(3 Hours) **Total Marks: 75**

N.B.: **1. Draw diagram whether necessary.**
2. Figures to right indicate full marks.

Q. 1 Attempt all multiple-choice questions (MCQ) **20M**

1 If the typical production capacity of a scale-up process is 100 – 1000 kg/h it should be called as
A) Bench scale B) Pilot Plant C) Demonstration Plant D) Commercial Plant

2 The overall yield from a linear synthesis of 4 step process of a compound will be _____if on average each step yields 80% product
A) 64% B) 51.2% C) 40.96% D) 80%

3 The ideal solvent for extraction
A) Should have the high volatility B)Should have less surface tension
C) Should have the minimum viscosity D) Should have less reactivity

4 Kozeny-Carman equation is related to which unit process
A) Filtration B) Crystallization C) Evaporation D) Distillation

5 Craig apparatus is example of
A) Decoction B) Infusion C) Percolation D) Counter current extraction

6 Device used to restrain the flow of a fluid or to prevent the spreading of fluid in a particular direction during distillation
A) Reboiler B) Baffles C) Bubble cap D) Condenser

7 Which of the following concept closely relate with crystallization
A) Distribution coefficient B) Solubility product
C) Vapour pressure D) Boiling point

8 The rate of Nitration depends upon
A) Temperature B) Concentration C) Pressure D) Time

9 DVS means
A) Ratio of H_2SO4 to H_2O B) Ratio of H_2O to H_2SO_4
C) Ratio of HNO_3 to H_2O D) Ratio of HCl to H_2O

10 Which of the following is not chlorinating agent?
A) $SOCl_2$ B) NaCl C) PCl_3 D) $COCl_2$

11 Hydrogen peroxide oxidizes which type of organic compounds?
A) Saturated B) Unsaturated C) Aromatic D) Alicyclic

12 Lindlar catalyst is

A) Palladium on $CaSO_4$ B) Platinum on $CaSO_4$
C) Palladium on $CaCO_3$ D) Platinum on $CaSO_4$

13 Who developed medium for penicillin production?

A) Jackson B) Alexander C) Salman Walkman D) Flory and Chain

14 Which of the following is the media composition for the production of streptomycin

A) Glucose, soybean meal, malt extract, ammonium chloride
B) Calcium carbonate, soybean meal, glucose, peptone
C) Ammonium sulphate, soybean meal, peptone, malt extract.
D) Soybean meal, glucose, peptone, malt extract, sodium chloride

15 Which of the following is the source of lovastatin?

A) *Micromonospora purpura* B) *Monascus purpureus*
C) *S. tenebrarius* D) *S. griseus*

16 Subset of a broad range of kinetic techniques utilized to determine the rate laws of chemical reactions and to aid in elucidation of reaction mechanisms is called

A) Reaction progress kinetics B) Reaction mechanism
C) Reaction kinetics only D) Progress of reaction

17 Choose the correct formula for % atom economy

A) Relative molecular mass of desired reactant/ Relative molecular mass of desired product*100
B) Relative molecular mass of desired reactant- Relative molecular mass of desired product*100
C) Relative molecular mass of desired product/ Relative molecular mass of desired reactant*100
D) Relative molecular mass of desired product- Relative molecular mass of desired reactant*100

18 ISO-14001 standards relates t0

A) Environment Management B) Personnel Managemen
C) Occupational , Health and safety management D) Fire and extinguishers

19 BS OHSAS 18001 has been withdrawn in

A) 1995 B) 2000 C) 2010 D) 2021

20 Area of ETP doesn't depend up on

A) Quality of waste water to be treated
B) Flow rate
C) Type of biological treatment to be used
D) Geographical terrain and Atmosphere of the region

Q 2. Attempt any two of the following

I. Attempt the following **10M**

a. Elaborate of steam distillation as an industrial process.

b. Classify different equipment used for filtration. Explain design and working of leaf filter.

II. Attempt the following **10M**

a. Explain what safety precautions are need for batch and continuous nitration processes.

b. Enlist various reagents used for chlorination and explain any two with examples.

III. Attempt the following **10M**

a. Explain in detail about the catalytic hydrogenation, case study on industrial reduction process.

b. What is fermentation? Write distinguishing between aerobic and anaerobic fermentation with suitable examples.

Q 3. Attempt any SEVEN of the following questions

I. Write a note on the pilot plant. **5M**

II. Explain the theories and principles behind crystallization. **5M**

III. What is MSDS? Explain its significance and its content. **5M**

IV. Elaborate on the validation of large-scale processes. **5M**

V. Discuss the "reaction progress kinetic" including their significance in reaction monitoring for mechanism prediction **5M**

VI. Classify various equipment used for evaporation. Explain Factors affecting the capacity and economy of evaporation. **5M**

VII. Discuss production of Penicillin or Streptomycin. **5M**

VIII. Explain the construction and working of "Biazzi continuous nitration process". **5M**

IX. Describe the industrial process of 1, 2 dichloroethane synthesis. **5M**
