CY 3151 — ENGINEERING CHEMISTRY

(Common to All Branches (Except Marine Engineering))

(Regulations 2021)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why do we express hardness of water in terms of calcium carbonate equivalent?
2. What is brackish water?
3. Define nanomaterials.
4. What are nanoclusters?
5. What is reduced phase rule?
6. Give two examples of hybrid composites.
7. What is meant by cetane number?
8. How do you control carbon foot print (any two)?
9. State critical mass.
10. Write any two uses of a lithium ion battery.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the water quality parameters? Explain their significance. (8)

(ii) Write a note on break point chlorination. (8)

Or

(b) (i) How is sea water purified using reverse osmosis technique? (8)

(ii) Explain sludge and scale formation in boilers. How are they removed? (8)

12. (a) (i) Explain laser ablation process for producing nanomaterials with a neat diagram. (8)

(ii) Discuss about size dependent properties of nanomaterials. (8)

Or

(b) (i) With a neat sketch, explain Sol-Gel synthesis for producing nanomaterials. (8)

(ii) Write an informative note on the applications of nanomaterials. (8)

13. (a) (i) State phase rule. Explain the terms involved in it. (8)

(ii) With the help of a neat phase diagram, describe lead and silver system. (8)

Or

(b) (i) What are composite materials? Discuss the important types of fiber reinforced composites. (8)

(ii) Discuss the properties and applications of metal matrix composites. (8)

14. (a) (i) Describe how proximate analysis of coal is carried out. Mention their significances. (8)

(ii) How is synthetic petrol manufactured by Bergius process? (8)

Or

(b) (i) Calculate the gross and net calorific value of coal having the following compositions:

C = 85%, H = 8%, S = 1%, N = 2%, ash = 4%, latent heat of steam = 587 cal/g. (8)

(ii) How can power alcohol be helpful in fuel crisis? (8)

15. (a) (i) Explain the various components of light water nuclear power plant with a suitable block diagram. (8)

(ii) How is wind energy harnessed? What are its advantages and limitations. (8)

Or

(b) (i) Explain the construction and working of lead acid battery. (8)

(ii) Describe the construction and working of H_2–O_2 fuel cell. (8)