

**Avinashilingam Institute for Home Science and Higher Education for Women
[Deemed to be University] Coimbatore-641 043**

Bachelor's Degree Examination – November 2018

III Semester

**Class : II UG
Major : Chemistry**

**Time: 3 hours
Max. Marks: 100**

15BCHC08 Thermodynamics- I and Solid State Chemistry

Part-A

10 x 1=10

Choose the correct answer

1. In an adiabatic process
a) $q=w$ b) $q=0$ c) $E=q$ d) $\Delta E=w$
2. At constant pressure, q equals
a) ΔH b) ΔE c) ΔT d) $P \Delta V$
3. Internal energy is represented by the symbol
a) S b) G c) A d) U
4. When heat transfer into a system is more than the work transfer out of the system then
a) The internal energy of the system remains constant
b) The internal energy of the system decreases
c) The internal energy of the system increases
d) None of the above
5. Thermochemistry is the study of chemical reaction accompanying
a) Heat change B)Rate change c) Mass change d) Volume change
6. The bond dissociation energy of H_2 is 436 kJ mol^{-1} . Choose the incorrect statement.
a) It requires 436 kJ to convert 1 mole of $H_2(g)$ to 2 moles of $H(g)$
b) It requires 436 kJ to convert 0.5 mole of $H_2(g)$ to 1 mole of $H(g)$
c) Dissociation of $H_2(g)$ is an endothermic process
d) None of these
7. The number of Bravais lattice available is
a) 14 b) 7 c) 3 d) 8
8. Amorphous solids
a) Possess sharp melting points
b) exhibit anisotropy
c) do not undergo clean cleavage when cut with knife
d) possess orderly arrangement over long distance
9. The fact that the fluorescence wavelength is often much longer than the irradiation wavelength (Stokes shift) is a consequence of which phenomenon?
a) Low extinction coefficients (Lambert-Beer law)
b) Vertical transitions (Kasha's rule)
c) High ISC rates (El-Sayed rule)
d) The Franck-Condon principle
10. What are the appropriate reasons for the deviation from the Beer's law among the following
A) Monochromaticity of light B) Very high concentration of analyte
C) Association of analyte D) Dissociation of analyte
a) A, B and D
b) B, C and D
c) A, C and D
d) A, B and C

Part B

5 X 6=30

Answer the following

Answer should not exceed 400 words or two pages

11. a) Explain the concept of heat and work.
(or)
11. b) Write short notes on Intensive and extensive properties with examples.
12. a) Derive the relation between C_p and C_v .
(or)
12. b) State and explain first and zeroth law of thermodynamics.
13. a) Derive Kirchoff's equation.
(or)
13. b) How would you determine heat of combustion of an organic substance using a bomb calorimeter?
14. a) What is the difference between crystalline and amorphous solids.
(or)
14. b) Write short notes on a) Miller indices b) space lattice
15. a) State and explain Beer Lamber's Law
(or)
15. b) State and explain Stark Einstein's Law

Part C

5 x 12=60

Answer the following

Answer should not exceed 800 words or four pages

16. a) Explain (i) reversible and irreversible process (ii) state function and path function.
(or)
16. b) Elaborate on isothermal, adiabatic, isobaric and isochoric process.
17. a) Explain Joule Thomson experiment and Joule Thomson co-efficient for an ideal gas.
(or)
17. b) Derive an expression for the work of expansion of an ideal gas in a reversible adiabatic process.
18. a) State Hess's law of constant heat summation and explain some of its important applications.
(or)
18. b) Derive the relation between internal energy change and change in enthalpy of an ideal system.
19. a) Explain the structure of $NaCl$, KCl and $CsCl$.
(or)
19. b) Explain powder and rotating crystal methods for structure determination.
20. a) Discuss the kinetics of photochemical reaction $H_2 + Br_2 \rightarrow 2HBr$.
OR
20. b) Draw and explain Jablonski diagram.