K22P 1568

Reg. No. : .....

Name : .....

I Semester M.Sc. Degree (CBSS – Reg./Sup./Imp.) Examination, October 2022
(2019 Admission Onwards)
CHEMISTRY
CHE 1C.02 : Inorganic Chemistry – I

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **all** questions in **one** word or **one** sentence. **Each** question carries **1** mark.

1. Give any two examples for metallochromic indicator.
2. Which organic precipitant is used for the gravimetric estimation of Fe (III) ?
3. What is relative standard deviation ?
4. Give the auto-ionisation reaction of $H_2SO_4$.
5. How is nuclear radius related to mass number of the nucleus ?
6. What do you mean by a breeder reactor ?
7. What are closo boranes ?
8. Which phosphorus sulphide is used for making matches ? **(8×1=8)**

SECTION – B

Answer **any eight** questions. Answer in **two** or **three** sentences. **Each** question carries **2** marks.

9. Explain the terms :
   a) Students t-test and
   b) F-test.

P.T.O.



10. Calculate the standard deviation for an element whose percentage in a sample has been found to be 20.8, 21.6, 22.1, 22.0, 23.3, 21.9 and 22.8.
11. Explain selective masking and demasking techniques in EDTA titration with suitable examples.
12. What is the order of basicity of alkylamines in solution phase ? Explain the reason.
13. What is meant by levelling effect ? Give an example.
14. What is symbiosis ?
15. Write a nuclear equation for
    a) α-decay of $_{91}Pa^{231}$
    b) β-decay of $_{90}Th^{227}$.
16. Why nuclei with nucleon number 2, 8, 20, 50, 82 or 126 shows exceptional behaviour ?
17. What are the similarities between a nucleus and a liquid drop ?
18. Derive 'STYX' code for $B_5H_{11}$ and draw its structure.
19. Starting from $S_4N_4$, how will you prepare $S_2N_2$ and $(SN)_X$.
20. How will you prepare $P_4S_7$ ? Give its structure. **(8×2=16)**

SECTION – C

Short paragraph questions. Answer **any four** questions. **Each** question carries **3** marks.

21. Discuss briefly the application of oxine in gravimetric estimation of metal ions.
22. What are the essential requirements for a substance to be used as a metallochromic indicator ?
23. With equations and words, explain what happens :
    a) When metallic potassium is dissolved in $NH_3$ to form a dilute solution.
    b) When more potassium is added to form concentrated solution.
    c) When (a) is treated with $Fe_2O_3$.
24. Discuss the properties of sulphuric acid as a non-aqueous solvent.



25. Explain transient and secular radioactive equilibrium.
26. Write a short note on collective model of nucleus.
27. Give an account of the structure and bonding in $[NPCl_2]_3$.
28. What is Wade's rule ? Discuss. **(4×3=12)**

SECTION – D

Essay type questions. Answer either '**a**' or '**b**' of **each** question. **Each** question carries **6** marks.

29. a) Explain the terms distribution coefficient and distribution ratio in solvent extraction. Discuss the principle involved in counter current extraction and its applications.

    OR

    b) What are chelometric indicators ? Explain the function of chelometric indicators with special reference to EDTA titration. Briefly discuss the feasibility of EDTA titration.

30. a) Write a generalised acid base concept. Use acid base concept to correlate the following observations :

    Basicity of metal oxides, acidity of metal oxides, hydration and hydrolysis reactions, acidity of oxyacids and basicity of substituted amines.

    OR

    b) Acids and bases are classified into hard and soft. What is its theoretical basis ? What are its applications ?

31. a) Explain the various methods used for the detection and measurements of radiation.

    OR

    b) What is reaction cross section ? Explain different types of nuclear reactions.

32. a) Write briefly on the preparation, properties and structure of phosphorus-sulphur cages.

    OR

    b) How is diborane prepared ? Discuss its important properties, structure and bonding ? **(4×6=24)**

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