



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/M.PHARM/SEM-2/MPT-206(1)/2013  
2013**

**DRUG DELIVERY SYSTEM**

Time Allotted : 3 Hours

Full Marks : 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP - A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) FDA approved transdermal patch 'Transderm-Nitro' used for the treatment of angina pectoris is an example of
- a) polymer membrane permeation controlled system
  - b) polymer matrix diffusion controlled system
  - c) drug reservoir gradient controlled system
  - d) microreservoir dissolution controlled system.



- ii) Simple enteric coated tablets can be called
- a) matrix system
  - b) reservoir system
  - c) diffusion controlled system
  - d) all of these.
- iii) The toxicity profile of Amphotericin *B* was first clinically improved by formulating it in
- a) solid lipid nanoparticles
  - b) liposomes
  - c) magnetic microparticles
  - d) niosomes.
- iv) Water for injection shall meet microbiological specification of not more than
- a) 10 cfu/ml
  - b) 10 cfu/100 ml
  - c) 500 cfu/ml
  - d) 100 cfu/ml.



- v) A drug is unsuitable for incorporation into controlled release formulations if it has
- a) low therapeutic index
  - b) biological half life of 2-8 hours
  - c) low dose
  - d) fast absorption.
- vi) The class of agents that could be useful as permeation enhancer of protein and peptide drugs includes
- a) bile salts
  - b) medium chain fatty acids
  - c) chelating agents
  - d) all of these.
- vii) The drug release from inert polymer matrix type delivery system follows
- a) first order kinetics
  - b) zero order kinetics
  - c) Higuchi square root kinetics
  - d) non-linear kinetics.



viii) Lecithin is also known as

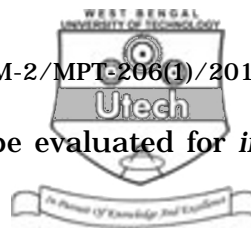
- a) Phosphatidyl inosital
- b) Phosphatidyl choline
- c) Phosphatidyl ethanolamine
- d) Sodium deoxycholate.

ix) A graph of amount of drug released vs square root of time would be linear if the drug release is

- a) Dissolution controlled
- b) Diffusion controlled
- c) Diffusion and dissolution controlled
- d) Osmotic pressure controlled.

x) Which of the following drugs can be delivered by iontophoresis ?

- a) Lignocaine
- b) Metoprolol
- c) Salbutamol
- d) All of these.



xi) Buccal drug delivery system should be evaluated for *in vitro* release at

- a) pH 4.5                                      b) pH 1.2  
c) pH 6.8                                      d) pH 8.6.

xii) The isoelectric point of the skin is in between

- a) 3 – 4    b) 4 – 5  
c) 5 – 6    d) 6 – 7.

### GROUP - B

#### ( Short Answer Type Questions )

Answer any *three* of the following.                      3 × 5 = 15

2. Write a note on iontophoresis with a line diagram of drug release mechanism.
3. Briefly enumerate the permeability enhancing mechanisms of poly ( acrylate ) derivatives for gastrointestinal delivery of protein and peptide drugs.
4. What do you mean by sink condition ? How is sink condition maintained in the body ?
5. Distinguish between bulk erosion and surface erosion from erodible matrix devices.
6. Write a note on coacervation phase separation technique.



**GROUP - C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. What are nanoparticles ? Enumerate any two methods of their preparation. How can you characterize nanoparticles ?

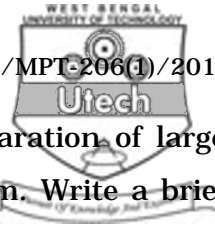
2 + 5 + 8

8. Illustrate the biopharmaceutical and pharmacokinetic considerations in the design of per-oral controlled release drug delivery systems. A prolonged action tablet formulation is to be designed for which an optimum blood drug level range is 8 - 16 mg%. The average biological half life of the drug is 8 hr. A 1.5 gm dose administered to a 70 kg patient yields a blood level of 6 mg% after 3 hr. The total amount eliminated during this time is 300 mg. At what rate must the drug be supplied to maintain a constant blood drug level of 12 mg% ? How much drug must be placed in the tablet to achieve duration of action of 12 hr ?

10 + 5

9. a) What do you mean by Transdermal Drug Delivery System ( TDDS ) ?
- b) What are the physicochemical & pharmacokinetic criteria to be considered for selection of a drug in TDDS formulation ?
- c) Enumerate the different parameters for evaluation of TDDS.

2 + 4 + 9



10. Describe a flow sheet diagram for the preparation of large volume parenterals emphasizing HVAC system. Write a brief account on the excipients used in parenteral formulations.

10 + 5

11. Write notes on any *two* of the following :

$2 \times 7 \frac{1}{2}$

- a) Brain targeted drug delivery
- b) Characteristics of ocular drug delivery
- c) Characterization of liposomes.

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