C 82141 (Pages : 2) Name

Reg. No. . . . . .

SECOND SEMESTER B.Sc. DEGREE (SUPPLEMENTARY/IMPROVEMENT) EXAMINATION, APRIL/MAY 2015

(UG–CCSS)

Complementary Course—Chemistry

CH 2C 03—PHYSICAL CHEMISTRY—I

Time : Three Hours Maximum : 30 Weightage

I. Answer *all* the twelve questions. Each question carries a weightage of 1. This section contains multiple choice, fill in the blanks and one word answer type questions :

1 Which of the following is IR active ?

(a) H_2. (b) Cl_2.

(c) H—Cl. (d) N_2.

2 Among the following which radiation is responsible for vibrational transition ?

(a) IR. (b) UV-Vis.

(c) X-ray. (d) Radiowaves.

3 The unit of wave number is :

(a) cm. (b) m.

(c) Å. (d) $cm.^{-1}$

4 Amorphous solids are _____

5 NaCl is a _____ crystal system.

6 A crystal lattice consists of _____ arranged in parallel planes.

7 ^{14}C is a _____ emitter.

8 a-particle is the nucleus of _____ atom.

9 The unit of rate is :

(a) S^{-1}. (b) mol L^{-1}.

(c) L mol $^{-1}$. (d) mol $L^{-1}S^{-1}$.

10 Which among the following is true ?

(a) Molecularity can be fractional.

(b) Molecularity can be zero.

(c) Molecularity is an experimental concept.

(d) Molecularity cannot be zero.

Turn over

11 Oxidation of SO_2 to SO_3 with NO as catalyst is an example for _____ catalysis.

12 The transmittance T is given by :

(a) $\frac{I_0}{I}$ (b) I

(c) $\log \frac{I}{I_0}$ (d) $\log \frac{I}{I_0}$

(12 x ¼ = 3 weightage)

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

13 Write the criterion for showing IR spectrum.

14 Mention two factors that contribute to the broadening of a spectral line.

15 Which of the following nuclei, ^{12}C, ^{13}C, 160, ^{17}O will show NMR phenomenon ? Give reason.

16 What is meant by centre of symmetry ? Give an example.

17 Explain the attraction between a neutron and a proton.

18 What are isobars ? Give an example.

19 What is quantum yield ? Give two reasons for low quantum yield.

20 Define chemiluminescence. Give one example.

21 What is photosensitization ?

(9 x 1 = 9 weightage)

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

22 Explain the factors that contribute to the intensity of spectral line.

23 Convert the wavelength 4000 A into joules.

24 What are Miller indices ? Calculate the Miller indices of a crystal plane which cuts through the crystal axes at (2a, 3b, c).

25 Briefly explain the structure of KCl crystal.

26 Write the principle behind C-14 dating.

27 Write notes on primary and secondary photochemical reactions.

28 Give an account on the temperature dependence of reaction rate.

(5 x 2 = 10 weightage)

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

29 Outline the principle of microwave spectroscopy. What are its applications ?

30 What are liquid crystals ? Give an account on Swam theory of liquid crystals. Mention two applications of liquid crystals.

31 Explain the Collision theory of reaction rate.

(2 x 4 = 8 weightage)