2)  $-\text{NO}_2$  group withdraws electrons from meta position.
- (3)  $-\text{NO}_2$  donate electrons at meta position.
- (4)  $-\text{NO}_2$  withdraws electrons from ortho and para positions.

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Space For Rough Work

18. In the reaction :



19. Which of the following compound is most acidic ?



20. Benzene carbaldehyde is reacted with concentrated NaOH solution to give the products A and B. The product A can be used food preservative and the product B is an aromatic hydroxy compound where OH group is linked to  $\text{sp}^3$  hybridised carbon atom next to Benzene ring. The products A and B are respectively,

(1) Sodium benzoate and phenol

(2) Sodium benzoate and phenyl methanol

(3) Sodium benzoate and cresol

(4) Sodium benzoate and picric acid

21. The reaction which involves dichlorocarbene as an electrophile is,

(1) Reimer-Tiemann reaction      (2) Kolbe's reaction

(3) Friedel-Craft's acylation      (4) Fittig's reaction.

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22. Ethanol is converted into ethoxy ethane,

- (1) by heating excess of ethanol with conc.  $\text{H}_2\text{SO}_4$  at  $140^\circ\text{C}$ .
- (2) by heating Ethanol with excess of conc.  $\text{H}_2\text{SO}_4$  at  $443\text{ K}$ .
- (3) by treating with conc.  $\text{H}_2\text{SO}_4$  at room temperature.
- (4) by treating with conc.  $\text{H}_2\text{SO}_4$  at  $273\text{ K}$ .

23. An organic compound X is oxidised by using acidified  $\text{K}_2\text{Cr}_2\text{O}_7$  solution. The product obtained reacts with phenyl hydrazine but does not answer silver mirror test. The compound X is,

- |                |                                         |
|----------------|-----------------------------------------|
| (1) 2-propanol | (2) Ethanal                             |
| (3) Ethanol    | (4) $\text{CH}_3\text{CH}_2\text{CH}_3$ |

24. Predict the product 'C' in the following series of reactions :



- |                                                                                         |                                                              |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------|
| (1)  | (2) $\text{CH}_3\text{CH}(\text{OH})\text{C}_6\text{H}_5$    |
| (3) $\text{CH}_3\text{CH}(\text{OH})\text{C}_2\text{H}_5$                               | (4) $(\text{CH}_3)_2\text{C}(\text{OH})\text{C}_6\text{H}_5$ |

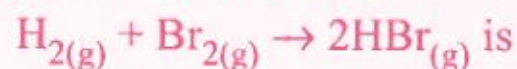
25. The number of oxygen atoms in  $4.4\text{ gm}$  of  $\text{CO}_2$  is,

- |                          |                         |
|--------------------------|-------------------------|
| (1) $1.2 \times 10^{23}$ | (2) $6 \times 10^{22}$  |
| (3) $6 \times 10^{23}$   | (4) $12 \times 10^{23}$ |

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Space For Rough Work

26. If the bond energies of H-H, Br-Br and H-Br are 433, 192 and 364 kJ mol<sup>-1</sup> respectively, then  $\Delta H^\circ$  for the reaction :



- |             |             |
|-------------|-------------|
| (1) -261 kJ | (2) +103 kJ |
| (3) +261 kJ | (4) -103 kJ |

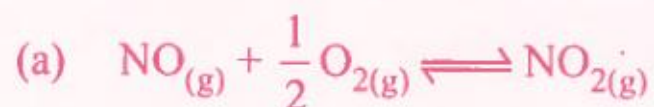
27. In the reaction;  $\text{Fe}(\text{OH})_{3(s)} \rightleftharpoons \text{Fe}^{3+}_{(aq)} + 3\text{OH}^{-}_{(aq)}$ , if the concentration of  $\text{OH}^{-}$  ions is decreased by  $\frac{1}{4}$  times, then the equilibrium concentration of  $\text{Fe}^{3+}$  will increase by,

- |              |              |
|--------------|--------------|
| (1) 8 times  | (2) 16 times |
| (3) 64 times | (4) 4 times  |

28. The correct statement regarding entropy is,

- (1) At absolute zero temperature, entropy of a perfectly crystalline solid is zero.
- (2) At absolute zero temperature, the entropy of a perfectly crystalline substance is +Ve.
- (3) At absolute zero temperature, the entropy of all crystalline substances is zero.
- (4) At 0 °C, the entropy of a perfect crystalline solid is zero.

29. Equilibrium constants  $K_1$  and  $K_2$  for the following equilibria



are related as :

(1)  $K_1 = \sqrt{K_2}$

(2)  $K_2 = \frac{1}{K_1}$

(3)  $K_1 = 2 K_2$

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

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Space For Rough Work

30. Van-Arkel method of refining Zirconium involves,

- (1) removing all oxygen and nitrogen impurities.
- (2) removing CO impurity
- (3) removing Hydrogen impurity
- (4) removing silica impurity

31. The composition of 'copper matte' is,

- (1)  $\text{Cu}_2\text{S} + \text{FeS}$
- (2)  $\text{Cu}_2\text{S} + \text{Cu}_2\text{O}$
- (3)  $\text{Cu}_2\text{S} + \text{FeO}$
- (4)  $\text{Cu}_2\text{O} + \text{FeS}$

32. The complex formed when  $\text{Al}_2\text{O}_3$  is leached from Bauxite using concentrated NaOH solution is,

- (1)  $\text{Na}[\text{Al}(\text{OH})_4]$
- (2)  $\text{NaAl}_2\text{O}_4$
- (3)  $\text{Na}_2[\text{Al}(\text{OH})_3]$
- (4)  $\text{Na}_2\text{AlO}_2$

33. The property which is **not** true about Fluorine is,

- (1) Most of its reactions are exothermic.
- (2) It forms only one oxo acid.
- (3) Highest electronegativity.
- (4) High F-F bond dissociation enthalpy.

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Space For Rough Work

34. Which is true regarding nitrogen ?

- |                              |                                                     |
|------------------------------|-----------------------------------------------------|
| (1) Less electronegative     | (2) Has low ionisation enthalpy                     |
| (3) d-orbitals are available | (4) Ability to form $p\pi - p\pi$ bonds with itself |

35. The shape of  $\text{XeF}_6$  is,

- |                      |                          |
|----------------------|--------------------------|
| (1) Square planar    | (2) Distorted octahedral |
| (3) Square pyramidal | (4) Pyramidal            |

36. The number of isomers possible for the octahedral complex  $[\text{CoCl}_2(\text{en})(\text{NH}_3)_2]^+$  is,

- |               |                  |
|---------------|------------------|
| (1) Two       | (2) Three        |
| (3) No isomer | (4) Four isomers |

37. CO is a stronger ligand than  $\text{Cl}^-$ , because

- |                               |                          |
|-------------------------------|--------------------------|
| (1) CO is a neutral molecule. | (2) CO has $\pi$ -bonds. |
| (3) CO is poisonous.          | (4) CO is more reactive. |

38. The bivalent metal ion having maximum paramagnetic behaviour among the first transition series elements is,

- |                      |                      |
|----------------------|----------------------|
| (1) $\text{Mn}^{2+}$ | (2) $\text{Cu}^{2+}$ |
| (3) $\text{Sc}^{2+}$ | (4) $\text{Cu}^+$    |

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39. When a brown compound of Mn (A) is treated with HCl, it gives a gas (B). The gas (B) taken in excess reacts with  $\text{NH}_3$  to give an explosive compound (C).

The compounds A, B and C are;

- (1)  $\text{A} = \text{MnO}_2$ ,  $\text{B} = \text{Cl}_2$ ,  $\text{C} = \text{NCl}_3$
  - (2)  $\text{A} = \text{MnO}$ ,  $\text{B} = \text{Cl}_2$ ,  $\text{C} = \text{NH}_4\text{Cl}$
  - (3)  $\text{A} = \text{Mn}_3\text{O}_4$ ,  $\text{B} = \text{Cl}_2$ ,  $\text{C} = \text{NCl}_3$
  - (4)  $\text{A} = \text{MnO}_3$ ,  $\text{B} = \text{Cl}_2$ ,  $\text{C} = \text{NCl}_2$
40.  $\text{Mn}^{2+}$  compounds are more stable than  $\text{Fe}^{2+}$  compounds towards oxidation to their +3 state, because
- (1)  $\text{Mn}^{2+}$  is more stable with high 3<sup>rd</sup> Ionisation energy.
  - (2)  $\text{Mn}^{2+}$  is bigger in size.
  - (3)  $\text{Mn}^{2+}$  has completely filled d-orbitals.
  - (4)  $\text{Mn}^{2+}$  does not exist.
41. Which of the following sequence is correct regarding field strength of ligands as per spectrochemical series ?
- (1)  $\text{SCN}^- < \text{F}^- < \text{CN}^- < \text{CO}$
  - (2)  $\text{F}^- < \text{SCN}^- < \text{CN}^- < \text{CO}$
  - (3)  $\text{CN}^- < \text{F}^- < \text{CO} < \text{SCN}^-$
  - (4)  $\text{SCN}^- < \text{CO} < \text{F}^- < \text{CN}^-$
42. As per IUPAC norms, the name of the complex  $[\text{Co}(\text{en})_2(\text{ONO})\text{Cl}]\text{Cl}$  is
- (1) Chlorido bis(ethane-1, 2 – diamine) nitro-o-cobalt (III) chloride.
  - (2) Chloro bis(ethylene diamine) nitro-o-cobalt (III) chloride.
  - (3) Chlorido di(ethylene diamine) nitro cobalt (III) chloride.
  - (4) Chloro ethylene diamine nitro-o-cobalt (III) chloride.

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43. In the following sequence of reactions ;



The compound A is

- |                              |                            |
|------------------------------|----------------------------|
| (1) Propane nitrile          | (2) Ethane nitrile         |
| (3) $\text{CH}_3\text{NO}_2$ | (4) $\text{CH}_3\text{NC}$ |

44. An organic compound A on reduction gives compound B, which on reaction with trichloro methane and caustic potash forms C. The compound 'C' on catalytic reduction gives N-methyl benzenamine, the compound 'A' is,

- |                  |                  |
|------------------|------------------|
| (1) Nitrobenzene | (2) Nitromethane |
| (3) Methanamine  | (4) Benzenamine  |

45. Which of the following gives positive Fehling's solution test ?

- |             |             |
|-------------|-------------|
| (1) Sucrose | (2) Glucose |
| (3) Fats    | (4) Protein |

46. A liquid can exist only,

- (1) Between triple point and critical point.
- (2) At any temperature above melting point.
- (3) Between melting point and critical point.
- (4) Between boiling and melting points.

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Space For Rough Work

47. The energy of electron in the  $n^{\text{th}}$  Bohr orbit of H-atom is

- (1)  $\frac{-13.6}{n^2} \text{eV}$  (2)  $\frac{-13.6}{n} \text{eV}$   
(3)  $\frac{-13.6}{n^4} \text{eV}$  (4)  $\frac{-13.6}{n^3} \text{eV}$

48. Consider the following sets of quantum numbers :

Which of the below setting is not permissible arrangement of electrons in an atom ?

- |     | n | l | m  | s              |
|-----|---|---|----|----------------|
| (1) | 4 | 0 | 0  | $-\frac{1}{2}$ |
| (2) | 5 | 3 | 0  | $+\frac{1}{2}$ |
| (3) | 3 | 2 | -2 | $-\frac{1}{2}$ |
| (4) | 3 | 2 | -3 | $+\frac{1}{2}$ |

49. The increasing order of bond order of  $\text{O}_2$ ,  $\text{O}_2^+$ ,  $\text{O}_2^-$  and  $\text{O}_2^{2-}$  is

- (1)  $\text{O}_2^+$ ,  $\text{O}_2$ ,  $\text{O}_2^-$ ,  $\text{O}_2^{2-}$  (2)  $\text{O}_2^{2-}$ ,  $\text{O}_2^-$ ,  $\text{O}_2^+$ ,  $\text{O}_2$   
(3)  $\text{O}_2$ ,  $\text{O}_2^+$ ,  $\text{O}_2^-$ ,  $\text{O}_2^{2-}$  (4)  $\text{O}_2^{2-}$ ,  $\text{O}_2^-$ ,  $\text{O}_2$ ,  $\text{O}_2^+$

50. HCl gas is covalent and NaCl is an ionic compound. This is because

- (1) Sodium is highly electro +Ve.  
(2) Hydrogen is a non-metal.  
(3) HCl is a gas.  
(4) Electronegativity difference between H and Cl is less than 2.1.

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Space For Rough Work

51. Which of the following is not true ?

- (1) In vulcanisation the rubber becomes harder and stronger.
- (2) Natural rubber has 'trans' configuration at every double bond.
- (3) Buna-S is a co-polymer of Butene and styrene.
- (4) Natural rubber is 1, 4-polymer of isoprene.

52. Which of the following is a polyamide ?

- |                |              |
|----------------|--------------|
| (1) Nylon-6, 6 | (2) Terylene |
| (3) Polythene  | (4) Buna-S   |

53. Which of the following is correct about H-bonding in DNA ?

- |                  |                  |
|------------------|------------------|
| (1) A – T, G – C | (2) A – G, T – C |
| (3) G – T, A – C | (4) A – A, T – T |

54. Which of the following is employed as Tranquilizer ?

- |                 |              |
|-----------------|--------------|
| (1) Equanil     | (2) Naproxen |
| (3) Tetracyclin | (4) Dettol   |

55. Reactivity of order of halides for dehydrohalogenation is

- (1)  $R-F > R-Cl > R-Br > R-I$
- (2)  $R-I > R-Br > R-Cl > R-F$
- (3)  $R-I > R-Cl > R-Br > R-F$
- (4)  $R-F > R-I > R-Br > R-Cl$

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56. Main axis of diatomic molecule is Z. The orbitals  $P_x$  and  $P_y$  overlap to form

- |                                  |                                  |
|----------------------------------|----------------------------------|
| (1) $\pi$ - molecular orbital    | (2) $\sigma$ - molecular orbital |
| (3) $\delta$ - molecular orbital | (4) No bond is formed.           |

57. The hybridisation of C in diamond, graphite and ethyne is in the order

- |                            |                            |
|----------------------------|----------------------------|
| (1) $sp^3$ , $sp$ , $sp^2$ | (2) $sp^3$ , $sp^2$ , $sp$ |
| (3) $sp$ , $sp^2$ , $sp^3$ | (4) $sp^2$ , $sp^3$ , $sp$ |

58. A miscible mixture of  $C_6H_6 + CHCl_3$  can be separated by

- |                 |                     |
|-----------------|---------------------|
| (1) Sublimation | (2) Distillation    |
| (3) Filtration  | (4) Crystallisation |

59. An organic compound contains C = 40%, H = 13.33% and N = 46.67%. Its empirical formula is

- |               |               |
|---------------|---------------|
| (1) $C_2H_2N$ | (2) $C_3H_7N$ |
| (3) $CH_4N$   | (4) $CHN$     |

60. Electrophile that participates in nitration of benzene is

- |            |              |
|------------|--------------|
| (1) $NO^+$ | (2) $NO_2^+$ |
| (3) $NO$   | (4) $NO_3^-$ |

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Space For Rough Work