D.K.M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1

NUCLEAR CHEMISTRY AND INORGANIC POLYMERS (15CCH6A)

UNIT – I SECTION – A

1. How is positron discovered?
2. What is anti electrons?
3. What is anti proton?
4. What is anti neutron?
5. What are nuclear particles?
6. What is neutrino and anti neutrino?
7. What is meson?
8. What are the different types of meson?
9. What are nuclides?
10. Define isotopes.
11. Define isobars.
12. Define isotones.
13. Explain nuclear radius.
14. Define mass defect?
15. Define N/P ratio.
16. Define binding energy.
17. Define the term packing fraction.
18. What is magic numbers?
19. How will you represent the two nuclei of an element with atomic number 11 and how 11 and 12 neutron each.

Section – B

1. Explain the nuclear forces operating between nucleons.
2. Explain the stability of the nucleus based on N/P ratio
3. Discuss in detail isotopes, isobars and isotones.
4. Explain the stability of nucleus based on packing fraction.
5. Write a note on the stability belt.

6. The mass of Li3 is 7.016005 a.m.u. mass of a proton is 1.007277a.m.u. period out the mass defect of Li3 nucleus.

Section – C

1. Discuss nuclear radius, nuclear mass and nuclear forces.
2. Define binding energy. Explain the stability of the nucleus based onbinding energy.
3. Explain nuclear models.
4. Discuss in detail the nuclear shell model.
5. Discuss in detail the liquid drop model.

Unit – II Section - A

1. What is meant by radioactivity?
2. What are the different types of radiation?
3. Define natural radioactivity.
4. Define artificial radioactivity.
5. What are α particles?
6. What are β particles?
7. What are the laws of radioactive disintegration.
8. Define half life period.
9. Define average life period?
10. What is meant by group displacement law?

Section – B

1. Write the difference between natural radioactivity and artificial radioactivity.
2. Write the difference between chemical reaction and nuclear reaction.
3. Discuss the different types of radioactive emission.
4. Explain group displacement law.
5. Write a note 4n+2 series.
6. Derive the half – life period of radioactive decay process.
7. Explain group displacement law.
8. How many α and β particles will be emitted when U changes to pb .

Section – C

1. Define radioactivity. Explain different types of radioactivity and different types of radiation.
2. Explain radioactive disintegration.
3. Explain group displacement law with 4n+2 and 4n series.
4. How will detect and measure radioactivity by Wilson cloud chamber and Geiger mullercounter method.

UNIT III Section – A

1. Write any two uses of radioisotope in medicine.
2. Gamma-rays are harmful to living tissues.it is a boon or bane? Explain
3. What are the industrial applications of radioisotope?
4. Define fission
5. Define fusion
6. Compare nuclear reaction and chemical reaction.
7. What are moderators?
8. What is the liquid used as coolant?
9. Compare fission and fusion reaction.
10. Define fission energy.

Section – B

1. Explain the production on energy in sun and stars
2. Explain how nuclear fission reaction is a controlled reaction.
3. Write note on Hydrogen bomb.
4. Write note on atomic bomb.
5. What are the different types of fission energy?
6. The binding energy per nucleon is maximum for iron nuclei. What do you understand by this statement?

Section – C

1. Explain the components of the nuclear reactor
2. Write a note on radioactive isotope
3. Explain nuclear fission and fusion reaction

UNIT IV Section – A

1. How is borazine prepared?
2. Write types of silicone compounds?
3. What are chelated polymers?
4. What are metal alkoxide polymers? Give example.
5. How silicon halides are prepared?

Section – B

1. Write notes on phosphonitrilic polymers?
2. Discuss about tetra sulphur tetra nitride polymers?
3. Write notes on coordination polymers?
4. Write about phosphorous polymers? Give an example.
5. Write the preparation, properties and uses of Borazole (or) Borazine.
6. Write notes on silicones.
7. Mention the properties of uses of silicones

Section – C

1. How inorganic benzene is prepared? Compare its structure properties with benzene.

2. Write the preparation, properties and uses of phosphonitrilic halides.

3. Discuss about Tetra sulphurtetranitride polymers.

4. Write notes onmetal alkoxide andchelated polymers with examples

UNIT V Section – A

1. Write the structure of SiO_4^{4-} ion.
2. What is a silicate mineral? Give example.
3. Write any two differences between silicates of borates?
4. What are cyclic silicates?
5. What is the difference between silica & silicates?

Section – B

1. Explain about phospherouspentoide polymers.
2. Write notes on any four types of silicates?
3. Write short notes about Borates.
4. Write short notes of the following.
   a) Felspars b) zeolits c) Ultramarines

Section – C

1. What are silicates? Mention difference types of silicates.
2. Write the preparation, properties and structure of silicones and related compounds?
3. Write short notes on vanadales, niobates and tantalates.
4. Explain poly molybdate and polytantalate polymers.