COMMON ENTRANCE TEST – 2017

<table>
<thead>
<tr>
<th>DATE</th>
<th>SUBJECT</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-05-2017</td>
<td>CHEMISTRY</td>
<td>2.30 pm to 3.50 pm</td>
</tr>
</tbody>
</table>

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<tr>
<th>MAXIMUM MARKS</th>
<th>TOTAL DURATION</th>
<th>MAXIMUM TIME FOR ANSWERING</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>80 Minutes</td>
<td>70 Minutes</td>
</tr>
</tbody>
</table>

MENTION YOUR CET NUMBER

QUESTION BOOKLET DETAILS
VERSION CODE / SERIAL NUMBER

XXXXXX

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 2.30 pm.
3. The Version Code / Serial Number of this question booklet should be entered on the OMR Answer Sheet and the respective circles should also be shaded completely.
4. Compulsorily affix the complete signature at the bottom portion of the OMR Answer Sheet in the space provided.

DONTs:
1. The timing and marks printed on the OMR Answer Sheet should not be damaged / mutilated / spoiled.
2. The 3rd Bell rings at 2.40 pm, till then;
   - Do not remove the 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 3rd Bell is rung at 2.40 pm, remove the 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 immediately by complete test booklet by showing it to Room Invigilator. 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 ballpoint pen against the question number on the OMR answer sheet.

Correct Method of shading the circles on the OMR Answer Sheet is: A ● B ● C ● D

4. Please note that even a minute unintended ink dot on the OMR Answer 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 3.50 pm, 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 (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.
10. In case of any discrepancy in the English and Kannada versions, the English version will be taken as final.
1. If $3.01 \times 10^{20}$ molecules are removed from 98 mg of H$_2$SO$_4$, then number of moles of H$_2$SO$_4$ left are
   (A) $0.1 \times 10^{-3}$ mol  (B) $0.5 \times 10^{-3}$ mol  
   (C) $1.66 \times 10^{-2}$ mol  (D) $9.95 \times 10^{-2}$ mol

2. The correct set of quantum number for the unpaired electrons of chlorine atom is
   (A) $2, 0, 0, \frac{1}{2}$  (B) $2, 1, -1, \frac{1}{2}$  
   (C) $3, 1, 1, \frac{1}{2}$  (D) $3, 0, 0, \pm \frac{1}{2}$

3. The electronegativities of C, N, Si and P are in the order of
   (A) P < Si < C < N  (B) Si < P < N < C  
   (C) Si < P < C < N  (D) P < Si < N < C

4. Which of the following structure of a molecule is expected to have three bond pairs and one lone pair of electrons ?
   (A) Tetrahedral  (B) Trigonal Planar  
   (C) Pyramidal  (D) Octahedral

5. Which of the following is the correct electron dot structure of N$_2$O molecule ?
   (A) $:N = N = \ddot{O}$  (B) $:N \equiv \ddot{N} - \ddot{O}$  
   (C) $\ddot{N} = N = \ddot{O}$  (D) $:\ddot{N} - N = \ddot{O}$
6. The pressure of real gases is less than that of ideal gas because of
(A) Intermolecular attraction
(B) Finite size of particles
(C) Increase in the number of collisions
(D) Increase in the kinetic energy of the molecules

7. A reaction has both $\Delta H$ and $\Delta S < 0$. The rate of reaction
(A) increases with increase in temperature
(B) increases with decrease in temperature
(C) remains unaffected by change in temperature
(D) cannot be predicted for change in temperature

8. The equilibrium constant for the reaction
$$N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$$ is $4 \times 10^{-4}$ at 2000K. In presence of a catalyst the equilibrium is attained ten times faster. Therefore the equilibrium constant in presence of catalyst of 2000 K is
(A) $40 \times 10^{-4}$  (B) $4 \times 10^{-2}$
(C) $4 \times 10^{-3}$  (D) $4 \times 10^{-4}$

9. The reaction quotient $Q_c$ is useful in predicting the direction of the reaction. Which of the following is incorrect?
(A) If $Q_c > K_c$, the reverse reaction is favoured
(B) If $Q_c < K_c$, the forward reaction is favoured
(C) If $Q_c = K_c$, no reaction occur
(D) If $Q_c > K_c$, forward reaction is favoured
10. \(3\text{ClO}_2^{aq} \rightarrow \text{ClO}^- + 2\text{Cl}^-\) is an example of
(A) Oxidation reaction  (B) Reduction reaction
(C) Disproportionation reaction  (D) Decomposition reaction

11. In the manufacture of hydrogen from water gas \((\text{CO} + \text{H}_2)\), which of the following is correct statement?
(A) CO is oxidized to \(\text{CO}_2\) with steam in the presence of a catalyst followed by absorption of \(\text{CO}_2\) in alkali.
(B) CO and \(\text{H}_2\) are separated based on difference in their densities.
(C) Hydrogen is isolated by diffusion.
(D) \(\text{H}_2\) is removed by occlusion with pd.

12. Plaster of Paris is represented as
(A) \(\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}\)  (B) \(\text{CaSO}_4 \cdot \text{H}_2\text{O}\)
(C) \(\text{CaSO}_4 \cdot 2\text{H}_2\text{O}\)  (D) \(\text{CaSO}_4\)

13. Addition of mineral acid to an aqueous solution of Borax, the following compound is formed
(A) Boron hydride  (B) Orthoboric acid
(C) Meta boric acid  (D) Pyroboric acid
14. Identify the correct statement in the following:
(A) n-butane and isobutane are functional isomers
(B) Dimethyl ether and ethanol are chain isomers
(C) Propan-1-ol and propan-2-ol are position isomers
(D) Ethanoic acid and methyl methanoate are position isomers

15. In which of the following, homolytic bond fission takes place?
(A) Alkaline hydrolysis of ethyl chloride
(B) Addition of HBr to double bond
(C) Free radical chlorination of methane
(D) Nitration of Benzene

16. For the preparation of Alkanes, aqueous solution of sodium or potassium salt of carboxylic acid is subjected to
(A) Hydrolysis  (B) Oxidation
(C) Hydrogenation  (D) Electrolysis

17. Which one of the following is not a common component of photo-chemical smog?
(A) Ozone  (B) Acrolein
(C) Peroxy acetyl nitrate  (D) Chloro fluoro carbons

18. Which of the following crystal has unit cell such that \( a \neq b \neq c \) and \( \alpha \neq \beta \neq \gamma \neq 90^\circ \)?
(A) \( \text{K}_2\text{Cr}_2\text{O}_7 \)  (B) \( \text{NaNO}_3 \)
(C) \( \text{KNO}_3 \)  (D) \( \text{K}_2\text{SO}_4 \)
19. The correct statement regarding defect in solids is
   (A) Frenkel defect is usually favoured by a very small difference in the sizes of cations and anions.
   (B) Frenkel defect is a dislocation defect.
   (C) Trapping of proton in the lattice leads to the formation of F-centers.
   (D) Schottky defect has no effect on the physical properties of solids.

20. In a face centred cubic arrangement of A and B atoms in which ‘A’ atoms are at the corners of the unit cell and ‘B’ atoms are at the face centers. One of the ‘A’ atom is missing from one corner in unit cell. The simplest formula of compound is
   (A) $A_7B_{24}$    (B) $A_7B_8$
   (C) $AB_3$        (D) $A_7B_3$

21. Which of the following aqueous solution has highest freezing point?
   (A) 0.1 molal $Al_2(SO_4)_3$
   (B) 0.1 molal $BaCl_2$
   (C) 0.1 molal $AlCl_3$   (D) 0.1 molal $NH_4Cl$

22. The Vant Hoff’s factor ‘i’ accounts for
   (A) extent of solubility of solute
   (B) extent of dissociation of solute
   (C) extent of dissolution of solute
   (D) extent of mobility of solute
23. When the pure solvent diffuses out of the solution through the semi-permeable membrane then the process is called
   (A) Osmosis (B) Reverse osmosis
   (C) Sorption (D) Dialysis

24. The standard reduction potential at 298 K for the following half cell reaction
   \[ \text{Zn}^{2+} + 2e \rightarrow \text{Zn} \quad E^\circ = -0.762 \text{ V} \]
   \[ \text{Cr}^{3+} + 3e \rightarrow \text{Cr} \quad E^\circ = 0.740 \text{ V} \]
   \[ 2\text{H}^+ + 2e \rightarrow \text{H}_2 \quad E^\circ = 0.0 \text{ V} \]
   \[ \text{F}_2 + 2e \rightarrow 2\text{F}^- \quad E^\circ = 2.87 \text{ V} \]
Which of the following is strongest reducing agent?
   (A) Zn (B) Cr (C) H₂ (D) F₂

25. By passing electric current, NaClO₃ is converted into NaClO₄ according to the following equation
   \[ \text{NaClO}_3 + \text{H}_2\text{O} \rightarrow \text{NaClO}_4 + \text{H}_2 \]
How many moles of NaClO₄ will be formed when three Faradays of charge is passed through NaClO₃?
   (A) 0.75 (B) 1.0 (C) 1.5 (D) 3.0
26. In the electrolysis of aqueous sodium chloride solution, which of the half cell reaction will occur at anode?

(A) \[ \text{Na}^{+} + e^{-} \rightarrow \text{Na} \]

\[ E^0 = -2.71 \text{ volts} \]

(B) \[ 2\text{H}_2\text{O}_2(l) \rightarrow \text{O}_2 + 4\text{H}^+ + 4e^- \]

\[ E^{\circ} = 1.23 \text{ volts} \]

(C) \[ \text{H}_2^{+} + e^- \rightarrow \frac{1}{2}\text{H}_2 \]

\[ E^{\circ} = 0.00 \text{ volts} \]

(D) \[ \text{Cl}^{+} \rightarrow \frac{1}{2}\text{Cl}_2 + e^- \]

\[ E^{\circ} = 1.36 \text{ volts} \]

27. Which of the following statement is in accordance with the Arrhenius equation?

(A) Rate of a reaction increases with increase in temperature

(B) Rate of a reaction increases with decrease in activation energy

(C) Rate constant decreases exponentially with increase in temperature

(D) Rate of reaction does not change with increase in activation energy

28. Which of the following statement is incorrect?

(A) The rate law for any reaction cannot be determined experimentally

(B) Complex reactions have fractional order.

(C) Biomolecular reactions involve simultaneous collision between two species

(D) Molecularity is only applicable for elementary reaction.
29. For a reaction \( \frac{1}{2} A \rightarrow 2B \) rate of disappearance of A is related to rate of appearance of B by the expression

(A) \( \frac{d[A]}{dt} = 4 \frac{d[B]}{dt} \)
(B) \( \frac{d[A]}{dt} = 4 \frac{d[B]}{dt} \)
(C) \( \frac{d[A]}{dt} = \frac{1}{2} \frac{d[B]}{dt} \)
(D) \( \frac{d[A]}{dt} = \frac{1}{4} \frac{d[B]}{dt} \)

29. The process which is responsible for the formation of delta at a place where rivers meet the sea is

(A) Coagulation  (B) Colloid formation  (C) Emulsification  (D) Peptization

30. Hydrogenation of vegetable oils in presence of finely divided Nickel as catalyst. The reaction is

(A) Heterogeneous catalysis  (B) Homogeneous catalysis  (C) Enzyme catalysed reaction  (D) Liquid catalysed reaction

31. Which of the following is not a favourable condition for physical adsorption?

(A) High temperature  (B) High pressure  (C) Higher critical temperature of adsorbate  (D) Low temperature

32. The metal extracted by leaching with a cyanide is

(A) Al  (B) Ag  (C) Cu  (D) Na

33. Extraction of chlorine from brine solution is based on

(A) Oxidation  (B) Chlorination  (C) Reduction  (D) Acidification
35. Which of the following element forms $p_n - p_n$ bond with itself?
(A) N
(B) P
(C) Se
(D) Te

36. Which one of the following metallic oxide exhibit amphoteric nature?
(A) CaO
(B) $\text{Na}_2\text{O}$
(C) BaO
(D) $\text{Al}_2\text{O}_3$

37. Select wrong chemical reaction among the following:
(A) $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2^+ + \text{Cl}_2 + 2\text{H}_2\text{O}$
(B) $8\text{NH}_3 + 3\text{Cl}_2 \rightarrow 6\text{NH}_4\text{Cl} + \text{N}_2$
(C) $2\text{NaOH} + \text{Cl}_2 \rightarrow 2\text{NaCl} + \text{H}_2 + \text{O}_2$
(D) $2\text{Ca(OH)}_2 + 2\text{Cl}_2 \rightarrow \text{Ca(OCl)}_2 + \text{CaCl}_2 + 2\text{H}_2\text{O}$

38. Which one of the following noble gas has an unusual property of diffusing through the materials such as rubber, glass or plastic?
(A) Ne
(B) Ar
(C) Kr
(D) He

39. The magnetic nature of elements depends on the presence of unpaired electrons. Identify the configuration of transition elements which shows highest magnetic moment?
(A) 3d$^7$
(B) 3d$^5$
(C) 3d$^8$
(D) 3d$^2$
40. Which of the following statement is wrong regarding Lanthanoids?
(A) Ln(III) compounds are generally colourless.
(B) Ln(III) compounds are predominantly ionic in character.
(C) The ionic size of Ln(III) ions decreases with increasing atomic number.
(D) Ln(III) hydroxides are mainly basic in nature.

41. Square planar complex of the type \( \text{MXAXBL} \)
(where A, B, X and L are unidentate ligands) shows following set of isomers
(A) Two cis and one trans
(B) Two trans and one cis
(C) Two cis and two trans
(D) Three cis and one trans

42. According to crystal field theory, the M – L bond in a complex is
(A) purely ionic       (B) purely covalent
(C) purely co-ordinate (D) partially covalent

43. The co-ordination number and the oxidation state of the element ‘M’ in the complex
\([\text{M(en)}_2 (\text{C}_2 \text{O}_4)] \text{NO}_2\) (where (en) is ethan-1, 2 – diamine) are respectively
(A) 6 and 3       (B) 6 and 2
(C) 4 and 2       (D) 4 and 3
44. Toluene reacts with halogen in presence of Iron (III) chloride giving ortho and para halo compounds. The reaction is
(A) Electrophilic elimination reaction
(B) Electrophilic substitution reaction
(C) Free radical addition reaction
(D) Nucleophilic substitution reaction

45. In the following sequence of reactions
\[ \text{CH}_3\text{Br} \xrightarrow{\text{KCN}} \text{A} \xrightarrow{\text{H}_2\text{O}^+} \]
\[ \text{B} \xrightarrow{\text{LiA/H}_4} \text{C} \]
The end product C is
(A) Acetone  (B) Methane  (C) Acetaldehyde  (D) Ethyl Alcohol

46. Which of the following order is true regarding the acidic nature of phenol?
(A) Phenol > O-cresol > O-nitrophenol
(B) O-cresol < phenol < O-nitrophenol
(C) phenol < O-cresol > O-nitrophenol
(D) phenol < O-cresol < O-nitrophenol

47. Which of the following reagent cannot be used to oxidize primary alcohols to aldehydes?
(A) \( \text{CrO}_3 \) in anhydrous medium
(B) \( \text{KMnO}_4 \) in acidic medium
(C) Pyridinium chloro chromate
(D) Heating in presence of Cu at 573 K

44. (C) [Hint: Refer to the question text]
45. (D) [Hint: Refer to the question text]
46. (B) [Hint: Refer to the question text]
47. (B) [Hint: Refer to the question text]
48. Cannizzaro's reaction is an example of auto oxidation
(A) It is a typical reaction of aliphatic aldehyde.
(B) It is a reaction answered only by aromatic aldehydes.
(C) It is a reaction answered by all aldehydes.
(D) It is a reaction answered by only aldehydes containing α-hydrogen.

49. Lower members of aliphatic carboxylic acid are soluble in water. This is due to
(A) Formation of hydrogen bonds with water.
(B) Van der-Waals interaction with water molecules.
(C) Water is non electrolyte.
(D) Due to London forces.

50. The correct order of increasing basic nature for the bases NH₃, CH₃NH₂ and (CH₃)₂NH in aqueous solutions
(A) CH₃NH₂ < NH₃ < (CH₃)₂NH
(B) (CH₃)₂NH < NH₃ < CH₃NH₂
(C) NH₃ < CH₃NH₂ < (CH₃)₂NH
(D) CH₃NH₂ < (CH₃)₂NH < NH₃
51. The product formed during the following reaction are

\[
\text{CH}_3 - \text{O} - \text{CH}_3 + \text{HI} \rightarrow ?
\]

(A) \[\text{CH}_3 \text{OH} + \text{CH}_3 - \text{C} - \text{I} \]

(B) \[\text{CH}_3 \text{I} + \text{CH}_3 - \text{C} - \text{OH} \]

(C) \[\text{CH}_3 \text{OI} + \text{H}_3\text{C} - \text{C} - \text{H} \]

(D) \[\text{CH}_4 + \text{H}_3\text{C} - \text{C} - \text{OI} \]

51. ವ್ಯವಹರದಲ್ಲಿಯೂ ರೀತಿಯಲ್ಲಿ ತೀರಿದು ಪ್ರತ್ಯೇಕ ರೂಪಾಂತರಗಳು

\[
\text{CH}_3 - \text{O} - \text{CH}_3 + \text{HI} \rightarrow ?
\]

(A) \[\text{CH}_3 \text{OH} + \text{CH}_3 - \text{C} - \text{I} \]

(B) \[\text{CH}_3 \text{I} + \text{CH}_3 - \text{C} - \text{OH} \]

(C) \[\text{CH}_3 \text{OI} + \text{H}_3\text{C} - \text{C} - \text{H} \]

(D) \[\text{CH}_4 + \text{H}_3\text{C} - \text{C} - \text{OI} \]
52. Reduction of ketones cannot be carried out with which of the following reagents?
(A) Sodium borohydride or Lithium Aluminium hydride
(B) Zinc amalgam and concentrated HCl
(C) Hydrazine and KOH in ethylene glycol
(D) Hydrogen in presence of palladium in Barium sulphate and quinoline

53. Gabriel phthalimide synthesis is used in the preparation of primary amine from phthalimide, which of the following reagent is not used during the process?
(A) KOH  (B) NaOH
(C) HCl  (D) Alkyl Halides

54. The Glycosidic linkage present in sucrose is between
(A) C – 1 of α-glucose and C – 2 of β-fructose
(B) C – 1 of α-glucose and C – 4 of α-glucose
(C) C – 1 of β-galactose and C – 4 of α-glucose
(D) C – 1 of α-glucose and C – 4 of β-fructose

55. Hormones are secreted by ductless glands of human body. Iodine containing hormone is
(A) Insulin  (B) Thyroxine
(C) Testosterone  (D) Adrenoline
56. Pick the wrong statement from the following:
(A) Sources of Vitamin B₂ are yeast, milk, green vegetables and cereals
(B) Deficiency of Vitamin B₆ (pyridoxine) results in convulsions
(C) Consumption of citrus fruits and green leafy vegetables in food prevents scurvy
(D) Deficiency of vitamin D causes xerophthalmia

57. The monomer used in Novolac, a polymer used in paints
(A) Phenol and Formaldehyde
(B) Melamine and Formaldehyde
(C) Butadiene and Styrene
(D) Butadiene and Acrylo Nitrile

58. Which of the following is not a biodegradable polymer?
(A) Polyhydroxy butyrate – CO – β hydroxy valerate
(B) pHBV
(C) Nylon 2-Nylon-6
(D) Glyptol

59. Bactericidal antibiotics among the following is
(A) Ofloxacin
(B) Erythromycin
(C) Tetracycline
(D) Chloramphenicol
60. Pick the correct statement among the following:

(A) Cetyl trimethyl ammonium bromide is a popular cationic detergent used in air conditioner

(B) Non-ionic detergents is formed when polyethylene glycol reacts with adipic acid

(C) Sodium dodecyl benzene sulphonate used in tooth paste is a cationic detergent.

(D) Sodium lauryl sulphate forms an insoluble scum with hard water.
[Image content]