UNIVERSITY OF THE PUNJAB

Final Prof. A/2015

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No. .....

Subject: Pharmaceutical Technology

PAPER: 3

TIME ALLOWED: 3 hrs.

MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All questions carry equal marks.

Q. No		Question	Marks
1	a	What is solid state characterization? How it is important in drug development?	10
	b	Name different approaches for the improvement of solubility of poor soluble drugs; discuss milling in term of its advantages, disadvantages and applicability.	10
2	a	Differentiate between following terms i. Isotonic and buffer solution ii. Sterile and pyrogen free solutions iii. Antiseptic and disinfectant solutions iv. Aseptic and terminal sterilization v. Controlled release and sustained release preparations	10
	b	Enlist various the factors/characteristics to be considered for the development of a parenteral preparation?	10
3	a	Propose a methodology for developing a rate controlled delivery system.	10
	b	Define liposomes, describe its various types	10
4	a	What are various considerations during the development of pre-clinical formulation?	10
	b	Explain the importance of studying crystalline and amorphous phases during Pre-formulation stage.	10
5	a	Define modified release dosage form according to the USP. Briefly describe the characteristics of drug which make them the candidate for slow release delivery system?	10
	b	What is microencapsulation? Describe the advantage and application of this technique in pharmacy.	10
6	a	What is optimization? Why sometimes a compromise in desired formulation properties is required?	10
	b	Enlist properties of the drugs suitable for gastro-retentive delivery system (GRDDS)? Describe the hydrodynamically balanced system as GRDDS.	10
7	a	Discuss the production of biopharmaceuticals with special reference to insulin.	10
	b	What are the immobilized enzymes? How they are prepared?	10

UNIVERSITY OF THE PUNJAB

Final Prof. A/2016
Examination: Doctor of Pharmacy
(Pharm.D.)

Roll No. .....

Subject: Pharmaceutical Technology **TIME ALLOWED: 3 hrs.**
PAPER: 3 **MAX. MARKS: 100**

NOTE: Attempt any FIVE questions. All questions carry equal marks.

Q. No		Question	Marks
1	a	Differentiate between solubility and dissolution, Name different approaches for the improvement of solubility of poorly soluble drugs.	10
	b	What are various processing and compression factors that are importance in the development of oral solid dosage form?	10
2	a	Define polymorphism, what is its effect on the physicochemical properties of drug substances?	10
	b	What are the different techniques for the identification of active pharmaceutical compounds? Discuss in terms of their sensitivity and selectivity?	10
3	a	What are different factors/characteristics to be considered for the development of a parenteral formulation?	10
	b	What are liposomes? Describe different methods for their production.	10
4	a	Define microencapsulation, what are various methods to prepare microcapsules? Give applications of this technique.	10
	b	Define the followings and give their application i) Drug targeting ii) Micro-emulsions iii) Biodegradable polymers.	10
5	a	Differentiate between delayed and extended release drug delivery systems, why we need these systems?	10
	b	Describe various diffusion based formulation designs to achieve extended release of drugs.	10
6	a	Describe briefly quality by design (QbD), what is six sigma concept in formulation design?	10
	b	Write a note on floating drug delivery system.	10
7	a	What is the immobilization of enzymes? What are its applications?	10
	b	How insulin is produced using recombinant DNA technology? Give illustration.	10

UNIVERSITY OF THE PUNJAB

Final Prof. 2nd A/2016
Examination: Doctor of Pharmacy
(Pharm.D.)

Roll No. .....

Subject: Pharmaceutical Technology
PAPER: 3

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All questions carry equal marks.

Q. No		Question	Marks
1	a	Define solubility, what are its various types? Describe the thermodynamics of solution formation that determines the solubility of a compound.	10
	b	How the followings are important at the stage of product development. i) Excipient compatibility ii) Particle size and shape	10
2	a	What is salt screening? Give its importance in pharmaceutical drug development	10
	b	A. Define following terms i. Polymorphism ii Co crystallization iii. Amorphization iv. Stable and metastable compounds v. Prodrug	10
3	a	Describe different methods for sterilization of pharmaceutical preparations?	10
	b	What are liposomes? How these are different from nisosomes? Give their applications	10
4	a	Differentiate between active and passive drug targeting, describe some strategies to achieve the targeting of drugs.	10
	b	Define the followings and give their application i) Organic coating ii) Feedback regulated drug delivery systems. iii) Acrylic polymers.	10
5	a	Differentiate between immediate and extended release drug delivery systems, why we need these systems?	10
	b	Describe various dissolution based formulation designs to achieve extended release of drugs.	10
6	a	Describe briefly the process analytical technique (PAT) and design space in formulation development	10
	b	Write a note on swell-able gastro-retentive drug delivery system (GRDDS), describe in-vivo characterization of GRDDS?	10
7	a	What are the practical problems associated with enzymes and how these are addressed?	10
	b	Describe steps involved in the production of monoclonal antibodies, Describe their applications.	10

UNIVERSITY OF THE PUNJAB

Final Prof: Annual - 2017
Examination: Doctor of Pharmacy
(Pharm.D.)

Roll No. .....

Subject: Pharmaceutical Technology
PAPER: 3

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All questions carry equal marks.

Q.1. (a) Write down various methods for Preparation of Liposomes? (10)
(b) Discuss soluble carriers used for Targeted Drug Delivery? (10)

Q. 2. (a) "Formulation is a system of input and output". Comment? (10)
(b) Briefly describe the Drug Design Space? (5)
(c) Why the one factor at a time (OFAT) approach fails to achieve optimum product? (5)

Q. 3. (a) Name various types of design considerations in drug formulation. (4)
(b) Describe various factors affecting the formulation design? (6)
(c) Describe advantages of microencapsulation, discuss various techniques used to prepare microcapsules? (10)

Q. 4. (a) Briefly describe Current Technologies used in Oral drug delivery system? (10)
(b) Write a note on Biodegradable Polymers used in Pharma industry? (10)

Q. 5. (a) What are different factors involved and considered while developing parenterals? (10)
(b) What are different techniques for the identification of pharmaceutical compounds? (10)

Q. 6. (a) Briefly discuss the concepts and principles of Gene Therapy. (10)
(b) Discuss the applications of gene therapy in the field of Pharmacy? (10)

Q. 7. (a) Which are the pharmacokinetic features that make a drug as appropriate candidate for modified release delivery system? (8)
(b) Discuss in-vivo/ex-vivo evaluation of modified release delivery systems? (12)

UNIVERSITY OF THE PUNJAB

Final Prof: 2nd Annual - 2017
Examination: Doctor of Pharmacy (Pharm.D.)

Roll No. .....

Subject: Pharmaceutical Technology
PAPER: 3

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All questions carry equal marks.

Q. 1. (a) Discuss new current technologies in Oral drug delivery system? (10)
(b) Describe Liposomes and their applications? (10)

Q. 2. (a) Describe Passive and Active Targetting? (08)
(b) Write a note on Lactide/Glycolide polymers used for development of controlled drug delivery? (08)
(c) One factor at a time (OFAT) approach fails to achieve optimum product?Comment.(04)

Q. 3. (a) Describe different methods for sterilization of pharmaceutical preparations? (10)
(b) Define isotonicity. Describe methods for making isotonic solution? (10)

Q. 4. (a) Define pre-formulation studies; describe strategies for the formulation of a newly discovered compound which has poor solubility but high permeability. (10)
(b) Define microencapsulation and describe various polymer classes used in this process. (10)

Q. 5. (a) What are the factors effecting the final stages of a product? (10)
(b) Write notes on the following;
I. Quality by Design (QBD)
II. Process Analytical Technique (PAT) approaches (5+5)

Q. 6. (a) Define Modified release drug delivery system. Briefly describe the design parameters for Zero order released modified delivery system? (2+8)
(b) Which are the physicochemical and pharmacodynamics features that make a drug as appropriate candidate for modified release delivery system? (10)

Q.7. (a) Discuss Particulate carriers used for Drug Targeting delivery system? (10)
b) How the following parameters are important at the stage of product development. (5+5)
i) Excipient compatibility
ii) Stability of compound

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UNIVERSITY OF THE PUNJAB

Roll No. .....

Final Prof: Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Subject: Pharmaceutical Technology
PAPER: 3 Part – I (Compulsory)

TIME ALLOWED: 30 min.
MAX. MARKS: 20

Attempt this Paper on this Question Sheet only.

Please encircle the correct statement. Each MCQ carries 1 Mark.. This Paper will be collected back after expiry of time limit mentioned above.

1. The new generation dosage forms have the characteristics.
A. unpalatability
B. Controllable release of drug
C. Excessively prolonged duration of action
D. Poor drug absorption

2. A pharmaceutical excipient has following feature(s).
A. Required as relative amounts in pharmaceutical dosage form
B. Required in specific amounts to obtain desired formulation properties
C. Considered functionally active
D. All of A, B and C

3. Which of the following is NOT true for the immediate release dosage?
A. Demonstrates more absorption
B. Multiple dosing produces relatively flatter (unfluctuation) plasma level time curve
C. Release rate is greater than the absorption rate
D. C max is achieved earlier

4. Which of the following statement is true for the dosage form?
A. For prolonged action, increasing dose frequency is the feasible option
B. Aim of dosage form is to achieve un-fluctuated plasma level time
C. Most of the conventional dosage forms are controlled release formulations
D. For prolonged action, the dose in immediate dosage form can be increased

5. According to USP, a modified release formulation may provide the following EXCEPT:
A. Control over temporal release.
B. Control over spatial release.
C. Control over both, temporal and spatial release.
D. Therapeutic or convenience objectives similar to a conventional dosage form

6. Which combination reflects an ideal modified release system?
A. Sustain drug action + defined release rate + maintained a constant blood concentration + effective blood level.
B. Sustain drug action + maintained a constant blood concentration + effective blood level.
C. Defined release rate + effective blood level.
D. Sustain drug action + defined release rate + effective blood level.

7. Which of the following statements is NOT true?
A. After single dose, extended release formulation releases drug slowly
B. Extended release formulation shows a delayed onset of action
C. The duration of action of extended release formulation is greater
D. Extended release formulation has higher values of absorption rate constant.

8. Which of the following statements is NOT true?
A. A delayed release formulation essentially contains two portions of drug one as loading dose and others is maintenance dose
B. Extended release formulation releases drug for a longer period of time.
C. Extended release formulation releases drug in a planned, predicable and slower-than-the normal manner
D. Extended release formulation is an example of modified release formulations

9. The features required for presenting a drug as modified release formulation EXCEPT.
A. Unionized drug molecule at absorption site
B. pH dependent aqueous solubility
C. High parturition coefficient
D. Smaller drug molecule

PTO

10. Following is the most selective technique used for identification of polymorphs in high throughput screening
A. FTIR
B. Single crystal X-ray Diffraction
C. Powder X-ray Diffraction
D. Differential scanning calorimetry

11. Amorphous compounds normally have low
A. Entropy
B. Enthalpy
C. Dissolution rate
D. Melting point

12. Crystalline or amorphous nature of a compound can be determined by
A. Visual inspection
B. Microscopy
C. FTIR analysis
D. DSC analysis

13. Parenteral preparation are normally prepared in _____
A. Solution form
B. Suspension form
C. Emulsion form
D. All of the above

14. Melting is a _____ process
A. Exothermic
B. Endothermic
C. Non thermic
D. Hyper thermic

15. High through put screening of polymorphs is a _____ of Pharmaceuticals
A. Part of preformulation studies
B. Recrystallization under variety of set conditions
C. Parallel crystallizations
D. All of the above

16. Pre-formulation stage of product development provides
A. Pharmaceutical problems associated with the molecule
B. Proper direction for the formulation
C. Intelligent selection of new compound from discovery
D. All above option are correct

17. Solid state characterization during product development focusses on searching the
A. Most soluble polymorph
B. Most stable polymorph
C. All possible polymorphs
D. Most active polymorphs

18. Ethyl cellulose and PVA are classified under which category of polymers
A. Natural polymers
B. Biodegradable polymers
C. Non-biodegradable polymers
D. Homoploymers

19. Amorphous substances when added in water give rise to an initial high solubility known as ---------- that come back to equilibrium when saturation is reached
A. Equilibrium solubility
B. Saturated solubility
C. Apparent solubility
D. Intrinsic solubility

20. Finely divided lactose is used as carrier in ---------- drug delivery systems
A. Aerosols
B. Implants
C. Powdered drug inhalers
D. Nasal drug delivery

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UNIVERSITY OF THE PUNJAB

Final Prof: Annual – 2018
Examination: Doctor of Pharmacy (Pharm.D.)

Roll No. .....

Subject: Pharmaceutical Technology
PAPER: 3 (Part – II)

TIME ALLOWED: 2 Hrs. & 30 min.
MAX. MARKS: 80

Attempt this Paper on Separate Answer Sheet provided.

Attempt any 4 questions. Each question carry equal marks.

Q. 2. (a) Describe methods of preparation and applications of niosomes. (12)
(b) Describe processes for coating multiparticulates. (08)

Q.3. (a) Describe the pharmacokinetic properties considered for defining the candidature of the drug for modified delivery system. (10)
(b) Describe briefly the theory of designing modified release delivery from approximation to optimization. (10)

Q. 4. (a) Discuss different types of matrix systems designed for extended release of drug. (12)
(b)Describe passive strategies in drug delivery and targeting systems. (08)

Q.5. (a) Discuss the production of biopharmaceuticals with special reference to insulin. (10)
(b) What are the immobilized enzymes? How they are prepared? (10)

Q.6. (a). Define phenomenon of polymorphism. Write down different techniques used for identification of polymorphism. (15)
(b) Write down the implications/ application of salt screening in the drug developmental process. (5)

Q. 7. (a) What are the physicochemical consideration in dosage form design? What type of studies are conducted for determining solubility profile of a newly discovered drug? (10)

(b) What is the importance of the followings properties at the stage of product development? (2 marks each)

i) Solid state stability
ii) Particle shape
iii) Intrinsic dissolution rate
iv) Age of the patient
v) First pass effect/metabolism

UNIVERSITY OF THE PUNJAB

Final Prof: 2nd Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No. .....

Subject: Pharmaceutical Technology
PAPER: 3 (Part – II)

MAX. TIME: 2 Hrs. 30 Min.
MAX. MARKS: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Attempt any *FOUR* questions. Each questions carry equal marks.

Q.2. (a) Discuss Instrumentation used in Granule manufacturing. (10)
(b) Describe active strategies in drug delivery and targeting systems. (10)

Q. 3. (a) What is optimization? Why sometimes a compromise in desired formulation properties is required? (10)
(b) What is traditional formulation approach? What are its limitations as compared to the computer-aided formulation approaches? (10)

Q. 4. (a) You are asked to develop a parenteral preparation. What are ideal characteristics required for these type of preparations? (10)
(b) Define phase, and what are the implication of different phases of API in drug developmental process? (10)

Q. 5. (a) Define pharmaceutical biotechnology? Describe the basic principle of biotechnology. (10)
(b) How monoclonal antibodies are prepared? Describe their applications. (10)

Q. 6. (a) Write down physical and chemical characterisation of Liposomes? (10)
(b) Describe different gastro retentive approaches to drug delivery? (10)

Q. 7. (a) What are the major types of consideration in dosage form design? (10)
(b)What type of approaches will be used in designing a drug having low dissolution rate? (10)

(b) What is the important the followings PARAMETERS at the stage of product development. (2 marks each)

i) Excipient compatibility
ii) Particle size
iii) pH solubility profile
iv) pKa determination
v) Clinical indication of the drug

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Final Prof: 2nd Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No. in Fig. .....

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Signature of Supdt.:

Subject: Pharmaceutical Technology **MAX. TIME: 30 Min.**

PAPER: 3 Part – I (Compulsory) **MAX. MARKS: 20**

Attempt this Paper on this Question Sheet only.
Please encircle the correct option. Division of marks is given in front of each question.
This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer cutting and overwriting is not allowed. (1x20=20)

1. The conventional dosage forms do not have the characteristics.
A. Instability
B. Insolubility
C. Manageable prolonged duration of action.
D. Unrestricted distribution in the body.

2. A pharmaceutical excipient has the following properties EXCEPT:
A. Amount in formulation is a mixture variable.
B. Pharmacologically inactive materials.
C. Adjusted to obtain desired formulation properties.
D. Functionally active.

3. An immediate release dosage form has the following features:
A. Multiple dosing produces more fluctuation in plasma level time curve.
B. Demonstrates lesser absorption.
C. In dissolution and absorption, dissolution is rate limiting step.
D. Absorption is usually incomplete.

4. Which of the following statement is NOT true for the immediate release dosage form?
A. Increasing amount of drug is prone to cause toxic concentration of drug.
B. Immediate release dosage from results in a briefer t-max.
C. For prolonged action, the dose frequency in immediate dosage form can be increased.
D. Most of the conventional formulations are the immediate-release dosage from.

5. According to USP, a modified release formulation may provide control over:
A. temporal release.
B. spatial release.
C. both, temporal and spatial release.
D. All A, B and C.

6. An ideal modified release system has:
A. Defined release rate + maintained constant blood concentration + effective blood levels + sustained drug action.
B. Maintained constant blood concentration + effective blood levels + sustained drug action.
C. Defined release rate + maintained constant blood concentration + effective blood levels
D. Defined release rate + effective blood levels + sustained drug action.

7. Which of the following statements is NOT true?
A. Extended release formulation allows at least a two-fold reduction in dose frequency.
B. Extended release formulation demonstrate a faster absorption rate constant.
C. Extended release formulation significantly increases in patient compliance.
D. Extended release formulation has better therapeutic performance.

8. Which of the following statements is NOT true?
A. Extended release formulation is an example of modified release formulations.
B. A sustained release formulation essentially contains two immediately releasing portions of drug.
C. Extended release formulation releases drug in a planned, predicable and slower-than-the normal manner.
D. Extended release formulation releases drug for a longer period of time.

9. The features required for presenting a drug as modified release formulation EXCEPT.
A. Drugs administered in dose of 500 mg or lesser
B. Drugs with release rate without influence of enzymes.
C. Drugs with narrow therapeutic index
D. Absorption must not be based on receptors mediation

10. Salt screening is a part of pre-formulation studies and is performed to _____
A. enhance the stability of API
B. enhance compatibility of API with excipients
C. Enhanced dissolution of API
D. All of the above

11. High through put screening of polymorphs is a _____ in drug developmental process
A. Part of pre-formulation studies
B. Part of post formulation studies
C. Part of structure elucidation
D. Part of product development

12. Following is the least-selective technique for the identification of API
A. FTIR
B. NMR
C. DSC
D. UV- Spectroscopy

13. Isotonic solutions have same _____
A. Chemical composition
B. Salt concentration
C. Colligative properties
D. Electrolyte concentration

14. Sterilization is defined as _____
A. Completed removal of microorganism
B. Destruction of microbial viability
C. Inhibition of microbial growth
D. All of the above

15. Micronization is a technique used in preformulation studies in order to_____ of API
A. Enhance solubility
B. Decrease solubility
C. Enhance dissolution
D. Decrease dissolution

16. Particle size controls the following property of drugs
A. Stability
B. Solubility
C. Dissolution
D. Surface tension

17. A precise technique to measure particle size
A. Scanning electron Microscopy
B. Sieving
C. X-ray diffraction
D. Laser diffraction

18. The microparticles in which drug substance is dispersed in polymeric matrix are called
A. Microcapsules
B. Microspheres
C. Microparticles
D. Microbeads

19. Which physical form of drug is therapeutically more active?
A. Ground form
B. Amorphous form
C. Crystalline form
D. All forms are equally active

20. Intrinsic dissolution of drugs measure the dissolution of drug from a -------
A. Fixed surface area
B. Fixed time interval
C. Enlarges surface of drug
D. Entire surface of drug

UNIVERSITY OF THE PUNJAB

Roll No. in Fig. .....

Doctor of Pharmacy (Pharm.D.) Final Prof: Annual–2019

Roll No. in Words. .....

Subject: Pharmaceutical Technology (Old Course)

Paper: 3 Part – I (Compulsory) Time: 30 Min. Marks: 20

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Signature of Supdt.

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option. (20x1=20)

1) In a formulation, the concentrations of formulative ingredients are:
A. Varied without change in concentrations of each other
B. Absolute amounts
C. Relative amounts
D. All of A, B and C

2) Addition of diacetyl phosphate in the formation of Niosomes causes
A. Increase in size of vesicles
B. Charge on vesicles
C. Increase in drug loading efficiency
D. All of the above

3) High speed mixers can also deal with the ——————————of dry material
A. Granulation
B. Size reduction
C. Size enlargement
D. Screening

4) Following is excipient is used in minor concentration in a formulation EXCEPT:
A. Lubricants
B. Glidants
C. Release retardants
D. Disintegrants

5) The clearance kinetics by the mononuclear phagocyte systems are highly dependent on
A. Physico chemical properties of the particulate
B. Biological properties of the particulate
C. Antigenic properties of the particulate
D. Immunogenic property of the particulate

6) The major causes of variability in product properties are:
A. Uncontrollable factors
B. Controllable factors
C. Known factors
D. Unknown factors

7) Following is not a type of gastro retentive system
A. Mucoadhesive systems
B. Floating systems
C. Colon specific systems
D. Bio adhesive systems

8) The compounds which have no definite packing geometry of atoms, ions or molecule are called
A. Polymorphic compounds
B. Amorphous compounds
C. Crystalline compounds
D. Co-crystals

9) A phase diagram is a plot of pressure_____, which represents the conditions under which a phase change is at equilibrium.
A. Pressure Vs Volume
B. Pressure Vs Temperature
C. Temperature Vs Volume
D. Temperature Vs Internal energy

P.T.O.

10) Pre-formulation stage of product development provides
A. Pharmaceutical problems associated with the molecule
B. Proper direction for the formulation
C. Intelligent selection of new compound from discovery
D. All above options are correct

11) Solid state characterization during product development focusses on searching the
A. Most soluble polymorph
B. Most stable polymorph
C. All possible polymorphs
D. Most active polymorphs

12) Automation of the process can be achieved in
A. Shear granulators
B. High speed granulators
C. Fluidized bed granulators
D. Spheronizers

13) Ethyl cellulose and PVA are classified under which category of polymers
A. Natural polymers
B. Biodegradable polymers
C. Non-biodegradable polymers
D. Homoploymers

14) Amorphous substances when added in water give rise to an initial high solubility known as ---------- that come back to equilibrium when saturation is reached
A. Equilibrium solubility
B. Saturated solubility
C.Apparent solubility
D. Intrinsic solubility

15) which one is a mechanical dispersion method of liposomes preparation
A. Sonication method
B. De-emulsification method
C. Double emulsion method
D. Ethanol injection method

16) Finely divided lactose is used as carrier in ---------- drug delivery systems
A. Aerosols
B. Implants
C. Powdered drug inhalers
D. Nasal drug delivery

17) Drug release from Niosomes is determined by
A. Dynamic Light Scattering
B. Electron Microscopy
C. Dialysis Method
D. DSC

18) Liposomes have following characteristics except
A. Nonbiodegradable
B. Nontoxic
C. Nonantigenic
D. Biologically inert

19) ———————— is very efficient mixing process
A. Screening
B. Fluidization
C. Granulation
D. Coating

20) Highly soluble and highly permeable drugs represent the _____ class of biopharmaceutical classification system
A. Class I
B. Class II
C. Class III
D. Class IV

UNIVERSITY OF THE PUNJAB

Roll No. .....

Doctor of Pharmacy (Pharm.D.) Final Prof: Annual–2019

Subject: Pharmaceutical Technology **(Old Course)**
Paper: 3 **Part – II**

Time: 2 Hrs. 30 Min. Marks: 80

Note: Attempt any *FOUR* questions. Each question carries equal marks.

Q. 2. (a) Write down different applications of Niosomes. (10)
(b) Describe one factor at a time (OFAT) approach. What are its limitations? (10)

Q.3. (a) what are the different types of interactions between the internal and external factors of a formulation system? (10)
(b) Describe optimization of a pharmaceutical product. Why product optimization is challenging? (10)

Q.4. (a) Describe active strategies in drug delivery and targeting systems. (10)
(b) Write a note on Fluidized bed granulators. (10)

Q.5. (a) How phenomenon of polymorphism can affect the physicochemical properties of drug compounds? (10)
(b) Discuss different techniques used in preformulation studies for the identification and characterization of polymorphs. (10)

Q. 6. Discuss in detail the Biotechnological aspects in the product development. (20)

Q. 7. (a) Describe the characteristics of an ideal dosage form, what is the importance of solubility during dosage form development? (10)

(b) Briefly describe the followings. (2 marks each)
i) Advantages of sustained release dosage form.
ii) Barrier Principle of sustained release dosage form
iii) Solvent evaporation method of microencapsulation
iv) Osmotic pressure activated systems
v) Hydrodynamically balanced system for controlled release

UNIVERSITY OF THE PUNJAB

Roll No. in Fig. .....

Roll No. in Words. .....

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Signature of Supdt.:

Doctor of Pharmacy (Pharm.D.) Final Prof: Annual–2021

Subject: Pharmaceutics – VII (Pharmaceutical Technology)

Paper: 3 Part – I (Compulsory) (New Course) Time: 30 Min. Marks: 20

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.
Division of marks is given in front of each question.
This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option. (20x1=20)

1) The controlled release drug delivery system show reduced *In-Vitro* and *In-Vivo* correlation.
A. No
B. Yes
C. Never
D. None of above

2) When a drug is enclosed by insoluble drug membrane barrier and drug is release in the systemic circulation for a certain period of time, the system is called.
A. Diffusion controlled matrix system
B. Dissolution controlled matrix system
C. Diffusion controlled drug delivery system
D. Diffusion controlled reservoir system

3) Particle size controls the following property of drugs
A. Stability
B. Solubility
C. Dissolution
D. Surface tension

4) For the release of macromolecules, the better system is.
A. Reservoir system
B. Matrix System
C. Both A & B
D. None of above

5) Hydroxymethyl cellulose is used to prepare the following matrix system.
A. Hydrophilic matrix
B. Hydrophobic matrix
C. Hydrophilic reservoir
D. None of above

6) the phenomenon, where a compound can exist in more than one crystalline motif is called
A. Co-crystallization
B. Polymorphism
C. Amorphization
D. All of the above

7) In osmotic system, both drug and osmogen are kept separate in a system is called.
A. Type 1 system
B. Type 2 system
C. Both A & B
D. None of above

8) The drug delivery system in which drug release is affected by the contents and type of the food in GIT is called .
A. Osmotic drug delivery system
B. Ion-Exchange Resins
C. Both A & B
D. None of above

9) Porosity of Semi permeable membrane is studied by surface morphology with the help of.
A. SEM
B. HPLC
C. UV
D. None of above

10) The antigen binding site of IgG molecules represents
A. Complement activation part
B. Macrophage interaction part
C. Homing part
D. Pharmacologically actin part

11) Total quality concept encompasses the following EXCEPT:
A. Quality culture
B. Quality is everybody's responsibility
C. Leads to continuous improvement
D. Based on quality by design

12) Passive targeting exploits the Natural ———————— Pattern
A. Absorption
B. Distribution
C. Metabolism
D. Clearance

13) A precise technique to measure particle size
A. Scanning electron Microscopy
B. Sieving
C. X-ray diffraction
D. Laser diffraction

14) The release of drug from liposomes depends on
A. Composition of liposomes
B. Type of drug encapsulated
C. Nature of the cell
D. All of the above

15) Intrinsic dissolution of drugs measures the dissolution of drug from a ———
A. Fixed surface area
B. Fixed time interval
C. Enlarges surface of drug
D. Entire surface of drug

16) The clearance kinetics by the mononuclear phagocyte systems are highly dependent on
A. Physico chemical properties of the particulate
B. Biological properties of the particulate
C. Antigenic properties of the particulate
D. Immunogenic property of the particulate

17) The microparticles in which drug substance is dispersed in polymeric matrix are called
A. Microcapsules
B. Microspheres
C. Microparticles
D. Microbeads

18) What is the pH of oral cavity?
A. 5.2 – 6.8
B. 1.2 – 3.5
C. 6.3 – 7.3
D. 7.5 – 8.0

19) The time between the introduction of the tablet into the medium and its rise to upper one third of the dissolution vessel is termed as
A. Floating time
B. Floating lag time
C. Dissolution time
D. Disintegration time

20)_____ is the most selective technique for the identification of polymorphism in pharmaceutical compound
A. Infrared spectroscopy
B. Raman spectroscopy
C. Powder X-ray diffraction technique
D. UV-Visible spectrophotometry

UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Final Prof: Annual–2021

Roll No. .....

Subject: Pharmaceutics – VII (Pharmaceutical Technology)

Paper: 3 Part – II (New Course) Time: 2 Hrs. 30 Min. Marks: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt any *FOUR* questions. Each question carries equal marks.

Q. 2. Compare wet and dry granulation Discuss High shear granulation technology, describe its working principal and applications. (20)

Q. 3.(a) What is effervescent granulation technology. Explain its methodology and applications.(10)
(b) Differentiate pellets with granules. What are advantages of continuous granulation? (10)

Q. 4. (a) Define Gene therapy. Discuss the mechanism Gene Silencing with a suitable diagram. (12)
(b) Discuss the different viral and non-viral vectors for Gene delivery. (08)

Q. 5. (a) Discuss the problems associated with the delivery of DNA and RNA as dosage form. (10)
(b) List the differences between RNA and DNA as Therapeutic agent to treat diseases (10)

Q. 6. (a) Write a note on the implication of polymorphism in drug developmental process (10)
(b) On what basis a polymorph is selected for further process in drug development. (10)

Q.7. Briefly describe the followings; (05 each)

i) Liposomes.
ii) Matrix tablets
iii) Niosomes
iv) Polymer degradation