



CHEMISTRY

BOOKS - CHHAYA CHEMISTRY (BENGALI ENGLISH)

PREVIOUS YEAR QUESTION PAPER 2017

Wbchse 2017 Section I

1. Maximum how many number of electrons of Cl atom follow the relation

$$n+l=3-$$

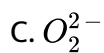
- A. 3
- B. 8
- C. 10
- D. 16

Answer:



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2. Which has the smallest bond-length ?

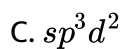
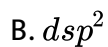


Answer:



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3. What is the hybridisation state of central I -atom in I_3^- ?



D. sp^3d

Answer:



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4. Which of the following is the unit of van der Waals gas constant b ?

A. $L^2 \cdot \text{mol}$

B. $L \cdot \text{mol}^{-2}$

C. $L \cdot \text{mol}$

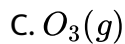
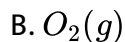
D. $L \cdot \text{mol}^{-1}$

Answer:



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5. At 25°C which of the following has enthalpy of formation zero ?

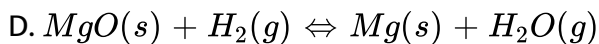
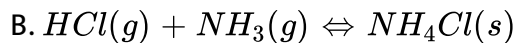
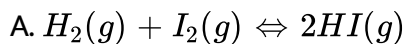


Answer:



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6. For which of the following reactions , $\Delta S > 0$?



Answer:



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7. In which of the following cases chemical reaction goes to completion in highest extent ?

A. $K = 10^6$

B. $K = 10^{-6}$

C. $K = 10^{-8}$

D. $K = 1$

Answer:



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8. Maximum how many number of H-bonds can be formed by a single H_2O molecule ?

A. 1

B. 2

C. 3

D. 4

Answer:



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9. What is the pH of 10^{-7} (M) HCl solution ?

A. 7

B. 6.79

C. 6.12

D. 7.1

Answer:



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10. Which of the following compounds contains bridge-bond ?

- A. Water
- B. Inorganic benzene
- C. Phenol
- D. Diborane

Answer:



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11. Which of the following compounds is formed when a nitrogenous organic compound is heated with metallic sodium ?

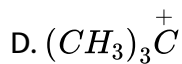
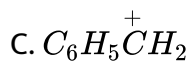
- A. Sodium nitrate
- B. Sodium nitrite
- C. Sodium amide
- D. Sodium cyanide

Answer:



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12. Which of the following is the stablest carbocation ?



Answer:



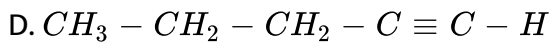
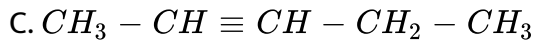
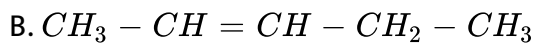
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13. Which of the following is insoluble in dil. H_2SO_4 ?

A



A.

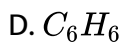
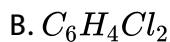


Answer:



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14. Which compound is responsible for hole formation in stratosphere of ozone layer ?



Answer:



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Wbchse 2017 Section II

1. A metallic oxide contains 60 % of metal . Calculate the equivalent weight of the metal .



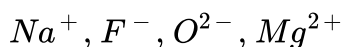
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2. Calculate the equivalent weight of phosphate radical .



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3. Arrange the following ions in ascending order of radius :



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4. Is the electronegativity of Sn^{2+} and Sn^{4+} equal or different ? Explain .



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5. State the third law of thermodynamics .



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6. Draw the structure of an aromatic compound having molecular formula $C_{12}O_9$.



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7. A polymer contains 0.16 % of sulfur by weight . What is the minimum molecular weight of the polymer ?



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8. Calculate the wavelength of H_α and H_β lines in Balmer series .



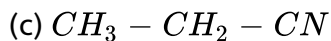
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9. When an electron jumps down from 5th Bohr orbit to 3rd Bohr orbit in H atom, then how many numbers of spectral lines will be formed ?



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10. Explain the order of basicity of the following compounds :



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11. Write short notes on Eutrophication .



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12. State Pauli's exclusion principle .



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13. How many number of electrons are present iin one $HClO_4$ molecule ?



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14. What is the oxidation state of Tl in the compound TlI_3 ?



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15. Which is stronger oxidising agent between CO_2 and PbO_2 and why ?



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16. Which one is more stable between BCl_3 and $TlCl_3$ and why ?



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17. What is the oxidation state of Zn in Zn-Hg ?



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18. Calculate the bond order of $[He - H]^+$ from molecular orbital theory

.



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19. Both $Br_2(g)$ and $NO_2(g)$ are reddish brown gaseous substances .
How will you chemically distinguish between them ?



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20. What will be the order of covalent character of the following compounds

(a) LiF (b) LiCl (c) LiBr (d) LiI



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21. Write the van der Waals equation for real gas ? Write the unit of a and b.



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22. What will be the ratio of rate of diffusion of $^{235}\text{UF}_6$ and $^{238}\text{UF}_6$?



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23. Heat of combustion of benzene is $xJ \cdot \text{mol}^{-1}$. Heat of formation of carbon dioxide and water are $yJ \cdot \text{mol}^{-1}$ and $zJ \cdot \text{mol}^{-1}$ respectively. Calculate the heat of formation of benzene.



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24. Boiling point of ethanol is $78.4^{\circ}C$.

Change in enthalpy during vaporisation of ethanol is $96J \cdot mol^{-1}$.

Calculate the change in entropy of vaporisation of ethanol.



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25. Calculate the oxidation state of sulfur in H_2SO_5 .



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26. $P_4 + 3NaOH + 3H_2O \rightarrow PH_3 + 3NaH_2PO_2$ What is the equivalent weight of P_4 in the above reaction?



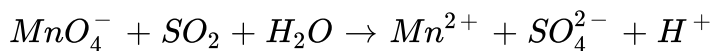
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27. What is the oxidation state of Cr in CrO_5 ?



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28. Balance the equation by ion-electron method :



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29. BaO_2 is a peroxide , but MnO_2 is not a peroxide Explain .



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30. What is Calgon ?



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31. What happens when $LiNO_3$ is strongly heated ? Write down the equation ?



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32. Which two alkaline earth metals cannot be identified by flame test ?



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33. Write down the preparation of Plaster of Paris with equation .



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34. Is-2- hydroxypropanoic acid optically active ? Explain .



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35. 20 g of NaOH is present in 250 mL of H_2O . Calculate the active mass of the solution .

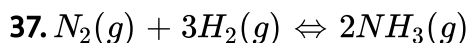


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36. State Le-Chateliers principle.



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NH_3 is x . Express K_p of the reaction with respect to x and P , where value of x is very small .



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38. Is aqueous solution of Borax basic ? Explain .



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39. Calculate the pH of $0.05(M)H_2SO_4$ solution .



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40. What is the formula of conjugate base of $[Al(H_2O)_6]^{3+}$?



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41. CCl_4 does not undergo hydrolysis but $SiCl_4$ undergoes ready hydrolysis -Why?



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42. What happens when boric acid solution is mixed with KHF_2 solution ? Give equation .



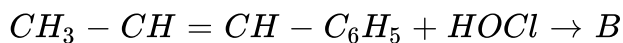
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43. Draw one canonical structure of O_2 .



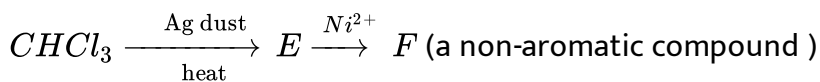
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44. Draw structural formula of compound from A to F .



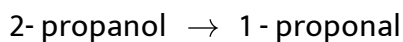
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45. Draw structural formula of compound from A to F .



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46. Convert :



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47. Convert :

2-butene \rightarrow ethane



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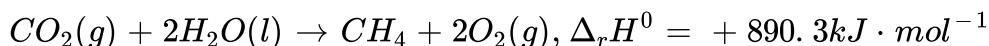
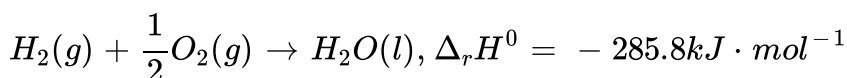
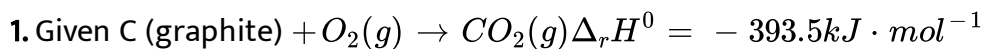
48. Convert :

Phenol \rightarrow Benzene



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Based on the above thermochemical equations , the value of $\Delta_r H^0$ at 298 K for the reaction $C(\text{graphite}) + 2H_2(g) \rightarrow CH_4(g)$ will be -

- A. $-74.8 \text{ kJ} \cdot \text{mol}^{-1}$
- B. $-144.0 \text{ kJ} \cdot \text{mol}^{-1}$
- C. $+74.8 \text{ kJ} \cdot \text{mol}^{-1}$
- D. $+144.0 \text{ kJ} \cdot \text{mol}^{-1}$

Answer:



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2. 1 gram of a carbonate (M_2CO_3) on treatment with excess HCl produces 0.01186 mole of CO_2 . The molar mass of M_2CO_3 in $g \cdot \text{mol}^{-1}$ is -

- A. 118.6
- B. 11.86
- C. 1186

D. 84.3

Answer:



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3. ΔU is equal to -

- A. Adiabatic work
- B. Isothermal work
- C. Isochoric work
- D. Isobaric work

Answer:



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4. The radius of the second Bohr orbit for hydrogen atom is (Planck's Const. $h = 6.6262 \times 10^{-34} J \cdot s$, mass of electron $e = 1.60210 \times 10^{-19} C$, permittivity of vacuum $\epsilon^0 = 8.854185 \times 10^{-12} kg^{-1} \cdot m^{-3} \cdot A^2$) -

A. 0.529 Å

B. 2.12 Å

C. 1.65 Å

D. 4.76 Å

Answer:



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5. pK_a of a weak acid (HA) and pK_b of a weak base (BOH) are 3.2 and 3.4 respectively. The pH of their salt (AB) solution is -

A. 7.0

B. 1.0

C. 7.2

D. 6.9

Answer:



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6. Both lithium and magnesium display several similar properties due to the diagonal relationship, however, the one which is incorrect is -

A. Both form nitrides

B. Nitrates of both Li and Mg yield NO_2 and O_2 on heating

C. Both form basic carbonates

D. Both form soluble bicarbonates

Answer:



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7. Which of the following species is not paramagnetic ?

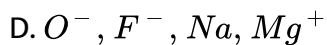
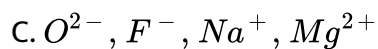
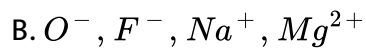
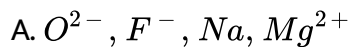


Answer:



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8. The group having isoelectronic species is -



Answer:



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9. The most abundant elements by mass in the body of a healthy human adult are : Oxygen (61.4 %) , Carbon (22.9 %) , Hydrogen (10.0 %) and Nitrogen (2.6%) .

The weight which a 75 kg person would gain if all 1H atoms are replaced by 2H atoms is -

A. 7.5 kg

B. 10 kg

C. 15 kg

D. 37.5 kg

Answer:



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10. 3-methylpent-2-ene on reaction with HBr in presence of peroxide forms an addition product . The number of possible stereoisomers for the product is -

- A. Two
- B. Four
- C. Six
- D. Zero

Answer:



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1. The correct statement regarding electrophile is -

- A. Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from a nucleophile
- B. Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from another electrophile
- C. Electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile
- D. Electrophile can be either neutral or positively charged species and can form a bond by accepting a pair of electrons from a nucleophile

Answer:



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2. A gas is allowed to expand in a well insulated container against a constant external pressure of 2.5 atm from an initial volume of 2.50 L to a final volume of 4.50 L . The change in internal energy ΔU of the gas in joules will be -

A. 1136.25 J

B. -500 J

C. -505 J

D. $+505$ J

Answer:



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3. The element $Z = 114$ has been discovered recently . It will belong to which of the following family /group and electronic configuration ?

A. Halogen family , $[\text{Rn}] 5f^{14}, 6d^{10}7s^27p^5$

B. Carbon family $[\text{Rn}] 5f^{14}d^{10}7s^27p^2$

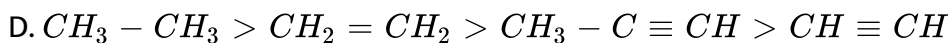
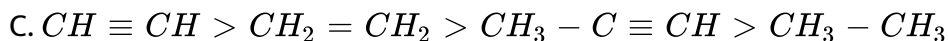
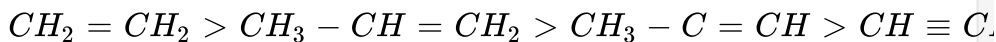
C. Oxygen family , $[\text{Rn}] 5f^{14}6d^{10}7s^27p^4$

D. Nitrogen family , $[\text{Rn}] 5f^{14}6d^{10}7s^27p^6$

Answer:

4. Which one is the correct order of acidity ?

A.



Answer:

5. With respect to the conformers of ethane , which of the following statements is true ?

A. Bond angle remains same but bond length changes

- B. Bond angle changes but bond length remains same
- C. Both bond angle and bond length change
- D. Both bond angles and bond length remain same

Answer:



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6. Which one of the following pairs of species have the same bond order ?

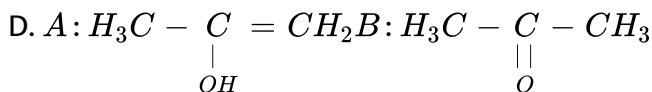
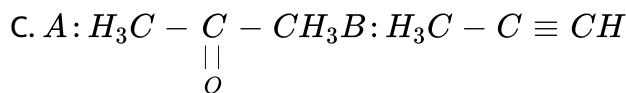
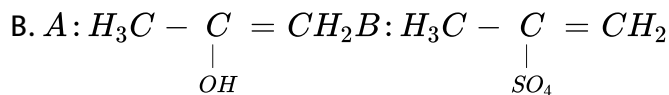
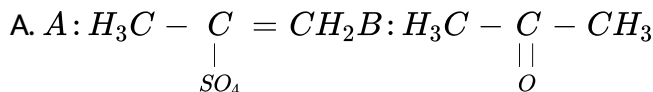
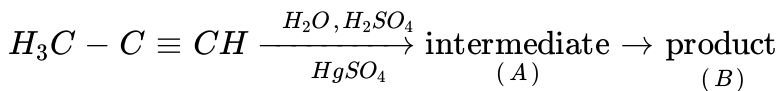
- A. CO , NO
- B. O_2 , NO^+
- C. CN^- , CO
- D. N_2 , O_2^-

Answer:



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7. Predict the correct intermediate and product in the following reaction :



Answer:



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8. Which of the following is a sink for CO ?

A. Haemoglobin

B. Micro-organisms present in the soil

C. Oceans

Answer:



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9. Mechanism of a hypothetical reaction $X_2 + Y_2 \rightarrow 2XY$ is given below

: (i) $X_2 \rightarrow X + X$ (fast) (ii) $X + Y_2 \rightleftharpoons XY + Y$ (slow) (iii)

$X + Y \rightarrow XY$ (fast)

The overall order of the reaction will be -

A. 1

B. 2

C. 0

D. 1.5

Answer:



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10. Concentration of the Ag^+ ions in a saturated solution of $Ag_2C_2O_4$ is $2.2 \times 10^{-4} M$). Calculate K_{sp}

A. 2.42×10^{-8}

B. 2.66×10^{-12}

C. 4.5×10^{-11}

D. 5.3×10^{-12}

Answer: D



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11. For a given reaction, $\Delta H = 3.5 kJ mol^{-1}$ and $\Delta S = 83.6 J \cdot K^{-1} mol^{-1}$. The reaction is spontaneous at (assume ΔH and ΔS do not vary with temperature) -

A. $T < 425 K$

B. $T > 425 K$

C. all temperature

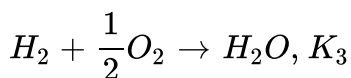
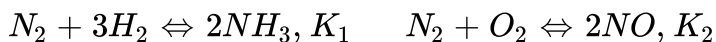
D. $T > 298K$

Answer:

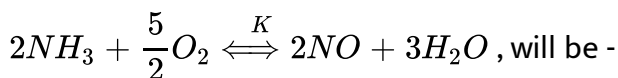


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12. The equilibrium constants of the following are -



The equilibrium constant (K) of the reaction :



A. $K_1 K_3 / K_2$

B. $K_2 K_3^3 / K_1$

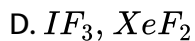
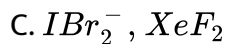
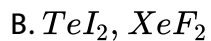
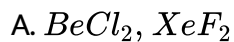
C. $K_2 K_3 / K_1$

D. $K_2^3 K_3 / K_1$

Answer:

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13. Which of the following pairs of compounds is isoelectronic and isostructural ?



Answer:

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