



## BRAINWARE UNIVERSITY

**Term End Examination 2022**  
**Programme – B.Tech.(CSE)-DS-2022**  
**Course Name – Engineering Chemistry**  
**Course Code - BSCD101**  
**( Semester I )**

**Full Marks : 60**

**Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### Group-A

(Multiple Choice Type Question)

1 x 15=15

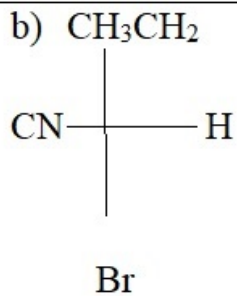
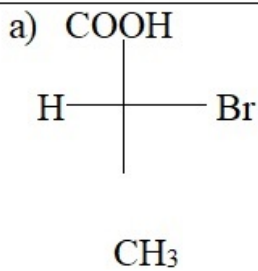
1. Choose the correct alternative from the following :

- (i) The energy is absorbed by the body in the form of  
a) Photons  
b) quantas  
c) Wave  
d) None of these
- (ii) Acetone reacts with  $\text{Ba}(\text{OH})_2$  to produce  
a) Aldol  
b) Mesityl oxide  
c) Diacetone alcohol  
d) Mesitylene
- (iii) The wave associated with the particle in 1-D box can be formed in the region  
a)  $x > 0$   
b)  $x < 0$   
c)  $0 < x < L$   
d)  $x > L$
- (iv) Let there be four groups .....  $\text{COOH}$ ,  $\text{D}$ ,  $\text{H}$  and  $\text{CONH}_2$  attached to the chiral carbon , Evaluate which one will have highest priority sequence  
a)  $\text{D}$   
b)  $\text{CONH}_2$   
c)  $\text{H}$   
d)  $\text{COOH}$
- (v) The sum of internal energy and pressure volume product is called  
a) entropy  
b) enthalpy  
c) heat supplied  
d) work done
- (vi) For an ideal gas ,  $(dU/ dV)$  is  
a) negative  
b) positive  
c) zero  
d) none of these
- (vii) Electrons should be filled in energy sub shells in order of increasing energy values, is the principle of  
a) Aufbau  
b) Pauling's  
c) Pauli's exclusion principle  
d) Hund's rule
- (viii) All the naturally occurring processes proceed spontaneously in a direction which leads to  
a) decrease of entropy  
b) increase in enthalpy  
c) increase of free energy  
d) decrease of free energy
- (ix) Which one is better used in Friedel craft reaction.  
a) Acetyl chloride  
b) Nitrobenzene  
c) Methyl chloride  
d) Aniline
- (x) What describes energy bands in solids?  
a) It is the single allowed energy level.  
b) It is a set of closely spaced allowed energy levels  
c) It is a set of widely spaced allowed energy levels  
d) It is collection of energy of all allowed energy levels
- (xi) Standard hydrogen electrode has been assigned to a potential of  
a) 1.5 Volt  
b) 1.0 Volt  
c) 0.5 Volt  
d) 0.0 volt
- (xii) In which of the following coordination entities the magnitude of  $\Delta_0$  (CFSE in octahedral field) will be maximum?



6. Assign R-S nomenclature.

(3)

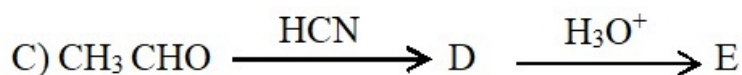
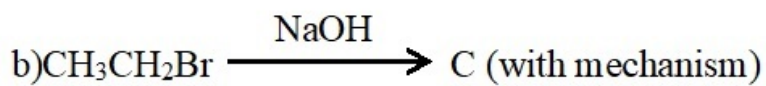
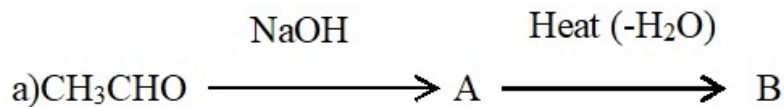


[1.5+1.5]

OR

Predict the following products

(3)



**Group-C**

(Long Answer Type Questions)

5 x 6=30

7. What happens when Formaldehyde and Acetaldehyde react with  $\text{NH}_3$  separately? (5)
8. What happens when tertiary butyl bromide is treated with  $\text{OEt}^-$ ? Predict the product with mechanism. (5)
9. Write down the vanderWaal's equation for n mole of a real gas. Write units of vanderWaal's constant a and b. (5)
10.  $\text{Zn} + \text{Cu}^{2+} = \text{Cu} + \text{Zn}^{2+}$  [2+3] (5)  
Construct a galvanic cell using this reaction.  
Calculate pH of quinhydrone electrode.
11. Derive an expression for work of expansion against constant pressure. (5)

**OR**

Comment on the magnetism of oxygen from the M.O diagram of oxygen molecule. (5)

12. Using Carnot Cycle, prove that efficiency of a heat engine is always less than one. ( 5) (5)

**OR**

Comment on the existence of  $\text{Be}_2$  molecule from M.O theory. (5)

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