

2018**CBCS****1st Semester****CHEMISTRY****PAPER—GE1T****(Honours)**

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

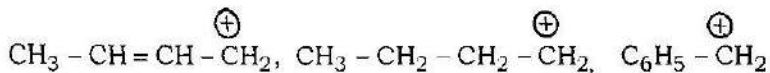
Inorganic Chemistry—I**Group—A**

1. Answer any five questions : 5×2

- (a) What is the significance of negative sign in Bohr's equation for energy of an electron in a hydrogen like atom ?

(Turn Over)

- (b) Write the conjugate bases of the following species, \rightarrow -
 $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ and HSO_4^- .
- (c) $\text{CH}_2 = \text{CH} - \text{Cl}$ does not participate in SN^2 reaction
 —Why ?
- (d) Write two differences between electronegativity and
 electron affinity.
- (e) What do you mean by optically active compounds ?
- (f) What do you mean by “Shielding effect” ?
- (g) Why *p*-nitrophenol is more acidic than phenol ?
- (h) Arrange the following carbocations in order of
 stabilities —



Give reason.

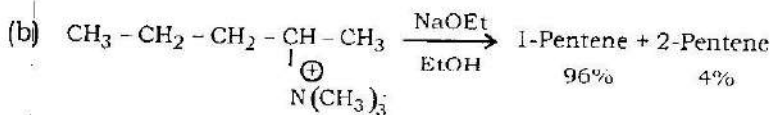
Organic Chemistry—I

Group—B

2. Answer any four questions :

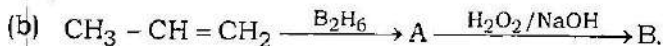
4×5

(a) H_3BO_3 is a very weak acid ($\text{p}K_a = 9.2$) but in presence of any cis - 1, 2 diol it behaves as a strong acid. Explain. 2



Explain the product distribution. 3

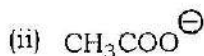
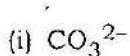
3. (a) Write down three postulates of Bohr's atomic model. 3



Identify A - B. 2

4. (a) Arrange the following species in order of acidity in both H_2O and $\text{CH}_3\text{CO}_2\text{H}$ medium. Give reason in each case. HCl , HNO_3 , H_2SO_4 . 3

(b) Write down the resonating structure of the following ions.



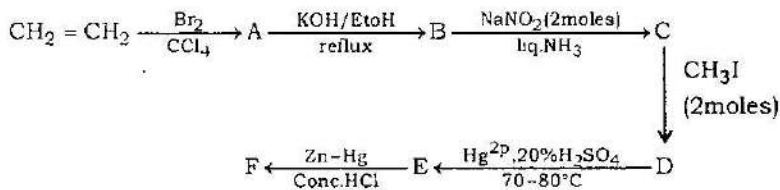
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5. (a) Write down the electronic configuration of Cr^{3+} and Cu^{2+} ions.

2

(b) Identify A to E.

3



6. (a) Although Zn, Cd and Hg are the members of 'd'-Block in the periodic table, they are not called as transition elements. Explain.

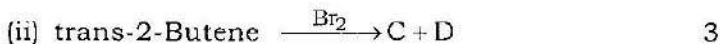
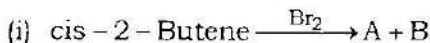
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- (b) Designate R/S nomenclature of L-lactic acid and D-glyceraldehyde. 3
7. (a) Arrange the following species in order of decreasing acidity. BF_3 , BCl_3 , BBr_3 and BI_3 . 3
- (b) Predict the products of ozonolysis of 2-butene. 2

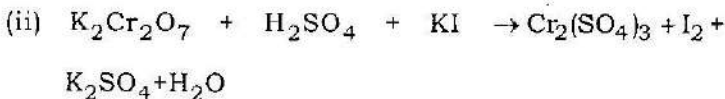
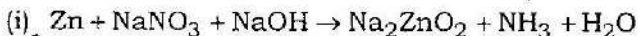
Group—C

8. Answer any *one* question : 1×10
- (a) State Hund's rule. Applying the rule, find out the number of unpaired electron in an atom having atomic number 15. 2
- (b) Write down the Fisher projection of meso-Tartaric acid and convert it to Newman projection. 3
- (c) Predict the direction of chemical reaction :
- $$\text{BF}_3\text{H}^- + \text{BH}_3\text{F}^- \rightleftharpoons \text{BF}_4^- + \text{BH}_4^- \quad 2$$

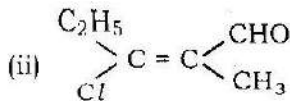
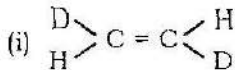
(d) Predict the products of the following reactions.



9. (a) Balance the following reactions by ion-electron method. 2×3



(b) Designate E/Z nomenclature of the following compounds : 2



(c) Explain why the following reaction give anti Markownikoff product in the absence of peroxide.

