M.Sc. 4th Semester Examination, 2024

CHEMISTRY

PAPER – CEM-404

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

PAPER – CEM-404 (Organic Special)

(*Food*)

GROUP–A

Answer any **four** questions : 2×4

1. What is Toned milk ?

2. Write the objectives of homogenization of milk.

3. Write the conditions of different milk pasteurisation methods.

4. Write the full form of FSSAI.

5. What do you mean by LDL and HDL ?

6. What do you mean by 'virgin oil' ?

GROUP–B

Answer any **four** questions : 4×4

7. Write the merits and demerits of Spray Drying of Milk. What do you mean by sweetened condensed milk ?

8. What are the general ingredients used for the preparation of ice-cream.

9. Write the steps of Butter manufacturing ?

10. What are the diffeences between fat and oil ?

11. What are the objectives of the following steps : 'churning' in butter making process and 'ripening' in the cheese making process ?

12. What are the benefits of eating fruits and vegetables ?

Or

Write a short note on adulteration of foods.

GROUP – C

Answer any **two** questions : 8×2

13. What is 'PUFA' ? Give one example of it. Name two essential fatty acids. Mention the Calorific value of fat. What are 'bad cholesterol' and 'good cholesterol' ? Mention two functions of fat in our body.

14. Write the steps for the preparation of refined vegetable oil. Name the solvents used in the solvent extraction process for oil. What are the objectives of the steps 'rendering' and 'bleaching' in oil processing ?

15. Mention two used of hydrogenated fat ? What do you mean by 'trans fat' ? What is winterization of oil ? Define the following : Iodine value and Peroxide value.

16. What do you mean by parboiling ? Wrie the difference between 'atta' and 'maida'. What is gluten ? Name two cereals and mention two processed food products made out of each of them.

(*Continued*)

Or

(*a*) What is HACCP? Write down the principles of HACCP.

(*b*) Describe function of food additives.

[Internal Assessment – 10 Marks]

PAPER – CEM-404 (Inorganic & Physical Special)

(*Food*)

GROUP – A

Answer any **four** questions : 2×4

1. Which of the oxidation states of arsenic is most likely to be toxic and why ?

2. Which radicals are produced by oxygen in the body ? Why are they toxic ?

3. What are the toxic effects of lead and cadmium ions on the kidney ?

4. Which compound can be used as a therapeutic agents for lead poisoning ? Why this antidote is always administered with calcium ?

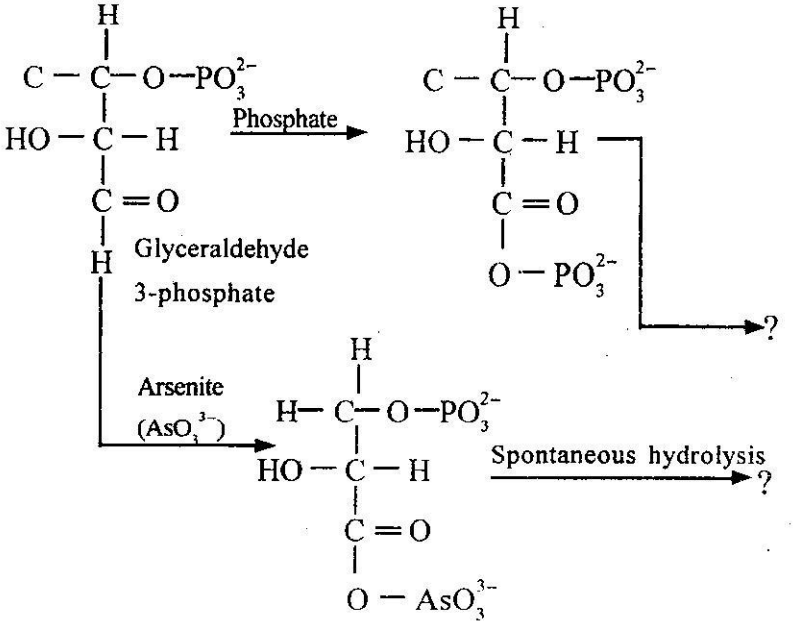
5. What are the basic differences between an electron microscope and a optical microscope ?

6. Why glass lenses cannot be used in electron microscope ?

GROUP–B

Answer any **four** questions : 4×4

7. Complete the following reactions with proper explanation.



8. How antidotes to arsenic poisoning take advantage of arsenic's sulfur-seeking tendencies ? Write down the name and chemical formula of one such antidote.

9. What is the biochemical action of carbon-monoxide ? How benzene is metabolized in our body ?

10. Write down the disadvantages of dynamic light scattering (DLS) techniques.

11. What are the advantages (with example) of AFM over the other conventional microscopic techniques ?

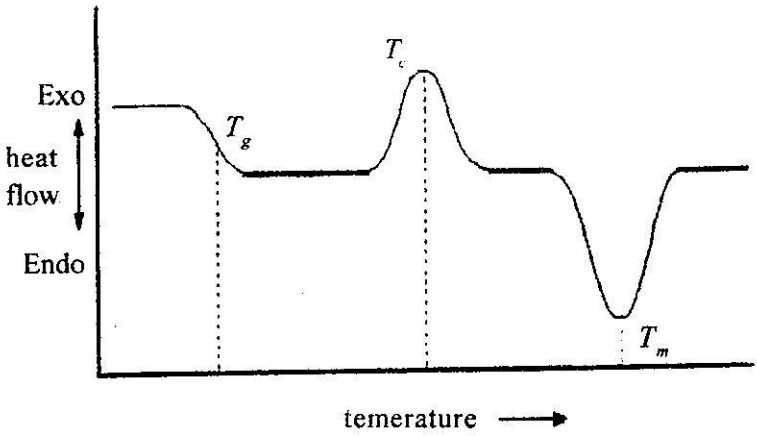
12. Describe the surface pressur-area isotherm of DPPC at 25 °C at the air-water interface.

GROUP – C

Answer any **two** questions : 8×2

13. (*a*) The differential scanning calorimetry (DSC) plot of a polymer is shown bellow :

(*Continued*)



Explain the T_g, T_c and T_m temerature on the above thermogramme of a polymer.

(*b*) Discuss the advantage and disadvantage of differential scanning calorimetry (DSC). 4 + 4

14. (*a*) Prepare a flow chart for the steps involved in the identification of a targeted protein from a mixture of biomolecules by Isothermal titration calorimetry (ITC).

(*b*) What are the advantages and disadvantages of using Isothermal titration calorimetry (ITC). 4 + 4

15. (*a*) Write down the common natural source of cyanide ? How is this form converted to toxic cyanide ion in the body ? What are the biochemical actions of cyanide ? How an antidote of cyanide poisoning works ?

(*b*) What is the metabolic pathway of methanol degradation ? How does this result in acidosis ? What are the major acute toxicological effects of ethanol ? 4 + 4

16. (*a*) Explain how does the surface pressure-area isotherm vary for a mixed monolayer comprising DSPE and DSPE-PEG ?

(*b*) Why Brewster angle microscopy is advantageous over epifluorescence microscopy ? 4 + 4

[Internal Assessment – 10 Marks]
