

Roll No.

76061

**M. Sc. 3rd Semester Chemistry
CBCS Scheme
Examination – November, 2018**

INORGANIC SPECIAL-I

Paper : 17CHE23GA1

Time : Three Hours]

[Maximum Marks : 80

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is **compulsory**. All questions carry equal marks.

1. (a) What is Ambidentate ligand ? Give suitable example. 2 × 8 = 16
- (b) What are the selection rules for absorption of molecular vibrations ?
- (c) What are the parameters of ESR ?
- (d) How many peaks are obtained in Isopropyl radical ?
- (e) What is Mossbauer effect ?

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- (f) What are the uses of mass spectrometry ?
 (g) What is zero field splitting ?
 (h) Define wide line NMR.

SECTION - A

2. (a) How will you determine the Vibrational modes of a molecule ? Explain with the help of SO_2 molecule. 8
 (b) How will you differentiate between nitro and nitrito complexes by vibrational spectra ? 8
3. (a) Give the IR Spectra of ethylene diamine complexes. 6
 (b) Discuss the spectrum of fluoride Complex of sperm whale myoglobin. 10

SECTION - B

4. Explain the hyperfine splitting in ESR Spectra of:
 $4 \times 4 = 16$
- (a) n-Propyl radical
 (b) HD radical
 (c) CH_3 radical
 (d) NH_3 radical
5. (a) Discuss the various factors affecting the magnitude of the g values. 10
 (b) Write short note on nuclear quadrupole interaction. 6

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6. (a) What is isomer shift in MIB Spectroscopy ? Explain the various factors affecting this shift. 8
 (b) Discuss the applications of Mossbauer spectroscopy for elucidation the structure of the tin compounds. 8

SECTION - C

7. (a) Calculate the Intensity of $M, M+2, M+4, M+6$ for $BrCHCl_2$ and $ClCHBr_2$. 6
 (b) What is the principle of Mass spectrometry ? What happens when a molecule combines with a high energy molecule. Give all possible reactions. 10

SECTION - D

8. (a) Discuss the ^{19}F NMR Spectrum of fluoracetone, dimethyl phosphorus trifluoride and ^{31}P spectrum of HPF_2 . 12
 (b) Write short note on Nuclear Quadrupole moment. 4
9. (a) Explain the Nuclear Quadrupole Transitions in Axially Symmetric Molecule. 8
 (b) Discuss the application of NQR Spectroscopy for deciding chemical bonding and structure. 8

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INORGANIC SPECIAL - II

Paper : 17CHE33GA2

Time : Three Hours]

[Maximum Marks : 80

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is compulsory. Attempt five questions in all, selecting one question from each Section (A-D).

1. Answer the following in short :

- (a) How we can explain the stability of nucleus ?
- (b) Explain the Compton effect.
- (c) What is the principle of isotopic dilution analysis ?
- (d) Explain the nuclear forces ?
- (e) What are the thermonuclear reactions ?

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- (f) Explain the ionization counter with diagram.
- (g) Differentiate between fragmentation and fission nuclear reaction.
- (h) Write a note on transfer nuclear reactions. 2 each

SECTION – A

- 2. (a) What is packing fraction? Explain the stability of nucleus on the basis of odd-even number of nucleons. 8
- (b) How will you explain the stability of the nucleus in term of binding energy? 8
- 3. (a) Describe the nuclear structure based on the collective model. 10,6
- (b) Explain the merits of a shell model.

SECTION – B

- 4. (a) Explain in details about the photoelectric effect. 8
- (b) Explain the pair production effect. 8
- 5. (a) Describe the principle and applications of the radiometric titration technique? 12
- (b) Explain the various limitations of NAA. 4

- (c) Tides
- (d) Swell
- (e) Cinder cone
- (f) Talus
- (g) River terrace
- (h) Lava

UNIT - I

2. Discuss in detail the various types of rapid onset disasters which are caused due to endogenetic earth processes. 16

3. Write a note on :

- (a) Coastal Erosion due to natural and anthropogenic factors. 8
- (b) Slow onset disaster 8

UNIT - II

4. Write a note on :

- (i) Flash flood and their hazardous effects 8
- (ii) Causes of Tsunami and its effects 8

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5. Discuss in detail the origin, types and effects of tropical cyclones. 16

UNIT - III

6. Discuss in detail the concept of vulcanicity and its early prediction. Classify the volcanoes on the basis of the nature of volcanic eruptions. 16

7. Discuss the phenomenon of Earthquake as an environmental hazard and its role in causing disaster to human society. 16

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