KATHMANDU UNIVERSITY
End Semester Examination [C]
December, 2018

Marks scored:

Level : B.E.
Year : II

DEC 27 2018

Course : CHEG 210
Semester: II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"
[20 Q × 0.5 =10 marks]

Answer the following multiple choice questions.

1. Yellow phosphorus is transported under
   a) Air b) Water c) Nitrogen d) Helium

2. Double contact double absorption (DCDA) process is the most recent process for manufacture of
   a) Nitric acid b) Sulphuric acid
   c) Ammonium sulphate d) Hydrochloric acid

3. Conversion of yellow phosphorus to red phosphorus is done by heating it in covered retorts at ..... ^{0}C in .....of air.
   a) 50-80, absence b) 250-400, absence
   c) 1000-1200, presence d) 250-400, presence

4. Potassic fertilizer is graded based on its ..... content.
   a) KCl b) K_2O c) KNO_3 d) K_2SO_4

5. Chemical formula of biuret is
   a) $NH_2.CO.NH_2$ b) $NH_3.COO.NH_3$
   c) $NH_2.CONHCO.NH_2$ d) NH_4COONH_2

6. Temperature and pressure in ammonia converter is
   a) 200 atm, 1000 ^{0}C b) 450 atm, 200 ^{0}C
   c) 450 atm, 550 ^{0}C d) 450 atm, 1000 ^{0}C

7. Fusion zone in the electric furnace used for reduction of phosphorus rock to elemental phosphorus is maintained at .....^{0}C
   a) 250-300 b) 500-750 c) 950-1050 d) 1400-1450

8. 20% oleum means that in 100 kg oleum, there are 20 kg of.....
   a) SO_3 and 80 kg of H_2SO_4 b) H_2SO_4 and 80 kg of SO_3
   c) SO_3 for each 100 kg of H_2SO_4 d) H_2SO_4 and 100 kg of SO_3

9. Common salt is generally not produced by ..... method from brine.
   a) Freeze drying b) Electrolytic
   c) Solar evaporation d) Vacuum evaporation

10. In the manufacture of H_2SO_4 from elemental sulfur, the sequence of major operation is followed,
    a) Furnace → converter → absorber
    b) Furnace → evaporator → absorber
    c) Furnace → converter → evaporator
    d) Converter → furnace → absorber

11. Which of the following contains least amount of nitrogen?
    a) Coke oven gas
    b) Blast furnace gas
    c) Producer gas
    d) Water gas (blue gas)

12. Calcination of limestone is not done in ..... kiln for producing lime.
    a) Vertical shaft
    b) Rotary
    c) Fluidized bed
    d) Fixed bed

13. Cement mainly contains
    a) CaO, SiO_2, Al_2O_3
    b) MgO, SiO_2, K_2O
    c) Al_2O_3, MgO, Fe_2O_3
    d) CaO, MgO, K_2O

14. Sand and ..... is fused at 1300 ^0C to produce sodium silicate.
    a) Limestone
    b) Soda ash
    c) Coke
    d) Sodium sulphate

15. Oxygen is separated by distillation from air after its liquefaction. The boiling point of oxygen is about ..... ^0C.
    a) -83
    b) -183
    c) -196
    d) -218

16. Titanium dioxide is a/an .....color pigment.
    a) Black
    b) White
    c) Yellow
    d) Blue

17. H_2S is scrubbed from refinery gases by absorption using .....
    a) Dilute H_2SO_4
    b) Ethanol amine
    c) Chilled water
    d) Tri-butyl phosphate

18. Type of glass used in optical work is ..... glass.
    a) Soda-lime
    b) Fiber
    c) Lead
    d) Borosilicate

19. In Solvay process, the product from calcium is
    a) Light soda ash
    b) Dense soda ash
    c) Sodium bicarbonate
    d) Dehydrated soda ash

20. Production of 1 ton of cement requires .....tons of limestone
    a) 0.6
    b) 2.2
    c) 1.2
    d) 3.8

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SECTION "B"
[5Q × 2 = 10 marks]

Write short answers of *ANY FIVE* of the followings.

1. Name four different unit operations and unit processes each involved in chemical process industries.
2. What are the raw materials used for ceramics making? Explain in brief.
3. What are the functions of extenders, diluents and resins in paint?
4. What is meant by clear-silica glass? Define refractoriness.
5. Name six different ways of fabrication of an article and explain any one in brief.
6. Draw process diagram for paint manufacturing process.

SECTION "C"
[2Q × 5 = 10 marks]

Answer *ANY TWO* questions of the followings.

7. Describe five different types of cement as per application and the constituent present.
8. Describe carbon monoxide, carbon dioxide and hydrogen sulfide gas removal during hydrogen purification process.
9. Write short note on (*ANY FIVE*)
   a) Refractoriness
   b) Ceramic composite
   c) Ordinary portland cement
   d) Cyclone preheaters
   e) Coke oven gas
   f) Pigment volume concentration

SECTION "D"
[2Q × 10 = 20 marks]

Read the following questions carefully and answer *ANY TWO* questions.

10. Discuss on complete process of production of superphosphates and triple superphosphate fertilizer with a neat and clean diagram. You should mention pertinent properties, chemical reactions involved, and description of individual unit. Description of individual unit in bullet form is highly recommended.

11. Describe how sulfur and sulfur dioxide is obtained from iron pyrites sources. You should include chemical reactions involved and description of all units of the process. Description of individual unit in bullet form is highly recommended.

12. Discuss in details for making of refractories in commercial scale. You should mention pertinent properties, chemical reactions involved, and description of individual unit. Description of individual unit in bullet form is highly recommended.