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6 SEM TDC CHM M 3 (N/O)

2019

(May)

CHEMISTRY

(Major)

Course : 603

(Inorganic Chemistry—III)

The figures in the margin indicate full marks for the questions

(New Course)

Full Marks : 48

Pass Marks : 14

Time : 2 hours

1. Choose the correct answer : 1×5=5

(a) Which vitamin is known as cyanocobalamin?

(i) Vit A

(ii) Vit C

(iii) Vit B_6

(iv) Vit B_{12}

(b) Which of the following is used to decolourize and deodorize vegetable and mineral oils?

(i) Kaolinite

(ii) Montmorillonite

(iii) Laponite

(iv) None of the above

(c) The stationary phase in adsorption chromatography is

(i) liquid

(ii) solid

(iii) gas

(iv) colloid

(d) Column chromatography is based on the principle of

(i) ion-exchange

(ii) exclusion principle

(iii) differential adsorption

(iv) absorption

(e) In the manufacture of cement, cement clinker is mixed with 2%–3% gypsum because gypsum

(i) removes impurity

(ii) helps quick setting

(iii) slow down setting of cement

(iv) increases the amount of cement

UNIT—I

2. *(a)* Answer any *three* of the following questions : 4×3=12

(i) Explain the role of Na and K in biological system.

(ii) Discuss the role of metal ions in biological nitrogen fixation.

(iii) Explain the role of iron in oxygen storage and transport in biological system.

(iv) Explain how metal poisoning can be treated by chelation therapy.

(b) Write short notes on (any *two*) : 1½×2=3

(i) Plastocyanin

(ii) Carbonic anhydrase

(iii) *cis*-Platin

UNIT—II

3. Answer any *three* of the following questions : 3×3=9

(a) Give the formula of kaolinite clay. Mention four applications of this clay material. 1+2=3

(b) What do you mean by secondary interaction? Mention the different types of such interactions. 1+2=3

(c) What do you mean by composite materials? Write a note on the application of nanocomposite material. 1+2=3

(d) Describe briefly about synthesis of nanomaterials. 3

(e) Write a short note on polymer nanocomposite materials. 3

UNIT—III

4. *(a)* Describe the principle and application of thin-layer chromatography. 3

Or

How on the basis of R_f values, a mixture containing three components can be separated using paper chromatography?

(b) Write short notes on any *two* of the following : 2×2=4

(i) Principles of column chromatography

(ii) Choice of solvent system in chromatography

(iii) Application of gas chromatography

UNIT—IV

5. *(a)* Answer any *two* of the following questions : 4×2=8

(i) How do Pb and Cd behave as toxicant? Explain with examples. 2+2=4

(ii) What are the basic raw materials used for the manufacture of cement? Write the composition of Portland cement. How can it be manufactured? 1+1+2=4

(iii) What are the constituents of paints? Explain the role of binder and solvent in paint industry. 1+1½+1½=4

(b) Write short notes on any *two* of the following : 2×2=4

(i) Purification of industrial waste water

(ii) Ceramics

(iii) Hazard from radioactive fallout

(Old Course)

Full Marks : 48

Pass Marks : 19

Time : 3 hours

1. Choose the correct answer : 1×5=5

(a) Anaemia is due to the deficiency of

(i) Fe

(ii) Zn

(iii) K

(iv) Na

(b) The function of plastocyanin is

(i) electron transfer in plants

(ii) oxygen transport

(iii) oxidation of L-ascorbic acid

(iv) oxidation of amine

(c) Which of the following is used to decolourize and deodorize vegetable and mineral oils?

(i) Kaolinite

(ii) Montmorillonite

(iii) Laponite

(iv) None of the above

(d) In fluorescence spectroscopy, the emitted radiation has

(i) a shorter wavelength

(ii) a longer wavelength

(iii) high energy per photon

(iv) None of the above

(e) In the manufacture of cement, cement clinker is mixed with 2%–3% gypsum because gypsum

(i) helps quick setting

(ii) slows down setting of cement

(iii) removes impurity

(iv) increases the amount of cement

UNIT—I

2. (a) Answer any *three* of the following questions : 4×3=12

(i) What are vitamin B_{12} and vitamin B_{12}-coenzyme? What metal is present there? What are the oxidation states of the metal in vitamin B_{12}? 3+½+½=4

(ii) Explain the role of iron in oxygen storage and transport in biological system. 2+2=4

(iii) What is carbonic anhydrase? Discuss its activity in living organisms. 2+2=4

(iv) What is an enzyme? Write a note on copper enzymes. 1+3=4

(b) Write a note on any *one* of the following : 2

(i) Nitrogenase

(ii) Importance of Ca for human body

UNIT—II

3. Answer any *three* of the following questions : 3×3=9

(a) Mention the two basic approaches for synthesis of nanomaterials. Name two characterization techniques for nano-materials. 2+½+½=3

(b) Write a note on polymer nanocomposite materials. 3

(c) Give the formula of montmorillonite clay and mention some uses of it. 1+2=3

(d) What do you mean by secondary interaction? Mention two types of such interactions. 2+1=3

UNIT—III

4. Answer any *three* of the following questions : 3×3=9

(a) What are the basic parts present in a general spectrophotometer? What kind of information do you get from AAS? 2+1=3

(b) What kind of information do you get from FTIR? How does it differ from IR-spectroscopy? 2+1=3

(c) Describe the technique adopted in TLC. What are ascending and descending paper chromatography? 2+1=3

(d) Write short notes on the following : 1½×2=3

(i) Choice of solvent system in chromatography

(ii) Principles of column chromatography

UNIT—IV

5. *(a)* Answer any *three* of the following questions : 3×3=9

(i) What is demineralized water? Describe a method of demineralization of water. 1+2=3

(ii) Discuss the health hazards which may be caused by mercury and its compounds. 3

(iii) What are paints? Mention the names of essential parts of a paint. What is the role of a binder? 1+1+1=3

(iv) What do you mean by setting of cement? Write down the reactions involved in it. 1+2=3

(b) Write a short note on any *one* of the following : 2

(i) Ceramics

(ii) Cadmium poisoning on human body

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