C 15755 (Pages 3) Name.....

Reg. No.....

SECOND SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2011

Physical Chemistry

CH_2CO_3 PHYSICAL CHEMISTRY

Time : Three Hours Maximum : 30 Weightage

I. Answer *all* the twelve questions. Each question carries a weightage of ¼. This section contains multiple choice, fill in the blanks and one word answer type questions :

1 Which of the following is microwave inactive ?

(a) H_2. (b) HCl.

(c) CO. (d) H_2O.

2 Among the following which has the highest wavelength ?

(a) Radio waves. (b) Microwaves.

(c) IR. (d) UV.

3 The value of zero point energy is :

(a) $h\upsilon$. (b) $\frac{1}{2} h\upsilon$.

(c) $2\,h\upsilon$. (d) None of these.

4 The number of types of protons in ethanol is ————.

5 How many Bravais lattices are possible for a cubic crystal ?

6 Which crystal among the following has $a = b = c$, $\alpha = \beta = \gamma = 90°$.

(a) KCl. (b) Rhombic Sulphur.

(c) Monoclinic Sulphur. (d) None of these.

7 $^{14}_{6}C$ and $^{14}_{7}N$ are :

(a) Isotopes. (b) Isobars.

(c) Isotones. (d) Isomers.

8 For the decomposition of NH_3 on hot Pt at very high pressure, order is _____.

9 If concentration is expressed in moles litre^{-1} and time in seconds, what will be the un rate constant K of a second order reaction ?

10 The number of molecules reacting per quantum of high absorbed is called _____.

11 The half life period of a first order reaction with rate constant (K) $1 \times 10^{-1} s^{-1}$, is _____

12 For a chemical change X → Y, it is found that the rate of the reaction becomes four when concentration of X is doubled. The order of the reaction is :

(a) 1. (b) 2.

(c) 3. (d) ½.

(12 × ¼ = 3 weigh

II. Answer *all* the nine questions. Each carries a weightage of 1 :

13 Find the frequency of an electromagnetic radiation of wavelength 4000 A°.

14 State Frank-Condon principle.

15 What is Anisotropy ?

16 What are Miller Indices ?

17 Define mass defect.

18 What is nuclear fusion ?

19 Write the integrated rate equation for a first order reaction and explain the terms.

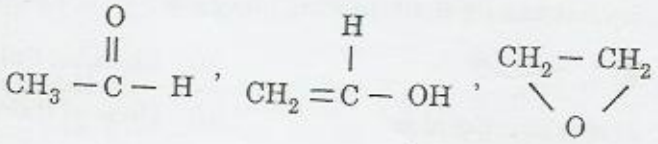
20 What is chemiluminescence ?

21 State Beer Lambert's law.

(9 × 1 = 9 weight

III. Answer any *five* questions. Each carries a weightage of 2 :

22 Using IR spectrum, how will you distinguish the following three isomers :



23 What are liquid crystals ? Name the different types. Given one example for each.

24 Give a brief account of stoichiometric defects in crystals.

25 Explain the diffusion method for the separation of isotopes.

26 Distinguish between order and molecularity.

27 Outline the principles of Carbon dating.

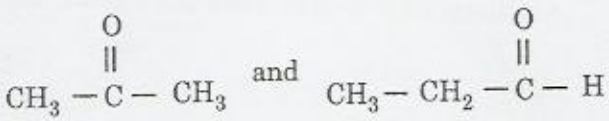
28 Distinguish between homogeneous catalysis and heterogeneous catalysis. Give one example for each.

(5 × 2 = 10 weightage)

IV. Answer any *two* questions. Each carries a weightage of 4 :

29 (a) Outline the principles of NMR spectroscopy.

(b) How will you distinguish the following by NMR spectral studies ?



30 (a) Write Bragg equation. Explain the terms.

(b) Give a brief account of powder method of crystal study.

31 (a) Write Arrhenius equation for reaction rate. Explain the terms.

(b) The values of rate constant of a reaction at 500 K and 700 K are 0.02 s^{-1} and 0.07 s^{-1} respectively. Calculate the values of Arrhenius parameters.

(2 × 4 = 8 weightage)