	Utech
Name:	
Roll No.:	A Grant of Kambidge 2nd Explored
Invigilator's Signature :	

CS/B.TECH(NEW)/SEM-2/CH-201/2012 2012 CHEMISTRY - I

Time Allotted: 3 Hours

The figures in the margin indicate full marks.

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

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

 $10 \times 1 = 10$

Full Marks: 70

- i) A living system is thermodynamically an example of
 - a) an open system
- b) an isolated system
- c) a closed system
- d) none of these.
- ii) The dimension of rate constant of a second order rate equation is
 - a) mole litres $^{-1}$
- b) mole litre $^{-1}$ s $^{-1}$
- c) $mole^{-1} litre^{-1} s^{-1}$
- d) $mole^{-1}$ litre s^{-1} .

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iii)	Whi	ch defect causes decre	ase o	f density of crystal ?	
	a)	Interstitial Defect	b)	Schottky Defect	
	c)	Frenkel Defect	d)	F-centre Defect.	
iv)	Anti-Markownikoff's addition of HBr is not observed in				
	a)	pentene	b)	2-butene	
	c)	butene	d)	propene.	
v)	The	half-life of a first order	reac	etion is 20 minutes. The	
	time required for 75% completion of the reaction is				
	a)	30 minutes	b)	40 minutes	
	c)	50 minutes	d)	60 minutes.	
vi)	Germanium is an example of				
	a) intrinsic semiconductor				
	b)	<i>n</i> -type semiconductor			
	c) p-type semiconductor				
	d)	an insulator.			
vii)	ZnO is white when cold and yellow when hot, becau				
	of				
	a)	charge transfer	b)	d-d transfer	
	c)	metal excess defect	d)	none of these.	

viii) For a reaction to proceed spontaneously, we must have

 $\Delta G < 0$ a)

b) AG > 0 man overness surface

 $\Delta G = 0$ c)

None of these. d)

Proteins are biopolymers. The monomer unit present in ix) them is

- a) amino acid
- b) carbohydrate
- fatty acid c)
- d) alkene.

Which of the following carboxylic acids will have the X) lagest K_a value?

- $CH_3 CH_2 COOH$ b) $Cl CH_2 COOH$ a)
- c) Ph COOH
- d) F_3 C COOH.

Which of the following carbonium ions will be the most xi) stable?

- a) Ph₃ C⁺
- b) H_3 C CH_2 +
- c) H_2 C = CH C H_2 + d) (C H_3) ₂ CH +

Fuel used in jet plane is

- aviation gasoline a)
- b) 99.5% ethyl alcohol
- alcohol with diesel c)
- d) alcohol with petrol.

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(Short Answer Type Questions)

Answer any three of the following.

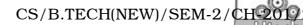


- 2. a) What is pseudo-unimolecular reaction? Give one example.
 - b) Deduce the expression for the rate constant of a first order reaction. Show that half-life period of a first order reaction is independent of the initial concentration.

2 + 3

- 3. What is LPG? Why is it used as a domestic fuel? Define octane number of a fuel. How octane number can be improved? 1+1+3
- 4. Prove that for an adiabatic reversible process PV $^\gamma=$ constant. How do you show that for an ideal gas $C_p-C_v=R~?~\gamma~~2\times2~\frac{1}{2}$
- 5. What is single electrode protential? Derive the pH of an electrochemical cell with the help of Nernst equation. 2 + 3
- 6. Write notes on any *two* of the following : $2 \times 2\frac{1}{2}$
 - a) Homogeneous catalysis
 - b) Resonance
 - c) Bio-diesel.

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GROUP - C

(Long Answer Type Questions)

Answer any three of the following.

 $3 \times 15 = 45$

- 7. a) Explain Kohlrausch's law. Discuss two applications of it.
 - b) Explain how ionic mobility varies with (i) size,(ii) temperature.
 - c) Derive Kirchhoff's equations.

(2+4)+4+5

- 8. a) Define Joule-Thomson coefficient and inversion temperature explaining heating and cooling condition.
 - b) Define free-energy (G) and entropy and write their physical significances.
 - c) Write down Arrhenius equation for the activation energy of a reaction. Plot $lnk\ vs\ 1/T$ and write the significance of the slope.
 - d) Explain the variation of equivalent conductance of strong and weak electrolytes with concentration.

4 + 4 + 3 + 4

- 9. a) Explain why p-nitrophenol has much higher boiling point than o-nitrophenol although both have same molecular weight.
 - b) What do you mean by hybridization? How is it related to structure and acidity of ethane, ethylene and acetylene?

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- c) Which one of the following is more acidic and why
 - i) CCl₃ COOH and (ii) CH₃ COOH.
- d) Differentiate between the following:

Addition polymerisation and condensation polymerisation. 2 + (2 + 2 + 2) + 2 + 5

- 10. a) Differentiate between Schottky and Frenkel defects with the help of diagram.
 - b) What is proximate analysis of coal and what is its significance?
 - c) Indicate the major fractionation products along with their boiling range and uses obtainable from atmospheric distillation of crude oil. 5+4+6
- 11. Write short notes on any *three* of the following: 3×5
 - a) Vulcanization
 - b) Hess law of constant heat summation
 - c) Gibbs-Helmholtz equation
 - d) E1 and E2 reaction
 - e) Hydrogen electrode
 - f) Conductometric titration.

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- 12. a) Discuss the essential structural criteria for conductivity, environmental stability and process ability in conducting polymers with suitable examples.
 - b) What is spontaneous ignition temperature of a fuel?
 - c) What is the importance of unleaded gasoline? Which type of hydrocarbons is suitable as components of unleaded gasoline and why?
 - d) Compare the acidic characters of formic acid, acetic acid and phenol. 6+2+5+2

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