Exam Date & Time: 21-May-2022 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

VI SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY 2022

DRUG DELIVERY [BME 4063]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates:
Answer ALL questions Missing data may be suitably assumed

1) Establish agonist and antagonist concentration-response relationship. Explain why such a relationship is considered to be a 'capacity limited' process. (4)

A)

B) Explain with a schematic diagram, the principles associated with the mechanism of swelling controlled and degradable controlled release systems. (3)

C) How do high fat meals and fasting state affect the rate of drug absorption? Put your arguments with proper logic. (3)

2) The therapeutic indices (T.I) of two drugs A and B are 95 and 3 respectively. Which of these drugs would you recommend for frequent administration without compromising patient's safety? Justify your views. (2)

A)

B) The drug Ibuprofen has a log D6.0 value of 2.12 and is poorly soluble in aqueous media. When administered orally, approximately 30% of the dose is lost due to incomplete dissolution. It encounters no further problems during absorption, but it is a CYP3A4 substrate and about 25% of the drug passing through the membrane undergoes intestinal metabolism. During its initial pass through liver, about 70% of the drug is lost due to metabolism. (4)

(i) Calculate the values of Fa, Fg, Fh and F for Ibuprofen.

(ii) Determine the effective dose when 50 mg is given orally.

(iii) Determine the value of an intravenous dose that is equivalent to a 100 mg oral dose.

C) Illustrate graphically and mathematically, the influence of tissue and plasma protein binding on the pattern of drug distribution (4)

3) Consider an extraction unit, where in Ca=160mg/L, Cv=100 mg/L, and Q=2L/h. Find (3)

out the rate of extraction, clearance and the fraction extracted.

A)

B) Amiodarone has a volume of distribution of 4600L. If the plasma concentration is 1mg/L,

(i) How much of drug is in the body?

(ii) How much of drug is in the plasma? (assume that the volume of plasma is 3L) (3)

(iii)How much of drug is in the tissue?

C) Explain how the following factors influence renal tubular reabsorption

(i) the drug's lipophilicity, (ii) pH and (iii) filtrate flow rate (4)

How does intake of coconut water influence renal clearance?

4) After collecting of blood (from toxoid treated horse), how would you proceed to obtain dry product (powder) of diphtheria antitoxin? (2)

A)

B) How do you assess whether an individual is susceptible or immune to diphtheria? Explain the process with logic. (4)

C) Compare 'active acquired immunity' and 'passive acquired immunity. (4)

5) Explain the working of a "nicotine patch" as transdermal drug delivery system. Put your strategy to develop pain less transdermal drug delivery system. (3)

A)

B) Explain the basic functions of the targeted drug delivery system. Differentiate active and passive targeting. (4)

C) Analyse the process pertaining to ultrasound mediated targeted drug delivery. (3)

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