

2022

M.Sc.

4th Semester Examination (CCAЕ)

CHEMISTRY

PAPER—CEM-404

ORGANIC, INORGANIC AND PHYSICAL SPECIAL

*Full Marks : 40*

*Time : 2 Hours*

*The figures in the margin indicate full marks.*

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

*Illustrate the answers wherever necessary.*

**(Organic Special)**

**Group—A**

1. Answer any four questions : 4×2

(a) Define CAP and MAP storage.

*(Turn Over)*

- (b) Describe the objectives of pasteurization of milk.
- (c) Define milk with chemical composition.
- (d) What are the disadvantages of milling of rice?
- (e) What is inter-esterification of oil?
- (f) What are the advantages of Rice Bran Oil compare to other edible oils?

### Group—B

2. Answer any *four* questions : 4×4
- (a) Define food additives. How do they act as food preservatives? 1+3
  - (b) Explain the effects of thermal and osmotic dehydration on fruits and vegetables. 2+2
  - (c) What is HACCP? Explain the principles of HACCP. 1+3
  - (d) What is the process of parboiling of rice? Describe its advantages. 2+2

- (e) Give differences between soap and detergent. 4
- (f) What is essential fatty acid? Give its two importance on human body. 2+2

**Group—C**

3. Answer any *two* questions : 2×8
- (a) Describe the principles of food preservation. How can post harvest handling technique be modified to minimize the loss of fruits and vegetables? 4+4
- (b) What is gluten? Give the composition of dry gluten. Explain the method of gluten formation and bread processing. 1+1+3+3
- (c) Write short notes on - Iodine value and Saponification value. 4+4
- (d) Explain processing and storage of Edible oil. 4+4
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**(Inorganic and Physical Special)**

**Group—A**

1. Answer any *four* questions :

4×2

- (a) What is the general formula of carbamates? Why carbamates pesticides widely used?
- (b) Which of the oxidation states of arsenic is most likely to be toxic? Why?
- (c) Which radicals are produced by oxygen in the body? Why are they toxic?
- (d) What are the two main toxic forms of cyanide? Which of these is most dangerous by inhalation?
- (e) What are the basic differences between an electron microscope and optical microscope?
- (f) What are the differences between the magnification and the resolution?

**Group—B**

2. Answer any *four* questions :

4×4

- (a) What is a common natural source of cyanide? How is this form converted to toxic cyanide ion in the body? How does cyanide deprive the body of oxygen?
- (b) What are the advantages (with example) of AFM over the other conventional microscopic techniques?
- (c) What is the biochemical action of carbon monoxide? What is the receptor with which carbon monoxide reacts? In what sense is this reaction reversible?
- (d) What are the chronic toxicological effects of benzene? What kinds of blood abnormalities are caused by benzene exposure? How does benzene toxicity affect white cell count? How does it affect bone marrow?
- (e) What is the metabolic pathway of methanol degradation? How does this result in acidosis? What are the major acute toxicological effects of ethanol?
- (f) Surface pressure-area isotherms are analogous to the three-dimensional phase transition. Explain with suitable example.

**Group—C**Answer any *two* questions.

2×8

3. (a) Explain as 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
4. (a) Write short note on the fluid mosaic model of cell membrane.
- (b) Describe the transport of lipid across the membrane with the help of flippase protein. 4+4
5. (a) Discuss about the different fields and applications where Isothermal titration calorimetry (ITC) is used.
- (b) What are the advantage and disadvantage of using Isothermal titration calorimetry (ITC). 4+4
6. (a) Write down the limitation of Dynamic light scattering (DLS).
- (b) What type of analysis and identified can be done by differential scanning calorimetry (DSC)? 4+4