SUBJECT CODE: 15CH/MC/GC14

B.Sc. DEGREE EXAMINATION, NOVEMBER 2016
BRANCH IV- CHEMISTRY
FIRST SEMESTER

REG.NO ……………………..

COURSE   : MAJOR CORE
PAPER   : GENERAL CHEMISTRY
TIME   : 30 MINUTES   MAX.MARKS : 30

Section- A
ANSWER ON THE QUESTION PAPER ITSELF
Answer all questions   (30 x 1 = 30)

Choose the correct answer:

1. Type of hybridization present in BF_3 is
   a. sp^3 b. sp^2 c. sp   d. sp^3d

2. Bond order of He_2 molecule is
   a. 1   b. 2   c. 3   d. 0

3. Protium, Deuterium and Tritium are
   a. Isotopes   b. Isobars   c. Isotones   d. Isomers

4. β- ray emission of $_{90}Th^{234}$ gives
   a. $_{92}U^{235}$ b. $_{90}Th^{235}$ c. $_{91}Pa^{234}$ d. $_{92}U^{236}$

5. Molecule which does not exhibit resonance structure
   a. Carbondioxide   b. Benzene   c. Butadiene   d. Water

6. Stronger basicity of methylamine than ammonia is due to ------- effect.
   a. − I   b. + I   c. − M   d. + M

7. Inversion temperature of hydrogen gas is
   a. 194 ^{0}C   b. -10 ^{0}C   c. 194 K   d. 10 ^{0}K

8. $PV = nRT$ is
   a. Ideal gas equation   b. Real gas equation   c. Boyle's law   d. Charle's law

9. Enthalpy of formation OC water is
   a. + 180.9 KJ   b. − 180.9 KJ   c. + 285.9 KJ   d. − 285.9 KJ

10. Pick out the physical process from the following
    a. Atomization   b. Combustion   c. Neutralization   d. Nuclear fission

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Fill in the blanks:

11. The rule which explains the covalent character of ionic compounds is _____.

12. Lateral overlapping of atomic orbitals lead to the formation _____ bond.

13. Fuel used in nuclear reactor is _____.

14. _____ converts non fissionable nucleus in to fissionable nucleus.

15. IUPAC name of 3^0 butyl alcohol is _____.

16. Carbene can be formed from _____.

17. The principle involved in liquefaction of gases is _____.

18. Number of moles of hydrogen contained in 18 dm^3 of the gas at a pressure of of 0.92 atm and a temperature of 27°C is _____.

19. The relation between ΔH and ΔE is _____.

20. Enthalpy change for the transition of graphite to diamond, found from $ΔH^o_{comb}$ values of - 393.5 KJmol^{-1} and -395.4 KJmol^{-1} for graphite and diamond is _____.
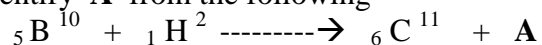
Match the following:

21. Hydrogen bomb   - Electrophile
22. Combustion of methane   - Partial pressure
23. Nitronium ion   - π bond
24. Ethylene   - Nuclear fusion
25. Dalton's law   - Exothermic reaction

Answer in a single line:

26. Mention any two differences between bonding and antibonding molecular orbitals.

27. Identify **A** from the following

$$_5 B^{10} + {}_1 H^2 ---------→ {}_6 C^{11} + A$$

28. Define lattice energy.

29. What do you mean by critical temperature?

30. Define enthalpy of formation of a compound.

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Section B
Answer any five questions: **(5×6=30)**

1. Discuss the formation of $O_2{}^{2-}$ ion using molecular orbital theory.

2. (i) Define lattice energy. (2)
   (ii) Differentiate VB theory and MO theory. (4)

3. (i) State mass defect. (2)
   (ii) $_8O^{16}$ is formed by the addition of appropriate nucleus to $_6C^{12}$. Calculate the energy released during this reaction. Mass of $_6C^{12} = 12.00381$ amu and mass of $_2He^4 = 4.00387$ amu. (4)

4. State and explain group displacement law.

5. (i) Write structural formula of the following compounds:
       a. 2-Butenoic acid   b. Sec. butyl alcohol (2)
   (ii) Mention any two applications of electromeric effect. (2)
   (iii) 'Chloroacetic acid is a stronger acid than acetic acid'. Explain. (2)

6. Derive Vanderwaal's equation of state for real gases.

7. (i) Define standard enthalpy of formation. (2)
   (ii) Calculate the enthalpy of formation of benzene from the following data: (4)
   $C_6H_6(l) + 15/2\ O_{2(g)}$ ------------$\rightarrow$ $6\ CO_{2(g)} + 3\ H_2\ O_{(l)}$ $\Delta H^0 = $ -3267.7 KJ
   $C_{(s)} + O_{2\ (g)}$ --------------$\rightarrow$ $CO_{2(g)}$ $\Delta H^0 = $ -393.5 KJ
   $H_2(g) + ½\ O_2$ ---------------$\rightarrow$ $H_2\ O$ $\Delta H^0 = $ -286.2 KJ

..2

Section C

**Answer any two questions:** (2×20=40)

8. (i) Discuss the structure of ClF_3 using VSEPR theory. (6)

  (ii) Describe Geiger Muller counter with neat diagram. (6)

 (iii) State and explain Fajan's rule. (5)

 (iv) The ^{14}C / ^{12}C ratio in a piece of wood is 14% that of the atmosphere.

    Calculate the age of wood. ($t_{1/2}$ of ^{14}C = 5760 years) (3)

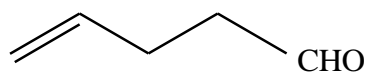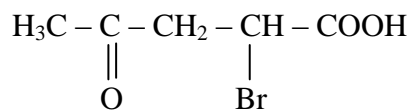9. (i) Write notes on hyper conjugative effect with examples. (6)
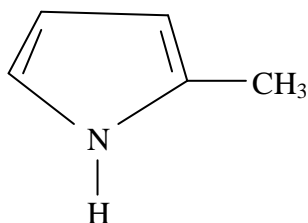
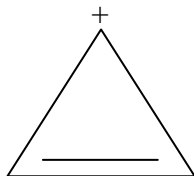 (ii) Give the IUPAC names of the (5)

a)

b)

c)

d)

$$H_3C - C - CH_2 - CH - COOH$$
$$\quad\quad \| \quad\quad\quad\quad |$$
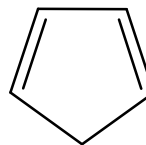$$\quad\quad O \quad\quad\quad\quad Br$$
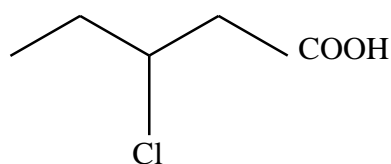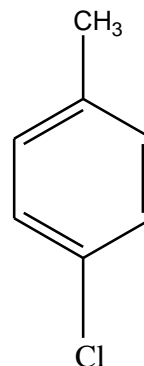
e)

(iii) Identify whether the following compounds are aromatic, non-aromatic and antiaromatic. (4)
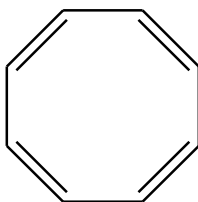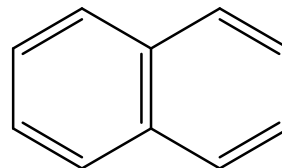
a)

b)

c)

d)

(iv) Discuss the liquid drop model of nucleus. (5)

10. (i) Give a brief account on Maxwell's distribution of molecular velocities. Illustrate the effect of temperature on this distribution. (8)

(ii) Calculate the temperatures at which the root mean square velocity, average velocity and most probable velocity of oxygen gas are all equal to 1500 ms^{-1}. (4)

(iii) Derive Kirchoff's equation depicting the variation of enthalpy of reaction with temperature. Write down the integrated form of this equation. (8)

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