E–0431

Sub. Code
1MCH1C1

M.Sc. DEGREE EXAMINATION, APRIL 2019

First Semester

Chemistry

ORGANIC CHEMISTRY – I

(CBCS 2011 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **ALL** questions.

1. State Hammond postulate, Explain.
2. What do you understand by the term "negative hyper conjugation"?
3. Write an energy profile diagram for an S_N1 reaction.
4. State and explain Bredts rule with an example.
5. What are annulenes? Explain with an example.
6. State and explain Craig's rule of aromaticity with an example.
7. Illustrate the prefixes erythro and threo with suitable examples.
8. State and illustrate the relationship between substrate symmetry and chirality.
9. Write the chemical names of Vitamin C and Vitamin A what is common to there vitamins?
10. What do you understand by the term "vitamin – B complex"?

Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Compare the structure of carbocation, carbonions and free radicals.

Or

(b) What are singlet and triplet carbenes? Explain the stereo chemical outcome of these carbene addition to cis and trans – 2 – butenes.

12. (a) How do solvents influence S_N1 and S_N2 mechanisms? Explain with examples.

Or

(b) What are ambident substrates and ambident nucleophiles? Explain using suitable examples involving reaction.

13. (a) Discuss the chemistry of cyclopentadienyl anion in detail.

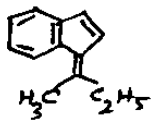
Or

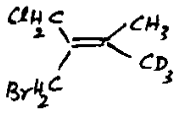
(b) Write a short note on alternant and non-alternant hydrocarbon.

14. (a) Illustrate the optical isomerism exhibited by biphenyl allenes and spiranes.

Or

(b) Designate the configuration of the following by E- and Z- notation what is the advantages of this system over cis and trans system of notation?

(i) 

(ii) 

15. (a) Draw the structure of the following:

(i) Vitamin A

(ii) Vitamin B_2

Or

(b) Describe the synthesis of Vitamin A.

Part C ($3 \times 10 = 30$)

Answer any **THREE** questions.

16. (a) Discuss the formation and stability of the following reaction intermediates:

(i) nitrenes

(ii) carbanions (3+3)

(b) State and explain the principle of microscopic reversibility with suitable examples. (4)

17. (a) How does each of the following factors affect S_N1 and S_N2 reactions?

(a) The substrate structure

(b) The nucleophile

(c) The leaving group (3+4+3)

18. (a) Briefly describe homoaromaticity and antiaromaticity with suitable examples.

(b) Write a short note on annulenes. (6+4)

19. (a) Write a note on physical and chemical methods (any two each) to determine the configuration of geometrical isomers.

    (b) Illustrate fischer, Sawhorse, Newmann and wedge formulae with a suitable example. (6+4)

20. Describe the structure and synthesis of the following vitamins:

    (a) Vitamin B_2

    (b) Vitamin k (5+5)

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1MCH1C2

M.Sc. DEGREE EXAMINATION, APRIL 2019

First Semester

Chemistry

INORGANIC CHEMISTRY – I

(CBCS 2011 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all the** questions.

1. How is bond order related to bond strength?

2. Distinguish between bonding and anti-bonding orbital.

3. Give any two examples of hard acid and hard base.

4. Electron affinity of noble gases are zero. Why?

5. What is meant by colour centres in solid state?

6. Explain the conductivity mechanism of p-type semi conductors.

7. Mention the health hazards caused by Asbestos.

8. How are carboranes classified? Give examples.

9. Calculate the EAN of $Fe(Co)_5$

10. Give any two uses of beryl.

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Compare and contrast the magnetic behaviour of NO and CO.

Or

(b) Using Hybridization theory, deduce the geometry of SF_4.

12. (a) Explain the concept of Levelling effect.

Or

(b) Discuss the periodic variation of ionic radii and electonegativity.

13. (a) How does crystal defect affect the properties of crystal?

Or

(b) Discuss the band theory of solids.

14. (a) Compare and contrast the properties of benzene and borazine.

Or

(b) Explain the structure of ploy tungstate ion.

15. (a) How is thorium extrated from its ore?

Or

(b) Discuss the structure of iron carbonyls.

Part C (3 × 10 = 30)

Answer any **THREE** questions.

16. Explain the LCAO of MO theory and deduce the bond order of nitrate ion.

17. (a) Explain HSAB principle and mention their applications.

    (b) What is bond energy? How does it relate the bond length and bond order? (6+4)

18. (a) What do you mean by an interstitial alloy? Discuss the Hume-Rothery rules in explaining the substitutional alloys and intermetallic compounds.

    (b) Explain the role of semiconductors in solar energy conversion (4+6)

19. (a) Discuss the preparation and structure of various silicones.

    (b) Draw the structures of four different types of silicates (6+4)

20. (a) Explain the bonding and structure of ferrocene.

    (b) Give the preparation and uses of any two compounds of thorium. (5+5)

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E–0433

Sub. Code
1MCH2E2

M.Sc. DEGREE EXAMINATION, APRIL 2019

Second Semester

Chemistry

Elective: INDUSTRIAL CHEMISTRY

(CBCS - 2011 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all the** questions.

1. What is meant by chemical process?
2. Define homogeneous process.
3. What is meant by octane number?
4. How are raw materials classified?
5. Explain the process of setting of cement.
6. What is lead glass? Give their composition and uses.
7. Mention the chemicals required to prepare fire works.
8. Explain the principle of electroplating.
9. What is meant by herbicides?
10. How is sugar recovered from molasses?

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the different unit operations in chemical process industries.

Or

(b) How are the concept technologies classified? Give an example for each.

12. (a) Explain the concentration process of raw materials.

Or

(b) Discuss the primary raw materials and basic intermediates of chemical process industries.

13. (a) Write short notes on optical glass and neutron absorbing glass.

Or

(b) Describe the manufacture of urea fertilizer.

14. (a) With the help of neat diagram, explain the manufacture of potassium chlorate.

Or

(b) What are soaps and detergents? How are they prepared?

15. (a) What are insecticides? Explain the synthesis and mode of action of any two insecticides.

Or

(b) Explain the synthesis and mode of action of any two DDVP and Warfarin.

Part C (3 × 10 = 30)

Answer any **Three** questions.

16. (a) Discuss the basic requirements of a industrial reactors.

    (b) Explain the designing and construction of chemical plants

17. What are fuels? How are they classified? Mention the composition and uses of producer gas and oil gas.

18. (a) Discuss the manufacture of Portland cement by Wet process and the engineering problems involved during process.

    (b) Explain the process of glazing and its verification in ceramic industry.

19. Write short notes on the following: (a) metal powder (b) waxes (c) Match industry.

20. How is cane sugar manufactured? Explain the process of estimation of sugar.

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