

15U411 (Pages:2) Name:.....
Reg No

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2017

(CUCBCSS – UG)
Chemistry – Complementary Course
CC15U CHE4 C04 - PHYSICAL AND APPLIED CHEMISTRY
(2015 Admission)

Time: 3 Hours Maximum : 64 Marks

Section A

(Answer all questions. Each question carries 1 mark)

1. The pH at which the sol particles of an ampholytic, substance become electrically neutral and consequently exhibit no movement in an electric field is called.....
2. A chemical reaction whose rate does not depend upon the concentration of reactants has order.....
3. Three – fourth life ($t_{3/4}$) of a first order reaction is equal to
4. In liquid-solid Chromatography the stationary phase is
5. A shift of absorption maxima (λ_{max}) to shorter wave length is called a shift.
6. The reference compound selected in NMR spectroscopy is
7. Kevlar is made by the polymerisation of p-phenylene diamine and
8. Cigarette smoke contains high levels of which causes lung diseases and lung cancer to active smokers as well as to passive smokers.
9. The chemical name of Ajinomoto is
10. Name the pesticide, the application of which caused various diseases and endless human sufferings in the Kasargod District of Kerala.

(10 x 1 = 10 Marks)

Section B

(Answer any 7 questions. Each questions carries 2 marks.)

11. State and explain 'Hardy-Schulze' law.
12. Differentiate 'average rate of a reaction' from 'instantaneous rate of a reaction'.
13. Give one example each for a zero order, first order, second order and fractional order reactions.
14. Differentiate between retention time and retardation factor (R_f) in chromatography.

15. State Beer-Labert's law. Give an equation connecting absorbance and concentration.
16. Sketch the normal modes of vibration of CO₂ molecule. State which of them are IR active.
17. What are the PVC and PTFE ? Give the preparation of any one of them.
18. How does pesticide pollution of water arises ? What are its adverse effects?
19. Define Cetane number and Octane number.
20. Give the chemical names of Paracetamol and Aspirin. Give the structure of paracetamol.

(7 x 2 = 14 Marks)

Section C

(Answer any 4 questions. Each question carries 5 marks)

21. Explain an optical property and a kinetic property of colloids.
22. Derive integrated rate equation for a second order reaction involving one reactant.
23. What is TLC ? Explain the principle and functioning of TLC.
24. Explain the following terms with reference to IR spectroscopy
 - 1) Fundamental bands
 - 2) Overtone bands
 - 3) Finger print region.
25. Write a note on structure and applications of synthetic rubbers.
26. Give five adverse effects of plastic pollution? How can we overcome adverse effects of plastic pollution. Name the poisonous gas produce during the burning of plastics.

(4 x 5 = 20 Marks)

Section D

(Answer any two questions. Each question carries 10 marks)

27. a) Explain intermediate compound formation theory of homogeneous catalysis.
 - b) A first order reaction has a specific reaction rate of 10^{-3} S^{-1} . How long will it take for 10g of the reactant to reduce to 1.5g? Also calculate the half-life of the reaction.
28. a) Explain chemical shift and spin-spin splitting with respect to NMR spectroscopy.
 - b) Sketch the schematic PMR spectrum of dimethyl ether.
29. Explain the causes, effects and consequences of
 - a) depletion of Ozone
 - b) Green house effect
 - c) photochemical smog.
30. Explain the manufacture of the following
 - a) Glass
 - b) Cement

(2 x 10 = 20 Marks)
