THE OPEN UNIVERSITY OF SRI LANKA

B.Sc DEGREE PROGRAMME/ STAND ALONE COURSES- LEVEL 5

CHU 3237/CHE 5237 INDUSTRIAL CHEMISTRY- PAPER I

FINAL EXAMINATION- 2008/2009

(2 ½ HOURS)

Wednesday 1st July 2009 ***10.00 a.m.- 12.30 p.m.***

Reg. No.: .....

Attempt as many questions as possible.

Total mark allocated to this paper is 120. However, the maximum a candidate can score is 100 marks. Those who obtain more than 100 will be deemed to have scored 100 marks.

1. What is the role of "flux" in a ceramic body mix? Name a "flux" that is commonly used in ceramic industry. (4 marks)

.....

.....

THE OPEN UNIVERSITY OF SRI LANKA LIBRARY

2. What is the product manufactured by each of the following industrial processes?

Drain casting ..... Powder pressing .....

(4 marks)

3. Oxides of metals are often used to produce coloured glass. Indicate the metal whose oxide is responsible for each of the colours given below:

Red ..... Blue .....

(4 marks)

4. Glass with special properties can be made by adding oxides of other elements to the glass body mixture. Indicate the compounds added in the preparation of following products.

Pyrex glassware .....

Crystal glass ware ..... (4 marks)

5. Write the process(es) used to produce different types of glass products. (4 marks)

Cups ..... Glass sheets .....

Vase ..... glass fibres .....

6. Distinguish between transparent glaze and matt glaze. (4 marks)

.....

.....

.....

7. The structure of boron nitride, BN resembles that of diamond and graphite. Draw the structures of boron nitride. (4 marks)

8. What do you mean by the term 'coking' in petroleum industry? Write its use(s). (4 marks)

.....

.....

.....

9. State the products formed in each of the following reactions: (4 marks)

$NH_3 + CO_2 \longrightarrow$?

Propylene $\xrightarrow[\text{catalyst}]{\text{Ziegler-Natta}}$?

Toluene + H_2 $\xrightarrow[\text{Metal oxide catalyst}]{100^oC}$?

10. What are spice oleoresins? (4 marks)

.....

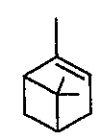
.....

.....

.....

11. How would you determine the percentage of volatile oil in a spice? (4 marks)

12. Give structures and names of four (04) products of industrial importance that can be obtained from chemical conversion of α-pinene. (4 marks)



α-pinene

13. Write chemical equations for splitting and transesterification of fat. Give the necessary conditions. (6 marks)

14. Draw a flow chart for refining of oil. (6 marks)

15. Define 'iodine number' of an oil. (2 marks)

.....

.....

.....

16. Write the product(s) of reduction of fat. (2 marks)

.....

17. Write two major sources of sulphur.

....

Write down the raw materials and methods used to extract:

Iron ....

Aluminium ....

(6 mark)

18. Write chemical equation(s) to show how triple superphosphate (TSP) can be produced from fluorapatite found in Eppawala. (2 marks)

.....

.....

19. Give two value- added products that can be obtained from apatite and write equations to show how they can be obtained from apatite. (4 marks)

.....

.....

.....

.....

20. What do you mean by corrosion? Write equations to illustrate corrosion. (6 marks)

.....

.....

.....

.....

.....

21. What do you understand by the term 'passivation'? (2 marks)

.....

.....

22. Name four types of corrosion. (4 marks)

.....

.....

23. Write two important characteristics that determine the quality of table salt. (4 marks)

.....

24. Write equations for the production of bromine in the Ethyl- Dow process. (4 marks)

.....

.....

25. Write an advantage and a disadvantage of each of methods using diaphragm cell and mercury cathode cell for the production caustic soda. (4 marks)

.....

.....

.....

.....

26. Draw a flow chart to show the production of sodium silicate and sodium bisulphate.

(4 marks)

27. Write two examples of each of argillaceous material and calcareous material:

(4 marks)

Argillaceous materials: ....

Calcareous materials: ....

28. Distinguish between setting and hardening. (4 marks)

.....

.....

29. Write the four main crystalline phases present in cement clinker (4 marks)

.....

30. Write the standard tests available for cement paste and identify the instrument used.

(4 marks)

....

....

.....