NUCLEON CHEMISTRY

CLASSS FOR IIT-JEE

CT for
Target IIT-JEE 2016

Time : 1 hr **Marks : 84**

Atomic masses : [H = 1, D = 2, Li = 7, C = 12, N = 14, O = 16, F = 19, Na = 23, Mg = 24, Al = 27, Si = 28, P = 31, S = 32, Cl = 35.5, K = 39, Ca = 40, Cr = 52, Mn = 55, Fe = 56, Cu = 63.5, Zn = 65, As = 75, Br = 80, Ag = 108, I = 127, Ba = 137, Hg = 200, Pb = 207]

PAPER- (JEE-ADVANCED)

MCQ (9) [4 , –2]

1. 64 gm of an organic compound has 24 g carbon and rest hydrogen and oxygen. The empirical formula of the compound is

(A) CH_4O (B) CH_2O (C) CH_3OH (D) $C_2H_8O_2$

2. When 2.86 g of a mixture of C_4H_8 and C_4H_{10} was burnt in sufficient oxygen 4.14 g of water was formed. which options are correct:

(A) 8.8 gm CO_2 formed (B) 0.2 mole CO_2 formed

(C) 1.12 g C_4H_8 in mixture (D) 0.03 mole C_4H_{10}

3. If 200 kg of 95% pure limestone ($CaCO_3$) is heated then

(A) mass of CaO obtained 106.4 kg. (B) mass of CaO obtained 212.8 kg.

(C) mass of CaO obtained 83.6 kg. (D) mass of CO_2 obtained 83.6 kg.

4. 'When 100 ml of 80% (w/v) NaOH is mixed with certain amount of 40% (w/w) NaOH solution of density 1.2 gm/ml, the percentage concentration of final solution becomes 60% (w/v). Which options are correct ?

(A) molarity = 10M (B) total volume of solution = 0.267M

(C) total moles of NaOH = 2 (D) molarity = 15M

5. 50 milliliters of CO is mixed with 20 mL of oxygen and sparked. After the reaction, the mixture is treated with an aqueous KOH solution. Choose the correct option.

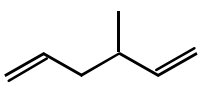
(A) The volume of the CO that reacts = 40 mL

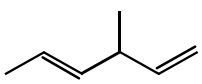
(B) The volume of the CO_2 formed = 40 mL.

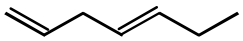
(C) The volume of the CO that remains after treatment with KOH = 10 mL

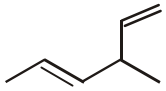
(D) The volume of the CO that remains after treatment with KOH = 20 mL

6. Which of the following is bondline structure of $CH_3-CH=CH-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH=CH_2$

(A) 

(B) 

(C) 

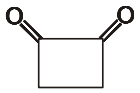
(D) 

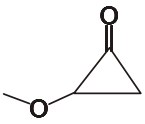
7. Select the correct options for molecular formula $C_2H_2Cl_2$

(A) The total number of isomers is 4. (B) Only two compounds are geometrical isomers.

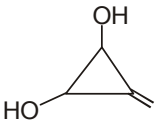
(C) All isomers have 5σ bonds and one π bond. (D) Its has linear shape.

8. The possible structures of molecular formula $C_4H_6O_2$

(A) 

(B) 

(C) 

(D) 

9. Which of the following statement is/are correct ?
(A) Isomers showing metamerism will have same functional group.
(B) All compounds having C = C bond exhibit geometrical isomerism.
(C) Stereoisomers can never be structural isomers.
(D) All structural isomers have different boiling point.

COMPREHENSION (1 × 2) [4 , –2]

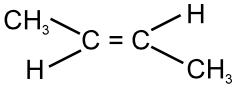
Comprehension

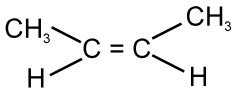
A hydrocarbon 'X' has 2 geometrical isomers. It has only one π bond in its molecule along with 11 σ bonds.

10. Which of the following can be the structural isomer of the hydrocarbon 'X'.

$CH_2 = CH - CH_2 - CH_3$ (I)

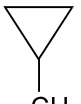
$CH_3 - C(CH_3) = CH_2$ (II)

 (III)

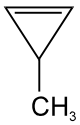
 (IV)

(A) III, IV (B) I, II (C) II, IV (D) I, III

11. The ring chain functional isomer of hydrocarbon 'X' is / are

 (I)

 (II)

 (I)

 (IV)

(A) I, II (B) II, III (C) III, IV (D) I, IV

INTEGER TYPE (8) [4, 0]

12. 264 g CO_2 is completely converted into glucose $C_6H_{12}O_6$ so that all carbon atoms are conserved. Find minimum moles of O_2 required for completely combustion of glucose :

13. 60 g C and 80 g O_2 are mixed if percentage yield of reaction is 60% then how many moles of Fe_2O_3 can be reduced in Fe from CO produced in above reaction :

14. The hydrated salt $Na_2SO_4.nH_2O$ undergoes 50.3% loss in weight on heating and become anhydrous. The value of 'n' will be :

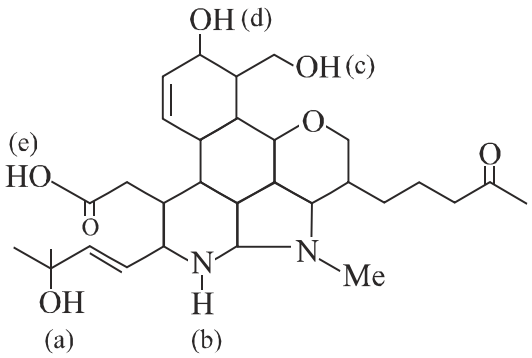
15. What weight(in Kg) of $CaCO_3$ must be decomposed to produce the sufficient quantity of carbondioxide to convert 2.12 kg of Na_2SO_3 completely in to $NaHCO_3$. [Atomic mass of Na = 23, Ca = 40]

$CaCO_3 \longrightarrow CaO + CO_2$

$Na_2CO_3 + CO_2 + H_2O \longrightarrow 2NaHCO_3$

16. 10 ml of sulphuric acid solution (sp. gr. = 1.84) contains 98% by weight of pure acid. Calculate the molarity of NaOH solution required to completely neutralize the acid if volume of NaOH used is 184 ml.

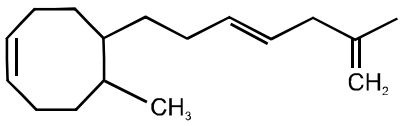
17.



Degree of unsaturation of the above compound ?

18. The compound (X) has molecular formula C_4H_7Cl. Find out the number of its cyclic isomers (structural and geometrical only excluding optical isomers).

19. The number of geometrical isomer possible for given compound



is

MTC (1) [2 × 4, -1]

Marking scheme For MTC

For each entry in Column-I, +2. If only the bubble(s) cooresponding to all the correct match(es) is(are) darkned, 0 If none of the bubbles is darkned, –1 in all other cases.

20. **Match the following :**

Column-I	**Column-II**
(A) 1 M glucose solution	(p) 1 mol solute per litre solution
(B) 3 M urea solution	(q) 180 g solute per litre solution
(C) 3 M CH_3COOH solution	(r) % w/v = 18% (solution)
(D) 1 M H_2SO_4 solution	(s) % w/v = 9.8% (solution)

ANSWER KEY

1.	(AC)	**2.**	(ABCD)	**3.**	(AD)	**4.**	(BCD)	**5.**	(ABC)	**6.**	(BD)	**7.**	(BC)
8.	(BCD)	**9.**	(ACD)	**10.**	(B)	**11.**	(D)	**12.**	**6**	**13.**	**1**	**14.**	**8**
15.	**2**	**16.**	**2**	**17.**	**9**	**18.**	**5.**	**19.**	**8**				

20. A- p, q, r ; B- q, r ; C -q,r ; D- p, s