



## CHEMISTRY

### BOOKS - CHHAYA CHEMISTRY (BENGALI ENGLISH)

### PREVIOUS YEAR QUESTION PAPER 2016

#### Wbchse 2016 Section I

1. Number of total electrons in n-th orbit of an atom is -

A.  $n$

B.  $n^2$

C.  $2n^2$

D.  $n - 1$

**Answer: C**



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2. The bond order of  $He_2^+$  ion is -

A. 0

B. 0.5

C. 1

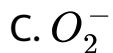
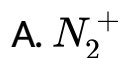
D. 1.5

**Answer: B**



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**3. Which is not paramagnetic of the following?**



**Answer: B**



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4. Surface tension of water with increase of temperature may-

- A. increase
- B. decrease
- C. remain same
- D. show irregular behaviour

**Answer: B**



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5. Which one of the following relation shows spontaneity ?

A.  $\Delta H = T\Delta S$

B.  $\Delta H > T\Delta S$

C.  $\Delta H < T\Delta S$

D.  $\Delta H \neq T\Delta S$

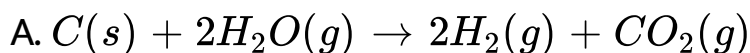
**Answer: C**

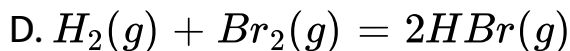
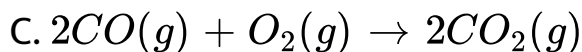


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**6.** For which of the following chemical equation has

$$\Delta H = \Delta U$$





**Answer: D**



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7.  $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$  . For this reaction at the chemical equilibrium condition which of the following relation is correct ?

A.  $K_p = K_c$

B.  $K_c = K_p \times RT$

C.  $K_p = K_c \times RT$

$$\text{D. } K_p = \frac{1}{K_c}$$

**Answer: C**



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**8.** Cause of different colour of the flame in flame test is -

A. low ionisation potential

B. low melting point

C. maleability

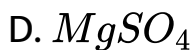
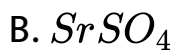
D. presence of one electron in the outermost orbit

**Answer: A**



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9. Which of the following alkaline earth metal sulphate is most soluble in water ?



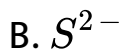
**Answer: D**



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10. If in an organic compound both N and S elements are present in Lassaigne's test which ion may be found ?

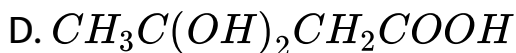
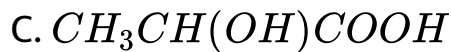
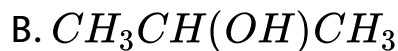
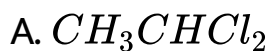


**Answer: D**



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11. In which of the following compound chiral C-atom is present

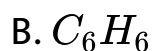
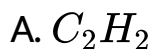


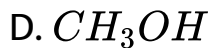
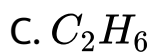
**Answer: C**



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**12.** Which one is most acidic among the given compounds ?





**Answer: D**



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**13.** The compound produced after the ozonolysis of benzene is-

A. glyoxal

B. methanal

C. ethanal

D. hexanal

**Answer: A**



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**14.** Which one of the following is not a green house gas ?

A. CFC

B. ammonia

C. carbon dioxide

D. methane

**Answer: B**



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## Wbchse 2016 Section II Group A

1. How many electrons are present in 1 millimol of methane ?



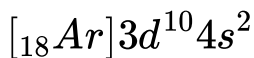
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2. 2.7 gram of a metal after reaction with excess acid produces 3.36 litre of  $H_2$  at NTP . What is the equivalent weight of the metal ?



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3. Determine the position of an element in long form of periodic table if its electronic configuration is



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4. Mention the name and position of two elements , one of which is most electronegative and other is most electropositive in periodic table .



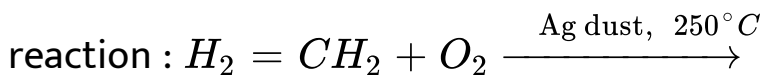
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5. Write the definition of entropy .



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6. Write the name and structural formula of A in the



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Wbchse 2016 Section II Group B

1. In two compounds of hydrogen and oxygen , hydrogen present in 42.9 % and 27.3 % respectively . Show that the data support the law of multiple proportions .



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2. Mention Heisenberg's uncertainty principle . Calculate the uncertainty of velocity of an electron which have an uncertainty in position of  $1 \text{ \AA}$  .



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3. If the energy of 1st Bohr's orbit is  $-13.58 \text{ eV}$  of a H-atom , calculate energy of third Bohr's orbit of the atom .



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4. Explain the phenomenon : " When phenolphthalein is added to aqueous solution of borax the colour of the



solution changed to pink which is again turn colourless if glycerol is added to it" .



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5. Between  $CH_3COOH$  and  $HCOOH$  which one is most acidic and why ?



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6. Name IUPAC name of  $HOH_2C - CHOH - CH_2OH$



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7. Name IUPAC name of  $CH_3CCl_2 - CH_2 - COOH$



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8. What is BOD ? Write one harmful effect on it .



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### Wbchse 2016 Section II Group C

1. State Hund's rule .



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2. Between two ions  $Fe^{2+}$  &  $Fe^{3+}$ , which one is more stable and why?



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3. Which of the following two elements have a diagonal relationship? Li, Be, Al and Si.



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4. Between  $_{29}Cu$  and  $_{19}K$  which one has higher ionisation enthalpy and why?



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5. Why does electron affinity of chlorine is higher than that of fluorine ?



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6. Arrange the foloowing oxides according to their increase of acidity -  $LiO$ ,  $BeO$ ,  $B_2O_3$  and  $CO_2$  .



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7. Arrange the following compounds according to their increase of melting point :  $NaCl$ ,  $MgCl_2$ ,  $AlCl_3$



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8. Between  $NH_3$  and  $NF_3$  which one is more polar and why ?



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9. Why does the  $PCl_5$  exist but  $NCl_5$  does not ?



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10. Why does  $BaSO_4$  is not stable in water ?



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11. For which property of the liquid the shape of a liquid drop is spherical ?



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12. In a 10 litre volumetric flask contains 1 gram He and 6.4 gram  $O_2$  at  $27^\circ C$  temperature . If that total pressure of the mixture is 1.107 atmosphere , then what is the partial pressure of He and  $O_2$  ?



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13. If the standard formation- enthalpy of  $CS_2$ ,  $CO_2$  and  $SO_2$  are  $117kJ \cdot mol^{-1}$ ,  $- 393kJ \cdot mol^{-1}$  and

$-297 \text{ kJ} \cdot \text{mol}^{-1}$  respectively, calculate the standard reaction enthalpy of  $\text{CS}_2 + 3\text{O}_2 \rightarrow \text{CO}_2 + 2\text{SO}_2$



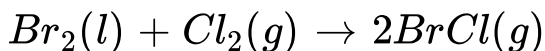
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14. State Hess's Law .



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15. Judge the spontaneity of the following reaction at 298 K temperature and at a particular pressure :



Given :

$$\Delta H = 29.3 \text{ kJ} \cdot \text{mol}^{-1} \quad \text{and}$$

$$\Delta S = 104.1 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$$



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16. Mention the oxidation number of two chlorine atoms in  $\text{Ca}(\text{OCl})\text{Cl}$  molecule .



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17. Balance the chemical equation by oxidation number method :  $P + \text{NaOH} + \text{H}_2\text{O} \rightarrow \text{PH}_3 + \text{NaH}_2\text{PO}_2$



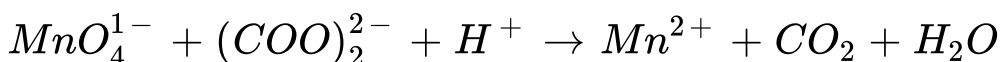
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18. What is the oxidation number of N atom is  $\text{NaN}_3$  molecule ?



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19. Balance the chemical equation by ion electron method :

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20. A water sample contains 1 millimol of  $Mg^{2+}$  ion per litre . Calculate the hardness of the water sample in ppm unit .

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21. What do you understand by 'Trailing of Mercury' ?



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22. Why do most of the lithium salts are present as hydrated one ?



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23. Which of the alkaline earth metal hydroxides are amphoteric in nature ?



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24. What is hydrolith ?



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25. Why does  $BF_3$  behave as Lewis acid ?



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26. Write with equation what happens when ? Water is added to calcium carbide .



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27. By which property the stability of  $(CH_3)_3C^+$  ion could be explained ?



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28. Why methane could not be prepared by Wurtz reaction ?



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## Wbchse 2016 Section II Group D

1. State law of mass action .

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2. For the reaction  $N_2 + 3H_2 \rightleftharpoons 2NH_3$  equilibrium constant is  $K_1$  and that of for the reaction  $NH_3 \rightleftharpoons \frac{1}{2}N_2 + \frac{3}{2}H_2$  is  $K_2$ . (ii) Then calculate the relation between  $K_1$  and  $K_2$ .

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3. Calculate the pH of 0.01 (M)  $CH_3COOH$  at  $25^\circ C$ .

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4. What is buffer solution ? Give one example of acidic buffer . In which case of acidic buffer  $\text{pH} = \text{pK}_a$  ?



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5. Why does dissociation rate of  $\text{H}_2\text{S}$  is decreased in presence of  $\text{HCl}$  in aqueous solution ?



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6. What is inorganic benzene ? How does it prepare ? State with conditions and equation .



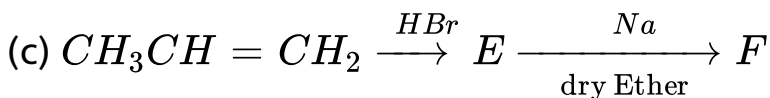
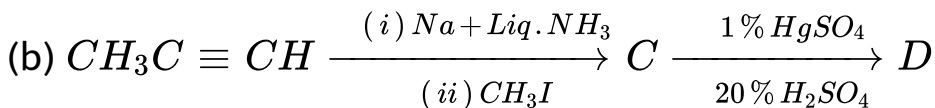
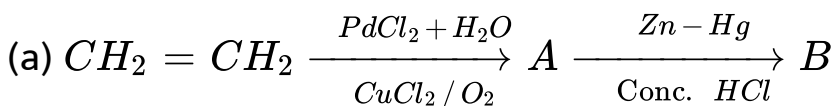
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7. Why graphite is conductive to electricity but diamond is not ?



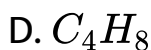
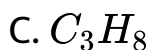
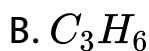
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8. Write the structural formula of the compound of A to F .



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1. At 300 K , and 1 atm , 15 mL of a gaseous hydrocarbon requires 375 mL air containing 20%  $O_2$  by volume for complete combustion . After combustion the gases occupy 330 mL . Assuming that the water formed is in liquid form and the volumes were measured at the same temperature and pressure , the formula of the hydrocarbon is -



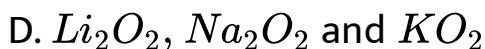
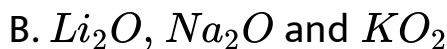
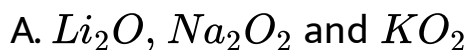


**Answer:**



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2. The main oxides formed on combustion of Li, Na and K in excess of air are respectively -



**Answer:**



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3. Which of the following atoms has the highest first ionization energy ?

A. Sc

B. Rb

C. Na

D. K

**Answer:**



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4. The distillation technique most suited for separating glycerol from spent-lye in the soap industry is -

A. Distillation under reduced pressure

B. simple distillation

C. Fractional distillation

D. Steam distillation

**Answer:**



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5. The concentration of fluoride , lead , nitrate and iron in a water sample from an underground lake was found

to be 1000 ppb , 40 ppb , 100 ppm and 0.2 ppm , respectively. This water is unsuitable for drinking due to high concentration of-

A. Iron

B. Fluoride

C. Lead

D. Nitrate

**Answer:**



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6. The heats of combustion of carbon and carbon monoxide are  $-393.5$  and  $-285.5 \text{ kJ} \cdot \text{mol}^{-1}$  ,

respectively . The heat of formation (in kJ) of carbon monoxide per mole is -

A.  $-110.5$

B.  $110.5$

C.  $676.5$

D.  $-676.5$

**Answer:**



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7. The species in which the N atom is in a state of  $sp$  hybridization is -



**Answer:**



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8. The equilibrium constants at 298 K for a reaction  $A + B \rightleftharpoons C + D$  is 100 . If the initial concentration of all the four species were 1 M each , then equilibrium concentration of D ( in mol .  $L^{-1}$  ) will be -

A. 1.182

B. 0.182

C. 0.818

D. 1.818

**Answer:**



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**9. Which one of the following statements about water is FALSE ?**

A. Ice formed by heavy water sinks in normal water

B. Water is oxidized to oxygen during photosynthesis

C. Water can act both as an acid and as a base

D. There is extensive intramolecular hydrogen bonding in the condensed phase

**Answer:**



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10. A stream of electrons from a heated filament was passed between two charged plates kept at a potential difference  $V$  esu . If  $e$  and  $m$  are charge and mass of an electron respectively , then the value of  $h / \lambda$  ( where  $\lambda$  is wavelength associated with electron wave) is given by -

A.  $\sqrt{2meV}$



B. meV

C. 2 me V

D.  $\sqrt{meV}$

**Answer:**



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**Neet 2016 Phase I**

1. Consider the molecules  $CH_4$ ,  $NH_3$  and  $H_2O$  . Which of the given statements is false ?

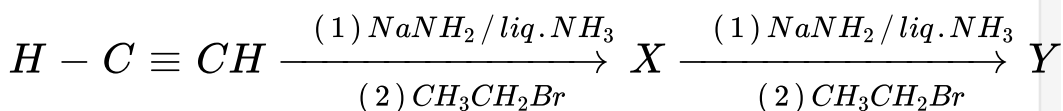
- A. The H-C-H bond angle in  $CH_4$ , the H-N-H bond angle in  $NH_3$  and the H-O-H bond angle in  $H_2O$  are all greater than  $90^\circ$
- B. The H-O-H bond angle in  $H_2O$  is larger than the H-C-H bond angle in  $CH_4$
- C. The H-O-H bond angle in  $H_2O$  is smaller than the H-N-H bond angle in  $NH_3$
- D. The H-C-H bond angle in  $CH_4$  is larger than the H-N-H bond angle in  $NH_3$

**Answer:**



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2. In the reaction



X and Y are -

A. X = 1 - butyne , Y = 3 - hexyne

B. X = 2 - butyne , Y = 3 - hexyne

C. X = 2 - butyne , Y = 2-hexyne

D. X = 1 -butyne , Y = 2-hexyne

**Answer:**



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3. In which of the following options the order of arrangement does not agree with the variation of property indicated against it ?

A.  $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$  (increasing ionic size )

B.  $B < C < N < O$  (increasing first ionisation enthalpy )

C.  $I < Br < Cl < F$  ( increasing electron gain enthalpy )

D.  $Li < Na < K < Rb$  ( increasing metallic radius)

**Answer:**





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4. Which of the following statements about hydrogen is incorrect ?

- A. Hydrogen has three isotopes of which tritium is the most common
- B. Hydrogen never acts as cation in ionic salts
- C. Hydronium ion ,  $H_3O^+$  exists freely in solution
- D. Dihydrogen does not act as a reducing agent

**Answer:**



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5. MY and  $NY_3$  , two nearly insoluble salts , have the same  $K_{sp}$  values of  $6.2 \times 10^{-13}$  at room temperature . Which statement would be true in regard to MY and  $NY_3$  ?

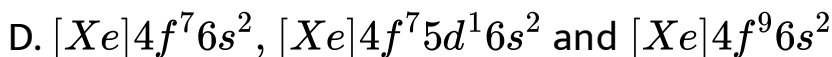
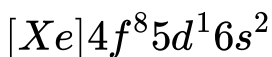
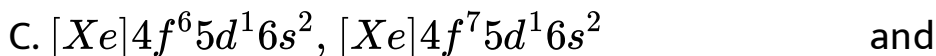
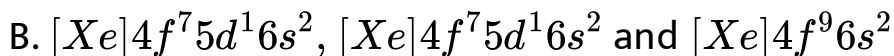
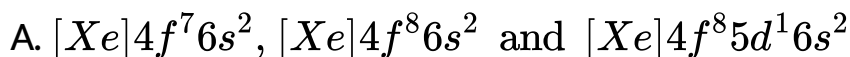
- A. The molar solubilities of MY and  $NY_3$  in water are identical
- B. The molar solubility of MY in water is less than that of  $NY_3$
- C. The salts MY and  $NY_3$  are more soluble in 0.5 M KY than in pure water .
- D. The addition of the salt of KY to solution of MY and  $NY_3$  will have no effect on their solubilities .

**Answer:**



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6. The electronic configurations of Eu (Atomic No. 63) ,  
Gd (Atomic No. 64) and Tb (Atomic No. 65) are



**Answer:**



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7. Two electrons occupying the same orbital are distinguished by -

- A. Principal quantum number
- B. Magnetic quantum number
- C. Azimuthal quantum number
- D. Spin quantum number

**Answer:**



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8. The correct thermodynamic conditions for the spontaneous reaction at all temperatures is -

A.  $\Delta H < 0$  and  $\Delta S = 0$

B.  $\Delta > 0$  and  $\Delta S < 0$

C.  $\Delta H < 0$  and  $\Delta S > 0$

D.  $\Delta < 0$  and  $\Delta S < 0$

**Answer:**



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9. Equal moles of hydrogen and oxygen gases are placed in a container with a pin-hole through which both can

escape . What fraction of the oxygen escapes in the time required for one-half of the hydrogen to escape ?

A.  $1/8$

B.  $1/4$

C.  $3/8$

D.  $1/2$

**Answer:**



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**10.** Predict the correct order among the following -

A. lone pair - long pair > lone pair - bond pair >  
bond pair - bond pair

B. lone pair - long pair > bond pair - bond pair >  
long pair - bond pair

C. bond pair - bond pair > lone pair - bond pair >  
lone pair - lone pair

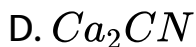
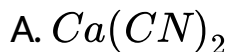
D. lone pair - bond pair > bond pair - bond pair >  
lone pair - lone pair

**Answer:**



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11. The product obtained as a result of a reaction of nitrogen with  $CaC_2$  is -



**Answer:**



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12. The correct statement regarding the comparison of staggered and eclipsed conformation of ethane , is -

- A. The staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has torsional strain
- B. The eclipsed conformation of ethane is more stable than staggered conformation because eclipsed conformation has no torsional strain
- C. The eclipsed conformation of ethane is more stable than staggered conformation even though the eclipsed conformation has torsional strain
- D. The staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain

**Answer:**



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13. The pair of electron in the given carbanion ,  $CH_3C \equiv C^\ominus$  , is present in which of the following orbitals ?

A.  $2p$

B.  $sp^3$

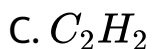
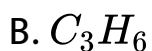
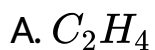
C.  $sp^2$

D.  $sp$

**Answer:**

## Neet 2016 Phase Ii

1. The compound that will react most readily with gaseous bromine has the formula -



**Answer:**

2. Which one of the following compounds shows the presence of intramolecular hydrogen bond ?

A. Conc.  $CH_3COOH$

B.  $H_2O_2$

C.  $HCN$

D. Cellulose

**Answer:**



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3. For a sample of perfect gas when its pressure is changed isothermally from  $p_i$  to  $p_f$ , the entropy change is given by

A.  $\Delta S = RT \ln\left(\frac{p_i}{p_f}\right)$

B.  $\Delta S = nR \ln\left(\frac{p_f}{p_i}\right)$

C.  $\Delta S = nR \ln\left(\frac{p_i}{p_f}\right)$

D.  $\Delta S = nRT \ln\left(\frac{p_f}{p_i}\right)$

**Answer:**



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4. The percentage of pyridine ( $C_5H_5N$ ) that forms pyridinium ion ( $C_5H_5N^+H$ ) in a 0.10 M aqueous pyridine solution ( $K_b$  for  $C_5H_5N = 1.7 \times 10^{-9}$ ) is -

A. 1.6 %

B. 0.0060 %

C. 0.013 %

D. 0.77 %

**Answer:**



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5. The solubility of  $\text{AgCl(s)}$  with solubility product  $1.6 \times 10^{-10}$  in  $0.1 \text{ M NaCl}$  solution would be -

A. zero

B.  $1.26 \times 10^{-5} \text{ M}$

C.  $1.6 \times 10^{-9} \text{ M}$

D.  $1.6 \times 10^{-11} \text{ M}$

**Answer: C**



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6. Suppose the elements X and Y combine to form two compounds  $\text{XY}_2$  and  $\text{X}_3\text{Y}_2$ . When 0.1 mole of  $\text{XY}_2$

weighs 10 g and 0.05 mole of  $X_3Y_2$  weighs 9 g , the atomic weights of X and Y are -

A. 30 , 20

B. 40 , 30

C. 60 , 40

D. 20 , 30

**Answer:**



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7. The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is (charge on electron =  $1.60 \times 10^{-19} C$ ) -

A.  $7.48 \times 10^{23}$

B.  $6 \times 10^{23}$

C.  $6 \times 10^{20}$

D.  $3.75 \times 10^{20}$

**Answer:**



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**8.** Boric acid is an acid because its molecule -

A. combines with proton from water molecule

B. contains replaceable  $H^+$  ion

C. gives up a proton

D. accepts  $OH^-$  from water releasing proton

**Answer:**



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9. The suspension of slaked lime in water is known as -

A. aqueous solution of slaked lime

B. lime water

C. quicklime water

D. milk of lime

**Answer:**



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10. The hybridizations of atomic orbitals of nitrogen in  $NO_2^+$ ,  $NO_3^-$  and  $NH_4^+$  respectively are -

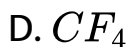
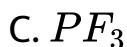
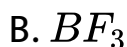
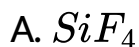
- A.  $sp^2$   $sp$  and  $sp^3$
- B.  $sp$ ,  $sp^3$  and  $sp^2$
- C.  $sp^2$ ,  $sp^3$  and  $sp$
- D.  $sp$ ,  $sp^2$  and  $sp^3$

**Answer:**



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11. Which of the following fluoro-compounds is most likely to behave as a Lewis base ?



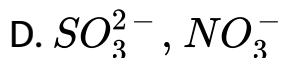
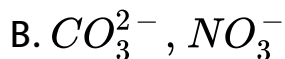
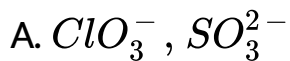
**Answer:**



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12. Which of the following pairs of ions is isoelectronic and isostructural ?





**Answer:**



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**13.** In context with beryllium, which one of the following statements is incorrect ?

A. Its hydride is electron-deficient and polymeric

B. It is rendered passive by nitric acid

C. It forms  $Be_2C$

D. Its salts rarely hydrolyze

**Answer:**



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**14.** Which of the following pairs of a d-orbitals will have electron density along the axes ?

A.  $d_{xy}$ ,  $d_{x^2 - y^2}$

B.  $d_{z^2}$ ,  $d_{xz}$

C.  $d_{xz}$ ,  $d_{yz}$

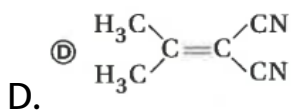
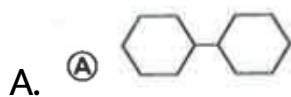
D.  $d_{z^2}$ ,  $d_{x^2 - y^2}$

Answer:



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15. In which of the following molecules, all atoms are coplanar ?

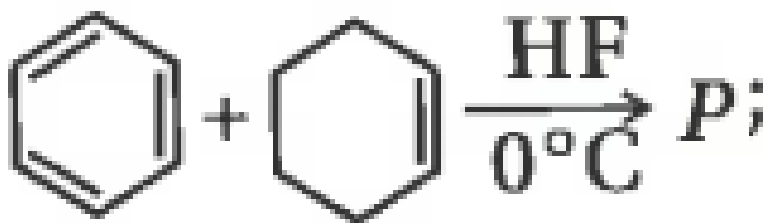


Answer:

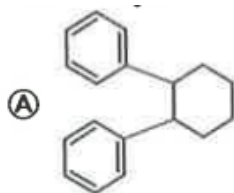


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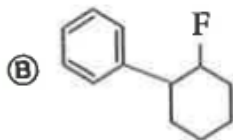
16. In the given reaction



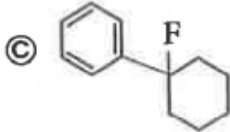
the product P is -



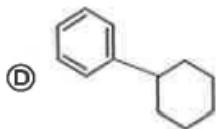
A.



B.



C.



D.

**Answer:**



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