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MPC 204 T ✓

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M.Pharm. 2nd Semester End-Term Examination

Pharmaceutical Chemistry

PHARMACEUTICAL PROCESS CHEMISTRY

Full Marks – 75

Time – Three hours

The figures in the margin indicate full marks
for the questions.

1. Answer the following (MCQ) : (20 × 1 = 20)
- (i) Which of the following factors are not involved in the scale-up process?
- (a) Inoculum development
 - (b) Sterilization
 - (c) Temperature
 - (d) Medium design
- (ii) Which of the following process is used in the recovery of the product?
- (a) Downstream processing
 - (b) Upstream processing
 - (c) Chromatography
 - (d) Treatment process
- (iii) Which of the following is not a General Requirement in a cleaning validation program?
- (a) Written procedures on how cleaning processes will be validated
 - (b) Written validation protocols in advance
 - (c) FDA approval of new drug application (NDA)
 - (d) Validation report stating whether or not cleaning process is valid

[Turn over

- (iv) Solvent extraction is governed by which law
- (a) Boyle's law
 - (b) Ostwald dilution law
 - (c) Nernst distribution law
 - (d) Beer's law
- (v) Which of the following does not influence filtration?
- (a) Temperature
 - (b) Density
 - (c) Viscosity
 - (d) pH
- (vi) Porcelain pieces are put into the distillation flask to avoid _____
- (a) Overheating
 - (b) Uniform boiling
 - (c) Bumping of the solution
 - (d) None of the mentioned options
- (vii) The nitrating agent is a _____ reactant.
- (a) Electrophilic
 - (b) Nucleophilic
 - (c) All of the mentioned
 - (d) None of the mentioned
- (viii) In which of the following reaction is Halogenation involved?
- (a) Addition
 - (b) Substitution
 - (c) Replacement
 - (d) All of the mentioned
- (ix) Which one of the following is an Addition reaction?
- (a) $\text{CH}_2 = \text{CH}_2 + \text{HBr} \leftarrow \text{CH}_3\text{-CH}_2\text{-Br}$
 - (b) $\text{CH}_2 = \text{CH}_2 + \text{HBr} \rightarrow \text{CH-Br-CH}_2\text{-Br}$
 - (c) $\text{CH}_2 = \text{CH}_2 + \text{Br}_2 \rightarrow \text{CH}_2\text{-Br-CH}_2\text{-Br}$
 - (d) All of the mentioned
- (x) Reduction involves in _____ oxidation number.
- (a) decrease
 - (b) increase
 - (c) independence
 - (d) remain constant

- (xi) Oxidising agents are
- (a) Mostly non metals
 - (b) Mostly metals
 - (c) Decrease in oxidation state
 - (d) Mostly transition metals
- (xii) In presence of what the compounds undergo catalytic hydrogenation?
- (a) Nickel
 - (b) Platinum
 - (c) Palladium
 - (d) All of the mentioned
- (xiii) Heterocyclic Compounds undergo which type of hydrogenation?
- (a) Partial hydrogenation
 - (b) Catalytic hydrogenation
 - (c) Selective hydrogenation
 - (d) Hydrogenolysis
- (xiv) Which of the following vitamins is also known as cobalamin?
- (a) Vitamin B11
 - (b) Vitamin B2
 - (c) Vitamin B6
 - (d) Vitamin B12
- (xv) Which of the following fermentation processes is used in the production of penicillin?
- (a) Aerobic fermentation followed by anaerobic fermentation
 - (b) Anaerobic fermentation
 - (c) Aerobic fermentation
 - (d) Anaerobic fermentation followed by aerobic fermentation
- (xvi) Which of the following is true about effluent treatment?
- (a) The effluent treatment facility is installed for biological treatment of the effluents
 - (b) The effluent bears large amounts of organic matter
 - (c) This treatment facility provides for removal of major pollutants from the effluent.
 - (d) All of the above

(xvii) Steam distillation process is used to separate substances which are

- (a) Steam volatile
- (b) Steam volatile and immiscible with water
- (c) Steam volatile and miscible with water
- (d) All of the mentioned

(xviii) What is meant by crystallization?

- (a) Concentration of atoms into a highly structured form
- (b) Solidification of atoms into a highly structured form
- (c) Solidification of solution
- (d) Concentration of solution

(xix) What is purpose of recrystallization?

- (a) To purify chemicals
- (b) To dissolve crystals
- (c) Continuous process of crystallization
- (d) To clean crystallizers

(xx) What is meant by Halogenation?

- (a) Introduction of Halogen atom
- (b) Removal of Halogen atom
- (c) Introduction and Removal of Halogen atom
- (d) None of the mentioned

2. Write notes on: (any seven)

(7 × 5 = 35)

- (a) Write the production of lovastatin and Simvastatin.
- (b) Occupational health and safety assessment series 1800.
- (c) Types of Evaporators and factors affecting evaporation.
- (d) Fire hazards and types of fire extinguishers.
- (e) Heterogeneous and homogeneous catalyst.
- (f) Explain about nitrating agent.
- (g) Material safety data sheet.
- (h) Counter current extraction.
- (i) Streamlining reaction steps and route selection.

3. Answer any two questions :

(2 × 10 = 20)

- (a) Explain azeotropic and steam distillation methods with suitable examples.
- (b) Discuss about Aerobic and anaerobic fermentation.
- (c) Explain in detail about the impurities in Active Pharmaceutical Ingredients, types and their sources including genotoxic impurities.