

M.Sc.(Chemistry) (NEP Pattern) - Semester-III
STPG03CHE06 - Paper-IV : Nuclear Chemistry-I

P. Pages : 2

Time : Three Hours



GUG/W/24/15965

Max. Marks : 40

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1. a) Describe successive radioactive decay and growth kinetics in detail. 4
b) Explain secular equilibrium. 4

OR

- c) Write about various mode of decay. 2
d) Write in brief on natural radioactivity. 2
e) What is half-life of mixed radioisotopes. 2
f) Write about statistical nature of nuclear radiation. 2
2. a) Explain 'Shell model'. 4
b) Write the semi-empirical mass formula and explain the terms involved. 4

OR

- c) Give comparison between nuclear and chemical reactions. 2
d) Write a note on nuclear binding energy. 2
e) Explain magic numbers. 2
f) Describe nature of nuclear forces. 2
3. a) Draw a neat diagram of ionization chamber and explain how it works. 4
b) Explain any two methods of detecting nuclear radiations in detail. 4

OR

- c) Explain GM counter shortly. 2
d) What is solid state detection. 2
e) Draw pulse height-voltage curve. 2
f) Explain working of proportional counter. 2

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| 4. | a) Describe in brief radioactive waste management and disposal. | 4 |
| | b) Write short notes on breeder reactor. | 4 |

OR

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| c) | Explain spontaneous fission. | 2 |
| d) | Write in brief on radioactive liquid waste management. | 2 |
| e) | Name two moderators used in nuclear reactors. | 2 |
| f) | What is PUREX process. | 2 |

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| 5. | Attempt any eight . | 8x1
=8 |
| a) | Define half-life period. | 1 |
| b) | What are photonuclear reactions. | 1 |
| c) | What is probability. | 1 |
| d) | Write about cross reactions. | 1 |
| e) | What are spallation reaction. | 1 |
| f) | Write principle of proportional counter. | 1 |
| g) | What is limitation of liquid drop model? | 1 |
| h) | What is nuclear fission. | 1 |
| i) | Define isotone. | 1 |
| j) | What is Radioactive waste. | 1 |
