Question Bank

ELECTIVE III CPSD

Unit 1

1. Which of the following is not a commodity chemical
   A. Sulfuric acid
   B. Nitrogen
   C. Ethylene
   D. Butyric acid

2. Which of the following is not the functional chemical
   A. Pharmaceutical
   B. Pesticide
   C. Perfumes
   D. Ethylene

3. Pharmaceutical product “Aspirin” an undifferentiated chemical contains
   A. Butyric acid
   B. Chloropropylene oxide
   C. Oxygen
   D. Acetyl salicyclic acid

4. Which of the following is true for commodity chemicals
   A. Selling into the market with low volume
   B. Short product life cycle
   C. A demand for a short time to market
   D. None of the above

5. The design carried out to modify an existing plant in retrofit or revamp could be
   A. To increase the capacity
   B. Reduce the operating cost
   C. Improve the safety
   D. Reduce the environmental emissions

6. Superstructure approach to chemical process design and integration is associated with the drawback like
   a. Different decisions are possible at each stage of the design
   b. Missing the benefit of interaction between different parts of flowsheet
   c. Mathematical model will be extremely large
   d. The approach will fail if initial structure does not have optimal structure

A. All are correct
B. Only a and b are correct
C. Only b and c are correct
D. Only c and d are correct

7. The advantages of superstructure approach are
   a. Different design options can be considered at the same time
   b. Complex multiple tradeoff can be handled
   c. Entire design procedure can be automated
   d. Capable of producing design quickly and efficiently
   e. Design team can control the basic decisions and interact as the design developes
   A. Only a, b, c are correct
   B. Only b, c, d are correct
   C. All are correct
   D. None of the above

8. Onion model of process design is applicable for
   A. Batch process
   B. Continuous process
   C. Semicontinuous process
   D. All of these

Unit 2

9. The characteristics of the product that relates to mechanical properties are concerned with
   A. Polymerization reactor
   B. Biochemical reaction
   C. Reversible reaction
   D. Irreversible reaction

10. The performance of the reactor will normally be dictated by laboratory results in case of
    A. Polymerization reaction
    B. Biochemical reaction
    C. Reversible reaction
    D. Irreversible reaction

11. The ratio of reactant consumed in the reactor to reactant fed to the reactor is
    A. Conversion
    B. Selectivity
    C. Reactor yield
    D. Efficiency

12. The ratio of desired product produced to reactant consumed in the reactor is

A. Conversion
B. Selectivity
C. Reactor yield
D. Efficiency

13. The ratio of desired product produced to reactant fed to the reactor is
    A. Conversion
    B. Selectivity
    C. Reactor yield
    D. Efficiency

14. If the reactant fed to the reactor is 372 kmol/hr, reactant consumed in the reactor is 279 kmol/hr and product produced is 269 kmol/hr, then conversion is
    A. 0.75
    B. 0.96
    C. 0.72
    D. None of these

15. The chemical used in perfumes, soaps, cosmetics and household items where it produce a fruity jasmine like aroma and to a minor extent as a flavor agent is
    A. Benzyl acetate
    B. Benzaldehyde
    C. Benzoic acid
    D. Benzene

16. What is the volume of PFR, if the required production rate is 0.0788 kmol/min residence time is 120 min, initial concentration is 8.33 kmol/ cu.m and conversion of 60 %
    A. 1.8 cu.m
    B. 1.76 cu.m
    C. 2.2 cu.m
    D. 100 lit

Unit 3

17. A single equilibrium stage can only achieve a limited amount of separation
    A. True
    B. False

18. Consider a sugar solution[Sugar + Water]; On vaporization water only evaporate since sugar is_____
    A. Volatile
    B. Non-Volatile
    C. Cryogenic
    D. None of the mentioned

19. Distillation is possible only if the solution components are_____
A. Volatile
B. Non-volatile
C. Cryogenic
D. None of the mentioned

20. If the gas phase composition of a component A is 0.65 and its relative volatility is 2. Find the liquid phase composition.
A. 0.48
B. 0.58
C. 0.68
D. 0.78

21. Solvent extraction is basically known as
A. Gas-liquid extraction
B. Liquid- liquid extraction
C. Liquid –solid extraction
D. None of the mentioned

22. Fractional extraction is also known as _____
A. Solvent
B. Double solvent
C. Triple solvent
D. None of the mentioned

23. On spraying the liquid over gas leads to _____
A. Humidification
B. Evaporation
C. Heating of gas
D. None of the mentioned

24. The additional operation requires for drying gas and liquid is _____
A. Absorption
B. Adsorption
C. Humidification
D. De-humidification

Unit 4

25. In a given heat exchanger network, the minimum number of heat exchangers are 8 and number of process stream is equal to 5, then what is the number of utilities of the heat exchanger network.?
    A. 4
    B. 6
    C. 3
    D. Can't be determine

26. Which of the following is/are the assumption taken in Pinch analysis
    A. Steady state operation
    B. There is one hot utility and one cold utility of infinite capacity
    C. There is no restriction for matching the stream
    D. All of the above

27. Which of the following is/are the important rule in order to perform the pinch analysis
    A. Heat flow is allowed across the pinch point
    B. Hot utility to be used in in the cold end
    C. Cold utility to be used in the hot end
    D. Design of each end should start at the pinch point

28. Identify the correct statement for the process plant
    A. Heat integration reduces the use of utilities
    B. Heat integration implies heat exchange between the hot and cold streams
    C. Heat integration increases the number of heat exchanges
    D. All are correct

29. If the pinch temperature is reduced for a heat exchanger network then,
    A. The number of heat exchangers in a heat exchanger network will reduce
    B. Use of utility will increase
    C. Use of utility will reduce
    D. The initial cost of the network will decrease

30. For the simplest case of heat exchanger network (HEN) synthesis by pinch technique, identify the correct statement
    A. There is no phase change in a heat exchanger
    B. There is no restriction for stream matching

C. There are one hot utility and one cold utility of infinite capacity
D. All are correct

31. The pressure drop in a heat exchanger is calculated as
    A. Core loss only
    B. Core loss and duct loss
    C. Entry loss and exit loss
    D. Cumulative effect of both (B) and (C)

32. Calibration of every experimental set up is necessary to eliminate
    A. Random error
    B. Systematic error
    C. Both (A) and (B)
    D. None of these

Unit 5

33. For ternary mixture if xb is greater than 0.5 and xc is less than 0.05 then, remove the sidestream as
    A. Liquid sidestream
    B. Vapor sidestream
    C. Combined vapor and liquid sidestream
    D. Sidestream can not be removed

34. For ternary mixture if xb is greater than 0.5 and xa is less than 0.05 then, remove the sidestream as
    A. Liquid sidestream
    B. Vapor sidestream
    C. Combined vapor and liquid sidestream
    D. Sidestream can not be removed

35. For the side rectifier, the degrees of freedom to be optimized are
    a. Number of stages in each of the four column sections
    b. Reflux ratio
    c. Reboil ratio
    d. Vapor split between the main column and sidestream column
    e. Feed condition
    f. Liquid split between the main column and sidestream column
    A. a,b,c,d

B. a,b,d,e
C. a, c, e, f
D. b,c,d,e

36. Components heavier than the heavy key are finally
    A. Recovered in the Condenser
    B. Recovered in the bottom stream
    C. Recovered in the Upsides stream
    D. Not recovered

37. For an infinite number of plates required, the desired separation
    A. Hardly possible
    B. Finely possible
    C. Can’t be specified
    D. Assumable

38. For identifying misallocated feed stages, which of the following is used?
    A. Key Ratios
    B. Molar Ratios
    C. Reflux Ratios
    D. Feed Ratios

39. d/b plots are used when there is
    A. Non key components
    B. Total reflux
    C. Boil up required
    D. Can’t be specified

40. d/b plots are
    A. Exponential
    B. Logarithmic
    C. Linear
    D. Non linear

Unit 6

41. Industrial safety management is that branch of management which is concerned with ----- hazards from the industries
    A. Reducing
    B. Controlling
    C. Eliminating
    D. All of these

42. The following is indirect cost of accident
    A. Money paid for treatment of worker
    B. Compensation paid to worker
    C. Cost of lost time injured worker
    D. All of these

43. The following are physical hazard agents
    A. Falls
    B. Electricity
    C. Inhalation
    D. All of these

44. A safety program consists of
    A. Three E's
    B. Four E's
    C. Five E's
    D. Six E's

45. For household wiring and small units, the following should be used for safety measures
    A. MCB
    B. ACB
    C. OCB
    D. MCCB

46. Which of the following colour is used for radiation hazard
    A. Red
    B. Orange
    C. Green
    D. Purple

47. The lower flammability measures
    A. The lowest concentration that will allow combustion of vapor-gas mixture
    B. The highest concentration that will allow combustion of vapor-gas mixture
    C. The lowest concentration that will allow combustion of liquid-gas mixture
    D. The lowest concentration that will allow combustion of liquid-gas mixture

48. The autoignition temperature of a gas or vapor is that temperature
    A. At which it will ignite spontaneously in air, without any external source of ignition
    B. At which it will not ignite spontaneously in air, without any external source of ignition
    C. At which it will ignite spontaneously in air, with any external source of ignition
    D. At which it will not ignite spontaneously in air, with any external source of ignition

49. The minimum ignition temperature of a dust
    A. Is the lowest temperature at which dust that is dispersed in the form of a cloud can ignite
    B. Is the highest temperature at which dust that is dispersed in the form of a cloud can ignite
    C. Is the lowest pressure at which dust that is dispersed in the form of a cloud can ignite
    D. Is the lowest temperature at which dust that is dispersed in the form of a cloud can not ignite

50. There are two basic kinds of explosions involving release of chemical energy
    A. Deflagration, Detonation
    B. Detonation, confined explosion
    C. Deflagration, unconfined explosion
    D. All of these

51. The best way to avoid fugitive emissions is by
    A. Using leaktight equipments
    B. Changing from packing to mechanical seals
    C. Using sealless pump
    D. All of these

52. Emergency discharge from relief valves can be dealt with a number of ways
    A. Direct discharge to atmosphere under conditions leading to rapid dilution
    B. Total containment in a connected vessel, with ultimate disposal being deferred
    C. Combustion in a flare
    D. All of these