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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- 2007/2008

(2 ½ HOURS)

Monday 23rd June 2008 *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. For what purpose is the ball mill used in ceramic industry? (4 marks)

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2. "Brilliance" in crystal glassware is achieved by adding certain elements to the glass body mixture.
(i)Identify the most important element used for this purpose.

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(ii) What is the physical property associated with "brilliance"? (4 marks)

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3. Why is the preparation of silicate glass by melting a mixture of silica, Na_2O and sodium carbonate not successful? (4 marks)

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4. Why is boron nitride referred to as "inorganic graphite"? (4 marks)

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5. "Glass ceramics" are known to have low thermal expansion. What advantages are there in such compounds? (4 marks)

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6. Write two reasons for carrying out petroleum cracking. (4 marks)

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7. What do you mean by 'thermal cracking'? What is the use of thermal cracking? (4 marks)

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

$$H_2C{=}CH_2 \xrightarrow[(2)\ 500^{O}C]{(1)\ Cl_2 / FeCl_3} ?$$

$$\text{Propylene} \xrightarrow[CO,\ H_2]{Ni\ /Co} ?$$

9. Give the structure and the name of the major component of an essential oil with the source (plant name). (4 marks)

Structure	Name of the compound	Source

10.(i) Sketch the oil collector used for collecting an essential oil which is heavier than water.

(ii) Give **one** example of an essential oil which is heavier than water.

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(iii) Explain how this oil is collected using the above collector. (4 marks)

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11. (i) How would you obtain rosin and turpentine from purified pine oleoresin? (4 marks)

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(ii) Categorize rosin and turpentine chemically.
Rosin:.....
Turpentine:.....

12. Cinnamon bark oil is adulterated with cinnamon leaf oil containing correct amount of synthetic cinnamaldehyde. How would you detect this adulteration? (4 marks)

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13.(i) Draw the full structure of fatty acid, C18:2 Δ 9c, 12c.

(ii) Write the IUPAC name. ..... (4 marks)

14. Draw the flow chart for the extraction of coconut oil from copra. (5 marks)

15. Solvent extraction is the selected technique for extracting oil from raw material with low oil content.

(i) What should be the % of oil content in the raw material for solvent extraction?

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(ii) Write advantages of this technique.

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(4 marks)

16. What are detergents? How are they produced? (3 marks)

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17. What do you mean by the term, mineral sands?

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Name two main mineral sands found in Sri Lanka. (4 mark)

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18. Write two examples of products manufactured in each of the industries based on latex and dry rubber. (4 marks)

Latex ....

Dry rubber ....

19. Identify the raw material used and the process involved in the extraction of

Iron ....

Aluminium .... (4 marks)

20. What do you understand by the throwing power of a plating bath? List the factors that determine the value of throwing power. (6 marks)

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21. Write the mathematical expression for throwing power in terms of weights w_1 and w_2 of the electrodes and distances x_1 and x_2 from them. (3 marks)

22. Briefly describe with examples, the phenomenon 'passivation'. (3 marks)

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23. Briefly describe, using equations, how soda ash is obtained from underground deposits of Trona in Wyoming. (4 marks)

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24. Briefly describe, using equations, how potassium can be produced from seawater. (4 marks)

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25. Suggest a method of production of iodine from natural I^- - bearing brine. (4 marks)

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26. Draw a flow diagram for the production of free- flowing table salt. (4 marks)

27. From the list given below, separate the argillaceous materials from calcareous materials:

Chalk, shales, slate, limestone, mudstone, clays (6 marks)

Argillaceous materials: .....

Calcareous materials: .....

28. Distinguish between mortar and concrete. (2 marks)

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29. Write the four real phases present in Portland cement clinker. (4 marks)

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30. Distinguish between 'flash set' and 'false set'. (4 marks)

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