SARDAR PATEL UNIVERSITY,VALLABH VIDYANAGAR
Ph.D ADMISSION TEST, AUGUST 2014
SUBJECT : INDUSTRIAL CHEMISTRY
FULL MARKS : 100

SECTION I- Tick the correct answer
(All questions carry 1 mark each) -------(10 * 1=10 marks)

1. Gas phase chlorination process is most often first order with respect to------
   a. Initiator **c** Reagent
   b. Product **d.**None of these

2. The number of side reactions possible in a hydration process is
   a. 1 **b.** 2 c.3 **d.** 4

3.Unit of absolute viscosity is
   a. Stoke **b.**Poise c.Newton **d.**pascal

4. Liquid discharge from a reservoir can be measured using
   a. Orificemeter **c.**Venturimeter
   b. Weir **d.**Pitot tube

5. When pure reactant A undergoes the reaction $3A + B \rightarrow 3R + 2S$,the fractional change in volume (ε_A) is

   a. 1 b. 0.25 c.0.75 **d.** 0

6. Flash point of diesel is determined by
   a. Abel apparatus **c.**Saybolt chromometer
   b. Pensky Martens apparatus **d.**bomb calorimeter

7. The lower rate of oxidation reaction using air is balanced by increasing-----
   a. Reagent quantity **c.** Temperature
   b. Time **d.** None of these

8. Unit of second order rate constant is
   a. $(\text{concentration})^{-1}\ \text{time}^{-1}$ c. time^{-1}
   b. concentration/time d. moles/(vol *time)

9. The lowest temperature at which a vapour above a liquid will continue to burn once ignited is called
   a. Flash point c. Fire point
   b. Ignition point d. Auto ignition

10. The catalytic effect of nitrous acid is observed in the nitration of
    a. Benzene b. Toluene c.Anisole d.Pyridine

SECTION –II- Tick the correct answer
(All questions carry 1 mark each) -------(40 * 1=40 marks)

1. Fertilizers supply ----nutrients
   i. Primary
   ii. Micro
   iii.Secondary
   iv. None of these

2. Air vessels are used in
   i. Centrifugal pump
   ii. Gas Absorber
   iii. Rotary Disc Contactor
   iv. Reciprocating Pump

3. Bubble cap columns are characterized by their
   i. Low cost
   ii. Low pressure drop
   iii. High pressure drop
   iv.None of the above

4. Higher value of distribution co-efficient in liquid extraction helps in
   i. Reducing the amount of feed
   ii. Reducing the amount of solvent
   iii. Reducing the operating temperature
   iv. Reducing the operating pressure

5. For the same feed and solvent rates ,which of the following will give a better separation?
   I. Single stage cross current extraction
   II. Multistage cross current extraction
   iii. Multistage counter current extraction
   iv.All of the above give same separation

6. Liquid solvent used in absorption is ---------.
   i. at its boiling point
   ii. below its boiling point
   iii.above its boiling point
   iv.none of the above

7. Moisture contained by a substance in excess of equilibrium moisture is called ----- moisture
   i. Unbound ii..Free iii.Critical iv.Bound

8. Bernoullis equation is applicable for-----
   i. Compressible fluids
   ii. Viscous fluids
   iii. incompressible fluids
   iv. gases

9. ------- valves are used for viscous fluids and slurries
   i. ball valve
   ii. globe valve
   iii.diaphragm valve
   iv.needle valve

10. The shell of a capsule is made up of
    i.Cellulose ii..Gelatin iii.Starch iv.Sugar

11. Which reagent is used as catalyst in Oppenauer reaction ?
    i. BF_3 ii.DCC iii.Selenium iv.aluminium-tert-butoxide

12. Thermal diffusivity is given by

i. k/ ρ Cp
ii. Cp μ /k
iii. ρCp/k
iv. μ/ h Cp

13. In countercurrent heat exchangers compared to parallel exchangers,

i. LMTD is greater
ii. More surface area is required for a given transfer rate
iii. Heat transfer rate is less
iv. more baffles are required

14. Forced Convection is characterized by

i. Power Number
ii. Reynolds number
iii. Grashoffs number
iv. Weber Number

15. Which evaporator is least suitable for the evaporation of cold viscous feed?

i. Forward feed
ii. Mixed feed
iii. Backward feed
iv. Parallel feed

16. Heat sensitive materials are dried using --- drier

i. Freeze
ii. Tray
iii. Spray
iv. Rotary

17. In a forced circulation evaporator,

i. low heat transfer co-efficient are obtained with viscous material
ii. high heat transfer co-efficient are obtained even with viscous material
iii. residence time of liquid is higher than natural circulation evaporator
iv. Crystalline products cannot be handled.

18. The ratio of moles of desired product formed to moles of undesired product formed is called---.

i. selectivity
ii. molarity
iii. mole ratio
iv. yield

19. The devices where hot and cold fluids flow alternatively over the surface are called-----.

i. recuperators
ii. regenerators
iii. shell & tube heat exchangers
iv. condensers

20. Latent heat --------

i. does not allow rise in temperature
ii. result in a change in the state of the substance
iii. result in humidity change
iv. None of these

21. The difference between the superheated temperature and the saturation temperature is called

i. enthalpy of superheat
ii. degree of superheat
iii. heat of superheat
iv. all of the above

22. Dryness fraction of wet steam is ----------

i. greater than 1
ii. Equal to 1
iii. zero
iv. less than 1

23. Rotary driers cannot handle------ materials

i. Freé flowing
ii. Sticky
iii.Dry
iv.Granular

24. The concentrating ratio of a flat plate collector is ---------

i. 1
ii. 500
iii.30
iv.5000

25. ------ is used to empty the boiler when necessary for cleaning,inspection & repair

i. economiser
ii. feed check valve
iii. blow off cock
iv. Super heater

26. Dimension of volumetric flow rate is----.

i. $ML^{-1}T^{-1}$
ii. L^2T^{-2}
iii.ML^{-3}
iv.L^2T^{-1}

27. Nusselts number number is used in ----- calculations

i. Mass transfer
ii. viscosity
iii.momentum transfer
iv.heat transfer

28. For terminating a pipeline,------ is used.

i.coupling
ii.plug
iii.elbow
iv.valve

29.Which one of the following is not a hazard identification technique?

i. FAR
ii. F& EI Index
iii.HAZOP
iv. Risk assessment

30. The tendency of liquid to segregate towards the walls and flow along the walls is called

i. flooding
ii. channeling
iii. weeping
iv. Loading

31. large proportion of kinetic energy is converted back to pressure energy

i. diverging section of venturimeter
ii. diverging section of orificemeter
iii.converging section of venturimeter
iv.converging section of orificemeter

32. In a mixed feed evaporator,steam is admitted in the ------ effect.

i. first
ii. third
iii.second
iv.last

33. The heat required to vaporize a unit amount of solid at constant temperature & pressure is called-----.

i. latent heat of vaporization
ii. latent heat of sublimation
iii.lattent heat of fusion
iv.heat of mixing

34. Methanol is flowing through a pipeline for which the Reynolds number is 15000.The type of flow is……..

i. laminar
ii. turbulent
iii.transition
iv.streamline

35. The absortivity of a white body is------.

i. 1
ii. 0.75
iii.0
iv.0.5

36. The overall resistance for heat transfer through a series of flat resistance is the ----- of the resistanees

i. average
ii. geometric mean
iii.product
iv.sum

37. ------ act as non reactive diluents for epoxy resin

i. Benzyl alcohol
ii. Pine oil
iii.furfural alcohol
iv.all of these

38. Octane number of gasoline is a measure of its

i. Ignition delay
ii. Ignition temperature
iii.Knocking tendency
iv.Smoke point

39. Increase in rotational speed of rotary drier results in

i. increase in hold up
ii. does not affect hold up
iii.decrease in hold up
iv.none of the above

40. Reactions with low activation energy are

i. Always spontaneous
ii. Fast
iii.Slow
iv.None of these

SECTION- III

(Short answers and not more than 5 sentences)
(All questions carry 5 marks)----**5 *5=25 marks**

1. Explain the various steps involved in the calculation of DOW F & EI Index
2. Expalin the side reactions of C-alkylation process
3. Write note on fault tree analysis.
4. Differentiate between PFR and CSTR
5. With the help of suitable examples, explain skin additives

SECTION- IV

(Long answers and not more than 10 sentences)

1.
   a. Discuss the raw materials and feed stocks for Nitrogeneous and Phosphatic fertilizers (06)
   b. Write a note on the raw materials & production of Alkyd resins (07)

2. Explain the various reactors used in oxidation process (06)