C 80161 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER B.A./B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS—UG)

Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY–III

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. How does the value of Henry's constant will change when the pressure of a gas is increased ?
2. Give any one application of electrolysis.
3. Name the most symmetric crystal system.
4. State Ostwald's dilution law.
5. Calculate the pH of 0.00001M solution.
6. Define electrochemical series.
7. Write the Conjugate base of NH_3.
8. Give mathematical expression for Raoult's law.
9. List one advantage of fuel cell.
10. Why is it necessary to use a salt bridge in a Galvanic cell ?

(10 × 1 = 10 marks)

Section B

Answer any **ten** *questions.*

Each question carries 2 *marks.*

11. What is Henderson equation ?
12. The solubility of AgCl is 1.05×10^{-5} mol/L. Calculate the solubility product.
13. What is Calomel electrode ?
14. What are liquid crystals ? How they are classified ?
15. What is reverse osmosis ?
16. What is common ion effect ?
17. Define cryoscopic constant and ebullioscopic constant.

Turn over

18. What do you meant by Van't Hoff Factor ?
19. What are buffer solutions ?
20. Write down the crystal angles of a unit cell of tetragonal, and monoclinic crystal systems.
21. Give the Debye-Huckel-Onsager equation and show its experimental verification.
22. Calculate the ionic strength of solution containing 0.2 M $CaCl_2$ and 0.05M NaCl.

(10 × 2 = 20 marks)

Section C

Answer any **five** *questions.*
Each question carries 6 *marks.*

23. Differentiate between ideal and non-ideal solutions.
24. Write a short note on concentration cells without transference.
25. Explain Kohlrausch's law. What are its applications ?
26. Give an account of modern concepts of acids and bases.
27. Explain Wein effect and Debye -Falkennhagen effect.
28. Derive Bragg's equation.
29. What is quinhydrone electrode ? What is its application and limitations ?
30. Discuss the structure of NaCl.

(5 × 6 = 30 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 *marks.*

31. Explain Stoichiometric and Non stoichiometric defects.
32. Explain the terms (i) Liquid junction potential (ii) Fuel Cell (iii) glass electrode.
33. Discuss potentiometric and conductometric titrations.
34. (a) Define Hydrolysis constant and Degree of hydrolysis of a salt.

    (b) Illustrate the relationship between hydrolysis constant (K_h) with K_w of (i) salt of strong acid and weak base (ii) salt of weak acid and weak base.

(2 × 10 = 20 marks)

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Reg. No.....

SIXTH SEMESTER B.A./B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS—UG)

Chemistry

CHÈ 6B 10—ORGANIC CHEMISTRY–III

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. Sketch the NMR spectrum of ethanol.
2. What is isoelectric point ?
3. What is Tollen's reagent ?
4. Draw the structure of methandrostenolone.
5. State Isoprene rule.
6. Draw the structure of geraniole.
7. State the occurance of citral.
8. What are steroid hormones ? Give an example.
9. Give the chemical names of vitamins A, B, and B_2.
10. What are nucleosides and nucleotides ?

(10 × 1 = 10 marks)

Section B

Answer any **ten** *questions.*

Each question carries 2 *marks.*

11. What are the different steps in the biosymthesis of proteins ?
12. Write short note on nutarotation.
13. Write short note on strecker synthesis.
14. Discuss in detail - Denaturation of proteins.
15. Write short note on Killiani - Fischer synthesis.
16. What are the applications of carbohydrates.

Turn over

17. What are epimers and anomers ?
18. What are the biological functions of lipids ?
19. What are carbohydrates ? How are they classified ?
20. Discuss the uses of waxes with examples.
21. Write short note on chemical shift.
22. What is meant by Zwitterion ? How does isoelectric point influence the properties of an amino acid ?

(10 × 2 = 20 marks)

Section C

Answer any **five** *questions.*
Each question carries 6 *marks.*

23. Briefly discuss secondary and teritiary structure of proteins.
24. How will you distinguish between the following pairs of compounds on the basis of IR spectroscopy :
    (a) Ethyl alcohol and diethyl ether.
    (b) Acetic acid and ethyl acetate.
25. What is meant by spin-spin splitting ? Illustrate taking the case of ethyl alcohol.
26. Discuss the structure of starch and cellulose.
27. Discuss the structural details of RNA and DNA and make a critical comment on the functions of mese molecules.
28. Discuss the uses of lemon grass oil and Eucalyptus oil.
29. Write short note on Diels-Alder reaction.
30. How are vitamins classified ? Give the structure of one vitamin belonging to each class.

(5 × 6 = 30 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 *marks.*

31. Discuss the source, structure and physiological functions of coniine and piperine.
32. Explain in detail DNA fingerprinting and its applications.
33. (a) Write short note on Anabolic steroids and their abuse.
    (b) Write short note on Hydrogenation and drying of oils.
34. (a) Discuss colour tests for proteins.
    (b) Inversion of cane sugar.

(2 × 10 = 20 marks)

C 80162 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER B.A./B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS—UG)

Chemistry

CHE 6B 12—ADVANCED AND APPLIED CHEMISTRY

Time : Three Hours Maximum : 80 Marks

Section A (One Word)

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Give an example of anesthetic.
2. What is bakelite ?
3. Give the structure of Endosulphan.
4. What is cetane number ?
5. Name the different types of RNA.
6. Name the major component of talcum powder.
7. What is antiperspirant ?
8. Name any one Bioerodible polymer for delivery of macromolecules.
9. Name any one Inorganic Fertilizer.
10. What is curve fitting ?

(10 × 1 = 10 marks)

Section B (Short Answers)

Answer any **ten** *questions.*
Each question carries 2 *marks.*

11. What are UV absorbers ?
12. Discuss the preparation of Indigo.
13. What are rodenticides ? Give two examples.
14. What is terylene ? What is its use ?
15. Discuss briefly semi-empirical method.
16. List the applications of nanomaterials in optics.
17. Discuss the structural features of DNA.
18. Discuss briefly the harmful effects of pesticides.

Turn over

19. Draw structures of BHT and BHA.
20. What is an operating system ? Give examples.
21. What is simple linear regression ?
22. What is object oriented programming ?

(10 × 2 = 20 marks)

Section C (Paragraphs)

Answer any **five** *questions.*
Each question carries 6 *marks.*

23. Discuss briefly the uses of LPG and CNG.
24. What are anti psychedetic drugs ? Give examples.
25. Write short note on refractory materials.
26. Discuss briefly combinatorial synthesis.
27. Write short note on chemical constitution of dye.
28. What are the advantages of Ziegler Natta polymerisation ?
29. What are herbicides ? Give three examples and uses.
30. Name two synthetic detergents ? How do they differ from soap ? What is the chemistry of cleansing action of soap ?

(5 × 6 = 30 marks)

Section D (Essays)

Answer any **two** *questions.*
Each question carries 10 *marks.*

31. (a) Discuss briefly semi conductor and metal oxide nano-particles.
    (b) Write short note on classification of dye based on structure.
32. (a) Write short note on manufacture and composition of cement.
    (b) Explain the twelve principles of green chemistry.
33. (a) Discuss the composition and advantages of milk.
    (b) Give the preparation of aspirin and paracetamol.
34. (a) Discuss the applications of Buna S, Buna N and Neoprene.
    (b) Write short note on knocking. What are anti-knocking compounds ?

(2 × 10 = 20 marks)

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Reg. No.....

SIXTH SEMESTER B.A./B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS—UG)

Chemistry

CHE 6B 09—INORGANIC CHEMISTRY–IV

Time : Three Hours Maximum : 80 Marks

Part A

Question No. 1–10 answer **all** *in one word / sentence*
Each question carries 1 *mark.*

1. Give an example for tridentate ligand.
2. Draw the structure of Trans-dichloro tetra-ammine cobalt (III) ion.
3. Write the composition of Brass.
4. What is Wilkinson catalyst ?
5. What is kroll process ?
6. Draw the structure of $KMno_4$.
7. Write the IUPAC name of the complex $\left[P + (IV)(NH_3)_4\, Br_2\right]Br_2$.
8. Draw the structure of Myoglobin.
9. What is the role of calcium ion in biological systems ?
10. Name three Zinc containing enzymes.

(10 × 1 = 10 marks)

Part B

Question No. 11–22 answer any **ten**.
Each question carries 2 *marks.*

11. Explain sodium-potassium pump.
12. Write short note on spectrochemical series.
13. What is intramedullary rod ?
14. Discuss briefly structural isomerism in co-ordination compounds.
15. Discuss briefly catalytic properties of transition metals.

Turn over

16. What are the causes of Lanthanide contraction ?
17. What is 18 electron rule ?
18. Write short note on zone refining.
19. Discuss the structure of Iron Pentacarbonyl, $Fe(CO)_5$.
20. What are the uses of $k_2Cr_2O_7$?
21. What are the factors affecting stability of complexes ?
22. What are the general properties of actinides ?

(10 × 2 = 20 marks)

Part C

Question No. 23–30 answer any **five**.
Each question carries 6 *marks.*

23. What are the limitations of VBT of Co-ordination compounds ?
24. Write short note on Ellingham diagram.
25. How is Titanium extracted from its ore ?
26. Discuss the applications of complexes in quantitative analysis.
27. Give the importance of metals in medicine.
28. Analyse the biochemical functions of haemoglobin and myoglobin.
29. Discuss the preparation and properties of ferrocene.
30. Write short note on open hearth process.

(5 × 6 = 30 marks)

Part D

Question No. 31–34 answer any **two**.
Each question carries 10 *marks.*

31. Discuss classification of steel. What are the uses of alloy steels ?
32. Discuss Geometrical Isomerism in co-ordination compounds.
33. Discuss the electronic configuration and general characteristics of Lanthanides. Also compare with Actinides.
34. (a) Write short note on chlorophyll and photosynthesis.
    (b) Discuss the toxicity of Lead and Arsenic.

(2 × 10 = 20 marks)

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SIXTH SEMESTER B.A/B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS—UG)

Chemistry

CHE 6B 13 (E2)—POLYMER CHEMISTRY

Time : Three Hours Maximum : 80 Marks

Section A (One word)

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Give two examples for natural polymers.
2. What is tacticity ?
3. Write another name for Ziegler-Natta polymerisation.
4. The monomer of Orlon is ————————.
5. Write the mathematical expression for polydispersity index.
6. Which is the first step of thermal degradation of PVC ?
7. Mention one example for thermoplastic used in injection moulding.
8. Draw the structure of the monomer of PMMA.
9. Give one important use of glyptal.
10. Name one absorbable synthetic polymer used as suture thread.

(10 × 1 = 10)

Section B (Short Answer)

Answer any **ten** *questions.*
Each question carries 2 *marks.*

11. What are isotactic polymers ? How are they generated ?
12. Schematically represent a homopolymer and a branched polymer.
13. Explain the polymerisation of vinyl chloride.
14. Write the general mechanism of anionic addition polymerisation.
15. What is glass transition temperature in polymers ? Mention two factors affecting it.
16. What is vulcanisation of rubber ?
17. What is meant by viscoelasticity of polymers ?

Turn over

18. What is calendaring in polymerisation process ?

19. How is silicone rubber prepared ?

20. How different kinds of plastics are identified by their codes ?

21. What are carbon fibres ? Give any *two* applications.

22. What are high temperature polymers ?

(10 × 2 = 20 marks)

Section C (Paragraph)

Answer any **five** *questions.*
Each question carries 6 *marks.*

23. Citing suitable examples give an account of various methods of synthesis of polymers.

24. Discuss in detail the mechanism of Zeigler-Natta polymerisation.

25. Give an account of weight average and number average molecular weights of polymers.

26. Describe rotational and blow moulding.

27. Write the method preparation of :

    (i) Butyl rubber.

    (ii) Teflon.

    (iii) Phenol-formaldehyde resin.

28. Write briefly on recycling of plastics.

29. Give a brief account of the structure, properties and uses of LDPE and HDPE.

30. Write a short note on conducting polymers.

(5 × 6 = 30 marks)

Section D (Essays)

Answer any **two** *questions.*
Each question carries 10 *marks.*

31. Citing suitable examples describe in detail the classification of polymers based on intermolecular forces.

32. Give a detailed account of ring opening and group transfer polymerisations.

33. Write an account of thermal, photo and oxidative degradation of polymers.

34. Describe any *four* polymerisation techniques.

(2 × 10 = 20 marks)