



CHEMISTRY

BOOKS - CHHAYA CHEMISTRY (BENGALI ENGLISH)

PREVIOUS YEARS QUESTION PAPER 2017

Wbchse 2017 Part A

1. Write down the van't Hoff equation for osmotic pressure of a solution.

State, with reason , whether all solutions obey this equation.

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2. Define heterogeneous catalysis with an example.

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3. How will you distinguish chemically between HN_3 and HN_3 ?



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4. Explain why $Cu(NH_3)_4^{2+}$ ion is coloured but $[Cu(CN)_4]^{3-}$ ion is colourless.



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5. What are the two monomer units of terylene ? Write the repeating unit of terylene .



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6. What is ferromagnetic substance ?



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7. KBr crystallises in face-centered cubic (fcc) crystals. The density and formula mass of KBr crystal are 2.65gcm^{-3} and 119gmol^{-1} respectively. Find the distance between K^{+} and Br^{-} ions in KBr crystal.



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8. Which kind of defect in ionic crystals does not alter the density ?



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9. An element X has atomic mass 60gmol^{-1} and density 6.23gcm^{-3} . The edge length of its unit cell is 400 pm. Identify the type of the unit cubic cell. Calculate the radius of X atom.



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10. 20 g of a solid solute is dissolved in 180 g of water. At 100°C the vapour pressure of the solution becomes 740 mmHg. Calculate relative

molecular mass of the solute. (No association/dissociation of the solute takes place)



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11. Define specific conductivity ?



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12. A current of 35 ampere is passed through acidulated water for 5 minute 50 second. How many gram of hydrogen will be liberated at the cathode ? [$1F = 96500$ coulomb]



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13. A green oxide of chromium(A), on fusion with KOH and KNO_3 gives a yellow compound (B). The aqueous solution of (B) on acidification with

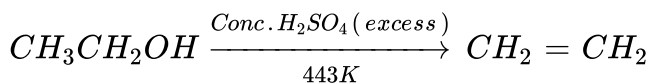
dilute H_2SO_4 gives an orange coloured compound (C). Identify (B) and (C) and write down balanced chemical equations involved.

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14. Which out of the two $La(OH)_3$ and $Lu(OH)_3$, is more basic and why?

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15. Write the mechanism of the following reactions:



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16. What are meant by aldose and ketose ? Write with examples.

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17. How does PCl_3 undergo hydrolysis.



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18. Write with balanced chemical equation, what happens when chlorine gas is passed through hot concentrated KOH solution.



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19. Write the thermal stability order of hydrogen halides.



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Wbchse 2017 Part B

1. A compound X is used as an antiseptic in 0.2% solution and as a disinfectant in 1% solution. Which of the following is X ?

- A. Phenol
- B. Soframycin
- C. Benzil
- D. Iodoform

Answer: A



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2. Which of the following is not a food preservative ?

- A. Common salt
- B. Sucrose
- C. Sodium benzoate
- D. Sucralose

Answer: D



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3. Which of the following is a biodegradable polymer ?

A. Nylon-2-Nylon -6

B. Nylon-6,6

C. Nylon-6

D. Bakelite

Answer: A



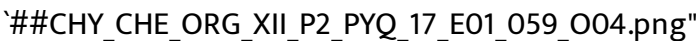
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4. In the solid state which of the following is the structure of analine ?

A. 

B. 

C. 

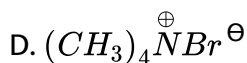
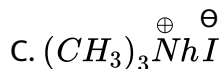
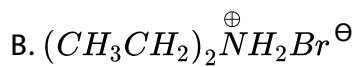
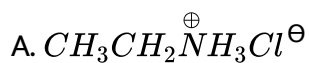
D.  width="30%">

Answer: B



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5. Which of the following is not an aminium salt ?



Answer: D




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6. Which of the following compounds is formed when acetophenone is treated with bromine in acidic medium ?

A. 

B. 

C.  width="30%">

D.  width="30%">

Answer: C



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7. Which of the following compounds is formed when phenol is heated with CCl_4 and NaOH ?

A. Salicylic acid

B. Sodium salicylate

C. Salicylaldehyde

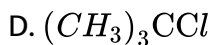
D. Para-Hydroxybenzaldehyde

Answer: B



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8. Which of the following compounds most readily undergoes solvolysis by S_N1 mechanism ?



Answer: D



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9. When tetraaminechloridonitritocobalt (III) nitrate is dissolved in water, how many ions will be formed from one molecule ?

A. 4

B. 3

C. 2

D. 0

Answer: C



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10. Which one of the following atomic numbers is that of a lanthanoid element ?

A. 54

B. 58

C. 92

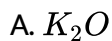
D. 74

Answer: B



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11. What is the formula of the oxide formed on burning potassium in oxygen ?



Answer: C



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12. The process of which alum purifies turbid water is -

- A. absorption
- B. Adsorption
- C. Coagulation
- D. Dispersion

Answer: C



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13. The quantity of electricity required to electrolyse separately 1 M aqueous solutions of $ZnSO_4$, $AlCl_3$ and $AgNO_3$ completely in the ratio of -

- A. 2:1:1:
- B. 2:1:3
- C. 2:2:1

D. 2 : 3 : 1

Answer: D



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14. Which of the following solids is a covalent crystal ?

A. Sodium chloride

B. Quartz

C. Sucrose

D. Iodine

Answer: B



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15. Atoms of which two elements among the following are of same size ?

Zr, Fe, Ru, Sc, La , Hf



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16. What would be the value of paramagnetic spin moment of

$K_3[Fe(CN)_6]$? (Atomic no. of Fe = 26)



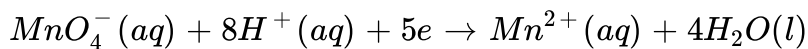
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17. If 193000 coulomb of electricity is passed through a metallic wire, how many electrons will flow through the wire ?



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18. Write the appropriate Nernst equation for the following half-cell reaction:



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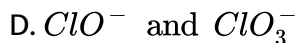
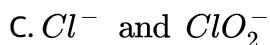
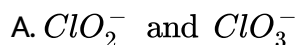
19. For which phenomenon colloidal particles do not settle down ?



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1. The product obtained when chlorine gas reacts with cold and dilute aqueous NaOH are -



Answer: B



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2. A metal crystallises in a face centred cubic structure . If the edge length of its unit cell is 'a' , the closest approach between two atoms in metallic crystal will be -

A. $2\sqrt{2}a$

B. $\sqrt{2}a$

C. $\frac{a}{\sqrt{2}}$

D. $2a$

Answer: C



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3. Sodium salt of an organic acid 'X' produces effervescence with conc. H_2SO_4 . 'X' reacts with the acidified aqueous $CaCl_2$ solution to give a white precipitate which decolourises acidic solution of $KMnO_4$. 'X' is -

A. $HCOONa$

B. CH_3COONa

C. $Na_2C_2O_4$

D. C_6H_5COONa

Answer: C



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4. Which of the following, upon treatment with tert-BuONa followed by addition of bromine water, fails to decolourise the colour of bromine?

A. 

B. 

C. 

D. 

Answer: D



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5. The freezing point of benzene decreases by $0.45^{\circ}C$ when 0.2g of acetic acid is added to 20 g of benzene . If acetic acid associates to form a dimer in benzene, percentage association of acetic acid in benzene will be -
(K_f for benzene = $5.12. \text{ kg. mol}^{(-1)}$)

A. 0.804

B. 0.746

C. 0.946

D. 0.646

Answer: C



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6. Two reactions R_1 and R_2 have identical pre-exponential factors. Activation energy of R_1 exceeds that of R_2 by 10KJ. mol^{-1} . If K_1 and K_2 are rate constants for reactions R_1 and R_2 respectively at 300K , then in (K_2/K_1) is equal to $-(R = 8.314\text{J. mol}^{-1}. \text{K}^{-1})$

A. 12

B. 6

C. 4

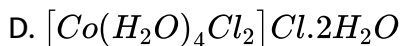
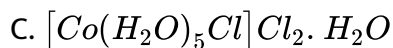
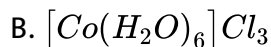
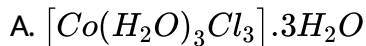
D. 8

Answer: C



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7. On treatment of 100 mL of 0.1 M solution of $\text{CoCl}_{3.6}\text{H}_2\text{O}$ with excess AgNO_3 , 1.2×10^{22} ions are precipitated. The complex is -

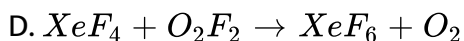
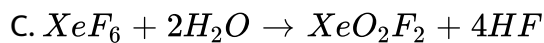
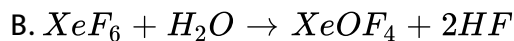
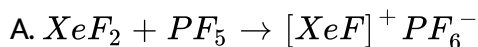


Answer: C



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8. Which of the following reactions is an example of a redox reaction ?



Answer: C



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9. The formation of which of the following polymers involves hydrolysis reaction ?

A. Bakelite

B. Nylon 6, 6

C. Terylene

D. Nylon 6

Answer: D



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10.

Given

$$E_{Cl_2|Cl^-}^0 = 1.36V, E_{Cr^{3+}|Cr}^0 = -0.74V, E_{Cr_2O_7^{2-}|Cr^{3+}}^0 = 1.33V, E_{MnO_4^-|Mn^{2+}}^0 = 1.51V$$

Among the following , the strongest reducing agent is -

A. Mn^{2+}



Answer: D



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11. The tyndall effect is observed only when following conditions are satisfies-

(a) The diameter of the dispersed particles is much smaller than the wavelength of the light used.

(b) The diameter of the dispersed particle is not much smaller than the wavelength of the light used.

(c) The refractive indices of the dispersed phase and dispersion medium are almost similar in magnitude.

(d) The refractive indices of the dispersed phase and dispersion medium differ greatly in magnitude.

A. (b) and (d)

B. (a) and (c)

C. (b) and (c)

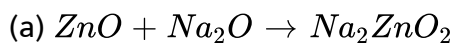
D. (a) and (d)

Answer: A



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12. In the following reactions , ZnO is respectively acting as a/an-



A. base and base

B. acid and acid

C. acid and base

D. base and acid

Answer: C



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13. Which of the following compounds will form significant amount of meta product during mono-nitration reaction ?

A. 

B. 

C. 

D. 

Answer: B



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14. Which of the following compounds will behave as a reducing sugar in an aqueous KOH solution ?

A. 

B. 

C. 

D. 

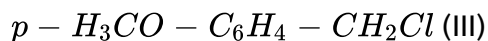
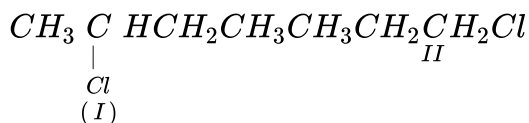
Answer: D



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15. The increasing order of the reactivity of the following halides for the

S_N1 reaction is -



A. $(\text{II}) < (\text{I}) < (\text{III})$

B. $(\text{I}) < (\text{III}) < (\text{II})$

C. $(\text{II}) < (\text{III}) < (\text{I})$

D. $(III) < (II) < (I)$

Answer: A



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16. Which of the following molecules is least resonance stabilized ?

A. 

B. 

C. 

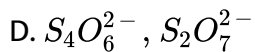
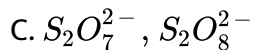
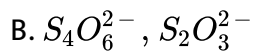
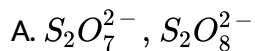
D. 

Answer: C



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1. In which pair of ions both the species contain S-S bond ?

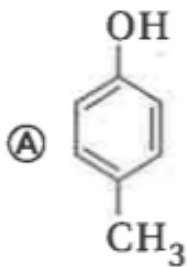


Answer: B

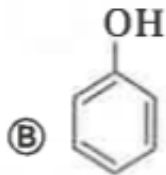


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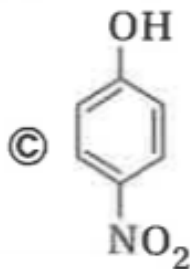
2. Which one is most acidic compound ?



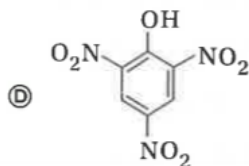
A.



B.



C.



D.

Answer: D



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3. The reason for greater range of oxidation states in actinoids is attributed to -

- A. the radioactive nature of actinoids
- B. actinoid contraction
- C. 5f, 6d, and 7s levels having comparable energies
- D. 4f and 5d levels being close in energies

Answer: C



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4. An example of a sigma bonded organometallic compound is -

- A. Ruthenocene
- B. Grignard's reagent
- C. Ferrocene
- D. Cobaltocene

Answer: B



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5. If molality of the dilute solution is doubled , the value of molal depression constant (K_f) will be-

- A. doubled
- B. halved
- C. tripled
- D. unchanged

Answer: D



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6. Of the following , which is the product formed when cyclohexanone undergoes aldol condensation followed by heating ?

A. 

B. 

C. 

D. 

Answer: B



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7. In the electrochemical cell-

$Zn|ZnSO_4(0.01M)||CuSO_4(1.0M)|Cu$, the emf of this Daniel cell is E_1 .

When the concentration of $ZnSO_4$ is changed to 1.0M and that of $CuSO_4$ changed to 0.01M, the emf changes to E_2 . From the following , which one is the relationship between E_1 and E_2 ? (Given , $\frac{RT}{F} = 0.059$)

A. $E_1 = E_2$

B. $E_1 < E_2$

C. $E_1 > E_2$

D. $E_2 = \text{equa ln ot } E_1$

Answer: C



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8. A first order reaction has a specific reaction rate of 10^{-2} sec^{-1} . How much time will it take for 20 g of the reactant to reduce to 5g ?

A. 238.6 sec

B. 138.6 sec

C. 346.5 sec

D. 693.0 sec

Answer: B



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9. The most suitable method of separation of 1:1 mixture of ortho and para-nitrophenols is -

- A. Sublimation
- B. Chromatography
- C. Crystallisation
- D. Steam distillation

Answer: D



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10. Which is the incorrect statement ?

- A. $FeO_{0.98}$ has non stoichiometric metal deficiency defect
- B. Density decreases in case of crystals with Schottky's defect
- C. $NaCl(s)$ is insulator ,silicon is semiconductor , silver is conductor , quartz is piezo electric crystal
- D. Frenkel defect is favoured in those ionic compounds in which sizes of cation and anions are almost equal

Answer: D



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11. State the reaction: Methoxybenzene reacts with HI .

A. ethyl chlorides

B. iodobenzene

C. phenol

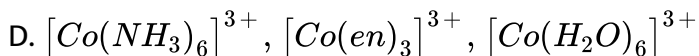
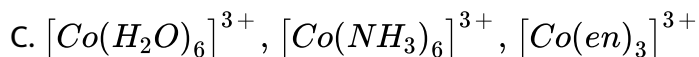
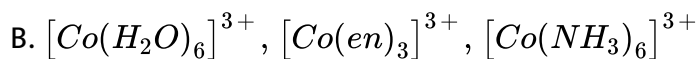
D. benzene

Answer: C



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12. Correct increasing order for the wavelengths of absorption in the visible region for the complexes of Co^{3+} is -



Answer: A



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13. Pick out the correct statement with respect to $[Mn(CN)_6]^{3-}$ -

A. It is sp^3d^2 hybridised and octahedral

B. It is sp^3d^2 hybridised and tetrahedral

C. It is d^2sp^3 hybridised and octahedral

D. It is dsp^3 hybridised and square planar

Answer: C



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14. Extraction of gold and silver involves leaching with CN^- ion. Silver is later recovered by-

- A. Liquation
- B. Distillation
- C. Zone refining
- D. Displacement with Zn

Answer: C



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15. The species , having bond angles of 120° is -

- A. PH_3
- B. ClF_3
- C. NCl_3

D. BCl_3

Answer: D



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16. The correct order of the stoichiometries of $AgCl$ formed when $AgNO_3$ in excess is treated with the complexes: $CoCl_3.6NH_3$, $CoCl_3.5NH_3$, $CoCl_3.4NH_3$ respectively is -

A. $1AgCl$, $3AgCl$, $2AgCl$

B. $3AgCl$, $1AgCl$, $2AgCl$

C. $3AgCl$, $2AgCl$, $1AgCl$

D. $2AgCl$, $3AgCl$, $1AgCl$

Answer: C



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17. Which of the following is dependent on temperature ?

- A. Molality
- B. Molarity
- C. Mole fraction
- D. Weight percentage

Answer: B



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18. Which of the following statements is not correct ?

- A. Insulin maintains sugar level in the blood of a human body
- B. Ovalbumin is a simple food reserve in egg-white
- C. Blood proteins thrombin and fibrinogen are involved in blood clotting
- D. Denaturation makes the proteins more active

Answer: D



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19. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric field ?

A. Na

B. k

C. Rb

D. Li

Answer: D



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20. Mixture of chloroxylenol and terpineol acts as-

- A. analgesic
- B. antiseptic
- C. antipyretic
- D. antibiotic

Answer: B



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21. $HgCl_2$ and I_2 both when dissolved in water containing I^- ions the pair of species formed is -

- A. HgI_2, I_3^-
- B. HgI_2, I^-
- C. HgI_4^{2-}, I_3^-
- D. Hg_2I_2, I^-

Answer: C

22. Name the gas that can readily decolourise acidified $KMnO_4$ solution-

A. CO_2

B. SO_2

C. NO_2

D. P_2O_5

Answer: B

23. Which of the following reactions is appropriate for converting acetamide to methanamine ?

A. Carbylamine reaction

B. Hoffmann hypobromamide reaction

C. Stephens reaction

D. Garbriels phthalimide synthesis

Answer: B



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