

(6 pages)

Reg. No. :

Code No. : 7873

Sub. Code : PCHM 12

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2019.

First Semester

Chemistry – Core

INORGANIC CHEMISTRY – I

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The number of electrons in the σ_{2p} molecular orbital in N_2^+ is
(a) 3 (b) 0
(c) 1 (d) 2
2. Among the following paramagnetic species is
(a) B_2 (b) C_2
(c) O_2 (d) CO

3. Among this which is the soft acid

(a) Cu^+ (b) K^+
(c) Na^+ (d) H^+

4. Among this which is aprotic solvent.

(a) HF (b) MeOH
(c) N_2O_4 (d) MeCN

5. An example for metal deficiency defect is

(a) NaCl (b) AgCl
(c) FeS (d) CsCl

6. The number of chloride ions present per unit of CsCl

(a) 6 (b) 8
(c) 1 (d) 4

7. Alloys of Lanthanides are called as

(a) Misch metals (b) Metalloids
(c) Plate metal (d) Actinides

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8. Elements that form oxocations are
 (a) Lanthanides (b) Actinides
 (c) Noble gases (d) Alkali metals.
9. The reaction ${}_5B^8 \rightarrow {}_4Be^8$ takes place due to
 (a) α - decay (b) β - decay
 (c) electron capture (d) positron decay
10. Which of the following is used as neutron absorber in nuclear reactors?
 (a) Water (b) Deuterium
 (c) Uranium (d) Cadmium

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
 Each answer should not exceed 250 words.

11. (a) Describe the structures of XeO_3 , XeO_2F_2 ?
 Or
 (b) Calculate the lattice energy of NaCl crystal with help of Born lande equation?
 ($z^+ = z^- = 1$, $e = 4.8 \times 10^8$ esu, $N = 6.0238 \times 10^{23}$,
 $r_0 = 2.76 \times 10^8$ cm, $A = 1.7476$)

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12. (a) Write the application of Hard soft acid and base?

Or

- (b) Write short note on leveling effect?

13. (a) What are the differences between Schottky and Frenkel defects?

Or

- (b) Write a short note on BCS theory.

14. (a) Write about any two separation techniques for lanthanides.

Or

- (b) State and explain the spectral and magnetic properties of actinides.

15. (a) Explain the spontaneous fission reaction with examples?

Or

- (b) Discuss radio chromatography.

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[P.T.O.]



PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Account on M.O. diagram of heteronuclear diatomic molecule with example.

Or

- (b) Give a detailed account on Kapustinski equation and bent rule?

17. (a) Explain the four concepts of acid and bases?

Or

- (b) Write the reactions taking place in liquid sulphur dioxide?

18. (a) Describe the crystal structure of zinc blende?

Or

- (b) Write the briefly optical and electrical properties of semiconductors?

19. (a) Explain lanthanide and actinides contraction?

Or

- (b) Explain similarities between lanthanide and actinides?

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20. (a) Write a note on nuclear fusion reaction with example.

Or

- (b) Write a note on photonuclear reaction and radiometric titrations.

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