

Total No. of Questions : 6]

SEAT No. :

P3571

[Total No. of Pages : 2

[4750] - 11

**M.Pharmacy (Semester - I)**

**ADVANCED ANALYTICAL TECHNIQUES**

**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Question No. 1 and 4 are compulsory.*
- 2) *Attempt any one question from the remaining in Section - I and any one from the remaining question of Section - II.*
- 3) *Answer to the two sections should be written on the separate books.*
- 4) *Draw diagram whenever necessary.*
- 5) *Figures to the right indicate full marks.*

**SECTION - I**

**Q1)** a) A compound with molecular weight 116 gives following structural information

UV: 283 m $\mu$ ,  $\epsilon_{\max}$  22

IR : 3000-2500, 1715, 1342 cm<sup>-1</sup>

NMR : 7.88  $\tau$  Singlet (3H), 7.40  $\tau$  Triplet (2H), 7.75  $\tau$  Triplet (2H), 1.1  $\tau$  singlet (1H) Deduce the structure of the compound. **[8]**

b) Discuss various transitions in UV spectroscopy. **[8]**

c) Give applications of IR spectroscopy. **[4]**

**Q2)** a) Discuss in detail theory, instrumentation and applications of NMR spectroscopy. **[8]**

b) Write about Finger Print region in IR spectroscopy. **[8]**

c) Write about Emission spectroscopy. **[4]**

**P.T.O.**

- Q3)** a) Give an account of theory, instrumentation and applications of mass spectroscopy. [8]  
b) Discuss about Chromophores in UV Spectroscopy. [8]  
c) Write note on HPTLC. [4]

## SECTION - II

- Q4)** a) Write about theory, instrumentation and application of HPLC. [10]  
b) Discuss theory, instrumentation and application of GC-MS. [10]
- Q5)** a) Give an account of Differential Scanning Calorimetry. [10]  
b) Write about Derivative Thermogravimetric analysis. [10]
- Q6)** a) Write about Ion pair Chromatography. [10]  
b) Explain theory and applications of X-ray diffraction techniques. [10]



Total No. of Questions : 6]

SEAT No. :

**P3572**

[Total No. of Pages : 1

**[4750] - 12**  
**M.Pharmacy (Semester - I)**  
**RESEARCH METHODOLOGY**  
**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Questions 1 and 4 are compulsory.*
- 2) *Attempt any one questions from the remaining in Section - I and any one questions from the remaining questions of Section - II.*
- 3) *Answers to the two sections should be written in separate books.*

**SECTION - I**

- Q1)** a) Give an account of sources for survey of literature. [10]  
b) Explain process of making a research proposal. [10]
- Q2)** a) Describe the various types of research in detail. [10]  
b) Explain in detail student t test. [10]
- Q3)** a) What is interpretation of data? Give the need and importance of interpretation of data. [10]  
b) Discuss the different forms of questionnaire. Give its advantages and disadvantages. [10]

**SECTION - II**

- Q4)** a) What is a patent? Describe importance of patent in research. [10]  
b) Explain the importance of poster, gesture, eye contact and expressions in oral presentation. [10]
- Q5)** Why protection is needed on intellectual property? Give the detailed account of historical development of concept of intellectual property rights. [20]
- Q6)** Write notes on any two of the following : [20]  
a) Industrial project as part of industry institute interaction.  
b) Trademark designs and copyrights.  
c) Status of intellectual property rights in India.



Total No. of Questions : 6]

SEAT No. :

P3573

[Total No. of Pages : 2

[4750]-13

M.Pharm. (Semester - I)

**ADVANCED PHARMACEUTICS**

**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any 2 questions from each section.*
- 2) *Draw well labeled diagram wherever necessary.*
- 3) *Figures to the right indicate full marks.*

**SECTION - I**

**Q1)** Explain in detail the importance and methodology of stability testing of pharmaceutical dosage forms. **[20]**

**Q2)** Explain different parameters studied in preformulation of a solid dosage form. Add a note on solid state characterization. **[20]**

**Q3)** Write short notes on (any two) : **[20]**

- a) Characterization of polymers.
- b) Co-processed excipients.
- c) Biodegradable polymers.

**P.T.O.**

## SECTION - II

**Q4)** Explain the experimental design approach used in the optimization of formulations. Write a note on classification of optimization methods. [20]

**Q5)** Discuss the applications and evaluation of microcapsules. Explain in detail any one technique used for the preparation of microcapsules. [20]

**Q6)** Write short notes on (any two) : [20]

- a) Correlation and regression analysis.
- b) Importance of Dissolution.
- c) Quality assurance and quality control.



Total No. of Questions : 8]

SEAT No. :

P3574

[Total No. of Pages : 2

[4750] - 14

M. Pharmacy (Semester - I)

ADVANCED PHARMACEUTICAL CHEMISTRY

Spl. Pharmaceutical Chemistry

(2008 Pattern)

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Question number one and five are compulsory out of remaining attempt any 2 questions from each Section I and Section II.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw well labeled diagrams wherever necessary.*

**SECTION - I**

**Q1)** Explain Sharpless oxidation. **[10]**

**Q2)** Give brief account of green chemistry. Explain reactions using microwave and ultrasound energy. **[15]**

**Q3)** Explain Synthon approach for drug synthesis. Develop synthetic route for any two drugs using synthon approach. **[15]**

**Q4)** Write note on any Two : **[15]**

- a) Allylic bromination
- b) Free radical reaction
- c) Oppenauer oxidation

**P.T.O.**

## **SECTION - II**

**Q5)** Explain mechanism, stereochemistry and applications of Grignard reaction. **[10]**

**Q6)** What is Pinacole - pinacolone rearrangement, explain along with reaction mechanism, stereochemistry and applications. **[15]**

**Q7)** Explain Stereospecificity and Stereoselectivity with suitable examples. **[15]**

**Q8)** Write note on any Two : **[15]**

- a) Suzuki coupling
- b) WolfKishner reduction
- c) Ionic liquid and Supercritical liquid



Total No. of Questions : 6]

SEAT No. :

P3575

[Total No. of Pages : 1

[4750] - 15

**M. Pharmacy (Semester - I)**  
**ADVANCED PHARMACOLOGY - I**  
**(2008 Pattern)**

*Time :3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) Answers to each section should be written in separate answer - books.*
- 2) Solve any two questions from each section.*

**SECTION - I**

**Q1)** Discuss the preclinical evaluation of antihypertensive agents. **[20]**

**Q2)** Discuss the preclinical evaluation of bronchodilators and antitussives. **[20]**

**Q3)** Write notes on (any two): **[20]**

- a) Patch clamp technique.
- b) Screening of anti - parkinsonian agents.
- c) Transgenic animals.

**SECTION - II**

**Q4)** Discuss the preclinical evaluation of anxiolytics and antidepressants. **[20]**

**Q5)** Discuss the preclinical evaluation of cardiac glycosides and antiarrhythmic agents. **[20]**

**Q6)** Write notes on (any two): **[20]**

- a) Screening of local anaesthetics.
- b) Breeding techniques for laboratory animals and CPCSEA guidelines for breeding of laboratory animals.
- c) RIA.





Total No. of Questions : 8]

SEAT No. :

**P3576**

[Total No. of Pages : 2

[4750] - 16

**M. Pharmacy (Semester - I)**  
**ADVANCED PHARMACOGNOSY**  
**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Question No.1 and Question No. 5 are compulsory out of remaining attempt two questions from Section - I and two questions from Section - II.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right side indicate full marks.*

**SECTION - I**

**Q1)** Explain various strategies used to enhance secondary metabolite production through tissue culture techniques. **[10]**

**Q2)** Answer the following :

- a) Explain application of tracer techniques in evaluation of biogenetic pathways of secondary metabolites. **[7]**
- b) Illustrate flavonoids as chemotaxonomic marker with suitable example. **[8]**

**Q3)** Explain the characteristics of natural products that make them appropriate material in discovering new drugs. Describe Vinca alkaloids as anticancer agent. **[15]**

**Q4)** Write note on the following (Any Three) : **[15]**

- a) Application of Chemotaxonomy in medicinal botany.
- b) Advantages of Chemotaxonomy.
- c) Strategies for selection of plant material for HTS.
- d) Flavouring agents derived from plants.

**P.T.O.**

## SECTION - II

- Q5)** Elaborate a detail account of Flavanoids as Hypolipidaemic agents with suitable examples. **[10]**
- Q6)** Answer the following:
- a) Explain anticancer role of Taxol and its derivatives. **[7]**
  - b) Review the plants having Antidiabetic activity. **[8]**
- Q7)** Write various *in vivo* models used for evaluation of Immunomodulatory activity. Explain Ginseng as immunomodulatory agent. **[15]**
- Q8)** Write note on the following (Any Three): **[15]**
- a) Androgapholide as a Hepatoprotective agent.
  - b) Biopolymers as Pharmaceutical Excipients.
  - c) Photosensitizing agents derived from plants.
  - d) Biofuels.



Total No. of Questions : 8]

SEAT No. :

**P3577**

[Total No. of Pages : 1

[4750] - 17

**M.Pharmacy (Semester - I)**  
**ADVANCED QUALITY ASSURANCE TECHNIQUES**  
**(c GMP & Documentation)**  
**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) Question numbers 1 and 5 are compulsory.*
- 2) Out of the remaining attempt any two questions from each section.*
- 3) Answer to the two sections should be written in separate answer books.*
- 4) Figures to the right indicate full marks.*

**SECTION - I**

- Q1)** Discuss SOP on handling market complaints. **[12]**
- Q2)** Explain the importance of time limit at various stages in manufacture. Add a note on sanitation in manufacturing area. **[14]**
- Q3)** Write a note on “Drug product salvaging” **[14]**
- Q4)** Discuss importance of Environmental Protection in pharmaceutical industry. **[14]**

**SECTION - II**

- Q5)** Write a note on design and structural features of manufacturing facility. Add a note on HVAC system. **[12]**
- Q6)** Discuss contents of “Site Master File” **[14]**
- Q7)** a) Explain maintenance of equipments in pharma manufacturing  
b) What is outsourcing? **[14]**
- Q8)** What are the requirements for Expiration dating as per cGMP? Add a note on reference standards. **[14]**



Total No. of Questions : 8]

SEAT No. :

P3578

[Total No. of Pages : 2

[4750]-18

**M. Pharmacy (Semester - I)**

**Traditional System of Medicine and Ayurvedic Formulations**

**(2008 Pattern)**

*[Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Q. no. 1 and 5 are compulsory.*
- 2) *Out of the remaining attempt any two questions from Section I and any two questions from Section - II.*
- 3) *Answers to the Two sections should be written in separate books.*
- 4) *Figures to right indicate full marks.*

**SECTION - I**

**Q1)** Explain Unani system of medicine. Give the theory and basic concept and add a brief note on Diagnosis and treatment of Unani system of medicine. [10]

**Q2)** a) Explain the principle of Ayurveda and add a note on Panchakarma [8]

b) What is Homeopathy system of medicine. Write a brief note on Homeopathic dilutions [7]

**Q3)** Give an account of Ethnopharmacognosy in modern drug discovery [15]

**Q4)** Write short notes (Any Three) [15]

- a) Charak Samhita
- b) Principle of Chinese system of medicine
- c) Rasayan in Ayurveda
- d) Acupuncture.

**P.T.O.**

## SECTION - II

**Q5)** Write in detail about preparation of Bhasma in Ayurveda. Give the characteristics, evaluation parameters and storage conditions of Bhasmas. [10]

**Q6)** What is Asava and Arishta. Give their methods of preparation with examples [15]

**Q7)** Define Standardization and explain in detail Physical, Chemical and Microscopical methods of evaluation of herbal drugs. [15]

**Q8)** Write short notes (Any Three) [15]

- a) Churna
- b) Taila
- c) Lepa and Kvatha
- d) Ghruta.



Total No. of Questions : 6]

SEAT No. :

P3579

[Total No. of Pages : 2

[4750] - 19

**M. Pharmacy (Semester - I & II)**

**BIOPHARMACEUTICS AND PHARMACOKINETICS**

**(2008 Pattern) (Elective)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) Answer any 02 questions from each section.*
- 2) Answers to the two sections should be written in separate books.*
- 3) Neat diagrams must be drawn wherever necessary.*
- 4) All questions carry equal marks.*

**SECTION - I**

**Q1)** What is in vitro in vivo correlation (IVIVC) ? Explain the need and objectives of IVIVC. Discuss various levels of IVIVC.

**Q2)** Discuss the methods of determination of rate of absorption.

**Q3)** Write notes on any two -

- a) Noyes - Whitney's dissolution rate law.
- b) Physiological transporter systems.
- c) In vitro models for determination of absorption.

**P.T.O**

## SECTION - II

**Q4)** Write on assessment of various pharmacokinetic parameters when the drug is administered as IV infusion. Explain the need of loading dose in this case.

**Q5)** Discuss kinetics of protein binding.

**Q6)** Write notes on any two -

- a) Michaelis - Menten equation.
- b) Causes and detection of nonlinearity.
- c) Concept of clearance and its determination.



Total No. of Questions : 8]

SEAT No. :

**P3580**

[Total No. of Pages :2

**[4750]-20**

**M. Pharm. (Semester - I & II)**

**STERILE PRODUCTS FORMULATION AND TECHNOLOGY**

**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) Question No. 1 and 5 are compulsory. Out of the remaining attempt two questions from section I and two questions from section II.*
- 2) Answers to the two sections should be written in separate books.*
- 3) Draw a neat and labeled diagrams wherever necessary.*
- 4) Figures to the right indicate full marks.*

**SECTION - I**

**Q1)** Explain in detail methods of preparation of liposomes and applications of liposomes for parenteral delivery. **[12]**

**Q2)** Explain in detail formulation and manufacturing of parenteral solution. **[14]**

**Q3)** Write a note on physicochemical properties of the drug studied during preformulation of the parenteral product. **[14]**

**Q4)** Write a short note on (Any Two) : **[14]**

- a) Ocular inserts
- b) Loaded erythrocyte
- c) Plastic as a packaging component for parenteral product.

**P.T.O.**



## SECTION - II

**Q5)** Explain components of HEPA filter. Write a note on HEPA filter testing and Rating. **[12]**

**Q6)** What are different large scale sterilization process? Give the account of validation of Autoclave. **[14]**

**Q7)** Write a note on GMP and regulatory guidelines for the manufacturing of parenteral product. **[14]**

**Q8)** Write a short note on (Any Two) : **[14]**

- a) Parenteral devices-canula and catheter
- b) Layout of parenteral facility
- c) Mechanism, advantages and drawbacks of autoclave sterilization



Total No. of Questions : 8]

SEAT No. :

**P3581**

[Total No. of Pages : 2

[4750] - 21

**M.Pharmacy. (Semester - II)**  
**DRUG REGULATORY AFFAIRS**  
**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Q. No. 1 & 5 are compulsory, out of remaining attempt two questions from section-I and two questions from section-II.*
- 2) *Answer to the two sections should be written in separate books.*
- 3) *Figures to the right indicate full marks.*

**SECTION - I**

**Q1)** Write the constitution and composition of the State Pharmacy Councils. [10]

**Q2)** a) Write the salient features of Indian Patent Act 1970. [8]

b) Write the salient features of DPCO 1995. [7]

**Q3)** a) Explain the provisions related to Pollution and Environment Control Act. [8]

b) Write the qualification and duties of Drug Inspector. [7]

**Q4)** Write short notes on following (any three) [15]

a) Labeling of drugs.

b) Drug Master File

c) ISO

d) USFDA

**SECTION - II**

**Q5)** Explain the Schedule-M requirements related to premises, sanitation & hygiene. [10]

**Q6)** a) Write the functions of Central Drugs Laboratory. [8]

b) Write in detail about import of drugs. [7]

**Q7)** a) Elaborate the different sections of NDA. [8]

b) Write the conditions of loan license to manufacture for sale of drugs. [7]

**P.T.O.**

**Q8)** Write short notes on following (any three)

**[15]**

- a) Pharmacopeias.
- b) Good Clinical practices.
- c) WHO
- d) MSDS preparation



Total No. of Questions : 6]

SEAT No. :

P3582

[Total No. of Pages : 2

[4750] - 22

M.Pharmacy (Semester - II)

ADVANCED MEDICINAL CHEMISTRY (M-II-3)

(Pharmaceutical Chemistry)

(2008 Pattern) (Theory)

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Q.No.1 and Q.No.4 are compulsory.*
- 2) *Attempt any one question from remaining questions from each section.*
- 3) *Write answers to section I and Section II in separate answer book.*

**SECTION - I**

**Q1) a)** Write applications of microorganisms in biotransformation of antibiotics. **[15]**

b) Write a note on enzyme immobilization techniques. **[5]**

**Q2) a)** What are the different types of receptors ? Explain the adrenergic receptors. **[15]**

b) Explain supporters and linkers in combinatorial chemistry. **[5]**

**Q3) a)** Explain applications of QSAR in drug design. **[10]**

b) Write a brief note on CADD. **[10]**

**P.T.O.**

## SECTION - II

**Q4)** Write Synthetic routes giving detail mechanism of following drugs describing reaction conditions: (Any Two) **[20]**

- a) Gefitinib
- b) Risperidone
- c) Linezolid
- d) Diazepam

**Q5)** a) Write a note on Combinatorial chemistry. **[10]**

b) Draw synthesis scheme with detail mechanism of Diphenhydramine. **[10]**

**Q6)** Write notes on any two: **[20]**

- a) Enzyme inhibition
- b) Gene therapy
- c) Dopamine receptors



Total No. of Questions : 6]

SEAT No. :

**P3583**

[Total No. of Pages : 2

**[4750] - 23**

**M.Pharm. (Semester - II)**

**CLINICAL PHARMACOLOGY**

**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Q. 1 & Q.4 are compulsory.*
- 2) *Solve any one question from remaining two for each section.*

**SECTION - I**

**Q1)** Describe in detail the management of hypertension. **[20]**

**Q2)** a) Describe in detail pharmacotherapy of hyperlipidemia. **[10]**

b) Chronic obstructive pulmonary disease. **[10]**

**Q3)** a) Rational use of antibiotics. **[5]**

b) Management of angina pectoris. **[5]**

c) Role of immunomodulators in immunopharmacology. **[5]**

d) Antiemetics. **[5]**

**SECTION - II**

**Q4)** Define clinical pharmacology. Describe the different phases of clinical research. Add a note on controlled clinical trials. **[20]**

**Q5)** a) Discuss principles of therapeutic drug monitoring with suitable examples. **[10]**

b) Explain clinical practice guidelines and management of pulmonary embolism. **[10]**

**P.T.O.**

- Q6)** a) Management of peptic ulcer [5]  
b) Anticoagulants [5]  
c) Digitalis glycosides [5]  
d) Therapeutic utility of beta blockers in myocardial infarction [5]



Total No. of Questions : 8]

SEAT No. :

P3584

[Total No. of Pages : 2

[4750] - 24

M. Pharmacy (Semester - II)

PHYTOCHEMISTRY AND PHYTOPHARMACEUTICALS

(2008 Pattern)

Time :3 Hours]

[Max. Marks :80

*Instructions to the candidates:*

- 1) *Question Nos. 1 and 5 are compulsory. Out of the remaining attempt 2 questions from Section I and 2 questions from Section II.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Describe in brief chemistry of flavonoids. How are flavonoids isolated? Explain with example of Quercetin. **[10]**

**Q2) a)** Write method of extraction, characterization & structural elucidation of Morphine. **[7.5]**

b) Write an elaborate account on chemical & pharmacological profile of **any one** of the following: **[7.5]**

i) Sennosides

ii) Taxol

**Q3)** What do you understand by Standardization of phytopharmaceuticals? Mention the role of spectroscopy & chromatographic techniques in Standardization of Bacosides and Curcumin. **[15]**

**Q4)** Write a note on following (**any two**) **[15]**

a) Chemical Profile of Digoxin.

b) Extraction of alkaloids.

c) Standardization of phylanthin

**P.T.O.**



## SECTION - II

- Q5)** Describe WHO guidelines for quality control of herbs. Write principle & procedure of Bitterness value. **[10]**
- Q6)** a) Describe the infrastructure required for production of herbal extracts. **[7.5]**  
b) Write a note on evaluation of herbal extracts. **[7.5]**
- Q7)** Describe Invivo & Invitro screening methods for evaluation of **[15]**  
a) Hepatoprotectives.  
b) Antioxidants.
- Q8)** Write note on following (**any two**) **[15]**  
a) Sterility, stability & Preservation of extracts.  
b) Screening of Antiinflammatory Drugs.  
c) Determination of pesticide residue.



Total No. of Questions : 6]

SEAT No. :

**P3585**

[Total No. of Pages : 1

[4750] - 25

**M. Pharmacy (Semester - II)**  
**PHARMACEUTICAL VALIDATION**  
**(Spl. Quality Assurance Techniques)**  
**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Q.1 and Q.5 are compulsory. Out of remaining solve any 1 from Section I and any 1 from Section II.*
- 2) *Figures to the right indicate full marks.*

**SECTION - I**

- Q1)** a) Define validation, write its importance and its types. [10]  
b) What is validation master plan? Elaborate its contents. [10]
- Q2)** a) Define calibration and write a note on calibration master plan. [10]  
b) Explain equipment validation of steam autoclave. [10]
- Q3)** Write short note on: [20]  
a) Operation qualification and performance qualification.  
b) Vendor certification.

**SECTION - II**

- Q4)** a) Explain process validation of tablet by dry granulation. [10]  
b) Write short note on cleaning method validation. [10]
- Q5)** Explain validation of the following utility service: HVAC. [20]
- Q6)** Write short note: [20]  
a) Computer system validation.  
b) Performance of UV visible spectrophotometer.



Total No. of Questions : 8]

SEAT No. :

**P3586**

[Total No. of Pages : 2

**[4750] - 26**

**M. Pharmacy (Semester - II)**  
**FORMULATIONS AND DEVELOPMENT**  
**(2008 Pattern)**

*Time : 3 Hours]*

*[Max Marks :80*

*Instructions to the candidates:*

- 1) *Question No. 1 and 5 are compulsory. Out of the remaining attempt two questions from section - I and two questions from Section - II.*
- 2) *Answers to two sections should be written in separate answer books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

**SECTION - I**

**Q1)** Explain in detail various approaches for taste masking. **[12]**

**Q2)** Explain the concept of Gastro retentive drug delivery systems. **[14]**

**Q3)** What are the characteristics of ideal package? Discuss the regulatory Perspective of selection of Pharmaceutical packaging material for various formulations. **[14]**

**Q4)** Write notes on ANY TWO: **[14]**

- a) Self emulsified drug delivery systems.
- b) Excipients used for pulsatile drug delivery systems.
- c) Buccal formulations.

**SECTION - II**

**Q5)** Discuss role of propellants in inhalation aerosols. Add a note on quality assurance of Aerosol formulation. **[12]**

**Q6)** Discuss need problems in veterinary dosage forms. Explain formulation strategy to administer veterinary dosage forms via drinking water. **[14]**

**P.T.O.**

**Q7)** Discuss in detail generation and significance of Nanopharmaceuticals. **[14]**

**Q8)** Write notes on ANY TWO: **[14]**

- a) Penetration enhancer in semisolid formulation
- b) Semisolid based on Niosomes.
- c) Metered dose inhalers.



Total No. of Questions : 6]

SEAT No. :

**P3587**

[Total No. of Pages : 2

[4750] - 27

**M.Pharmacy (Spl. Pharmaceutical Chemistry) (Semester - II)**

**DRUG DESIGN**

**(2008 Pattern) (M-II-4)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Question Nos. 1 & 4 is compulsory.*
- 2) *Answer any one question from Section - I and any one question from Section - II from the remaining.*
- 3) *Answer to the two sections should be written on separate books.*
- 4) *Figures to the right indicate full marks.*

**SECTION -I**

**Q1) a)** Enlist various physicochemical properties of drug molecule that affects the biological activity. Explain in brief about effect of ionization and hydrogen bonding on biological activity with suitable examples. **[15]**

b) Write significance of A.D.M.E in drug design. **[5]**

**Q2) a)** What are prodrugs? Write about designing of drug based on metabolism studies with examples. **[15]**

b) Bioprecursor prodrugs. **[5]**

**Q3)** Explain in brief about QSAR with its advantage and application. Discuss Hansch's Model. **[20]**

**SECTION -II**

**Q4)** Explain the concept of antagonism and enzyme inhibition were proved to be excellent tools in the process of drug design with suitable examples. **[20]**

**Q5) a)** Write a note on indirect drug design. **[10]**

b) Explain in brief about conformational search technique in CADD. **[10]**

**Q6)** Write a short note on (Any Two) :

**[20]**

- a) Three dimensional QSAR.
- b) Steric features of drug and their effects on the biological activity.
- c) Craig plot & cluster analysis.

☺ ☺ ☺ ☺

Total No. of Questions : 6]

SEAT No. :

**P3588**

[Total No. of Pages : 2

[4750] - 28

**M. Pharmacy (Semester - II)**  
**MOLECULAR PHARMACOLOGY**  
**(Spl. Pharmacology)**  
**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answer any two questions from each section.*
- 2) *Answer to the two sections should be written in separate answer books.*
- 3) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

- Q1)** a) Discuss the recent advances in drugs acting on dopamine receptors. [10]  
b) Enlist the various endogenous bioactive molecules. Add note on modulators of NO and endothelin. [10]
- Q2)** a) Discuss the recent advances in drugs acting on GABA and benzodiazepine receptors. [10]  
b) What are reactive oxygen intermediates? Explain therapeutic implications of antioxidants. [10]
- Q3)** a) Purinergic receptors and modulators. [5]  
b) Neurosteroids. [5]  
c) Glutamate receptors. [5]  
d) Transgenic animals in experimental pharmacology. [5]

**P.T.O**

## SECTION - II

- Q4)** a) Define immunopharmacology. Explain antibody mediated immunity. [10]  
b) Discuss the implications of Human Genome Mapping in Drug research. [10]
- Q5)** a) Explain the process of Apoptosis with its clinical implications. [10]  
b) Explain role of chronopharmacology on drug therapy. [10]
- Q6)** a) Cholinergic receptors. [5]  
b) Arachidonic acid derived metabolites. [5]  
c) Drugs acting on hormone receptors. [5]  
d) Sodium channel modulators. [5]





Total No. of Questions : 8]

SEAT No. :

**P3589**

[Total No. of Pages : 2

[4750] - 29

**M. Pharmacy (Semester - II)**

**NOVEL DRUG DELIVERY SYSTEM**

**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any two questions each from the Section - I and Section - II.*
- 2) *Figures to the right indicate full marks.*
- 3) *Answer to two sections must be written in separate answer books.*

**SECTION - I**

**Q1)** What is chrono therapeutics? Describe formulation of and evaluation of pulsatile drug delivery system. **[20]**

**Q2)** Describe mechanisms of transports of drugs through mucosal routes? Write a note on penetration enhancers. **[20]**

**Q3)** Give detailed account of formulation mechanisms in gastric retentive drug delivery system. **[20]**

**Q4)** Write short notes (any two) : **[20]**

- a) Influence of drug properties on design of sustained release drug delivery systems.
- b) Biodegradable microspheres.
- c) Osmotic drug delivery.

**P.T.O**

## SECTION - II

**Q5)** Describe evaluation of colon targeted drug delivery. **[20]**

**Q6)** Drug targeting using monoclonal antibodies. **[20]**

**Q7)** Describe formulation considerations for protein and peptide drugs. **[20]**

**Q8)** Write notes on (any two) : **[20]**

- a) Microbial approach for colon specific drug delivery formulation.
- b) Enhanced permeation and retention effect.
- c) Formulation of transdermal drug delivery system.



Total No. of Questions : 8]

SEAT No. :

P3590

[Total No. of Pages : 1

[4750] - 30

**M. Pharm. (Semester - II)**  
**INDUSTRIAL PHARMACOGNOSY**  
**(2008 Pattern)**

*Time :3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Q. No. 1 and Q. No. 5 are compulsory, Out of remaining solve any two from Section I and Section II.*
- 2) *Answer to the two Sections should be written in separate books.*

**SECTION-I**

- Q1)** Explain the demand for Medicinal Plants and Herbal medicine. [10]
- Q2)** Describe the export potential for Spices, Phytopharmaceutical products and Medicinal Plants used in cosmetics and aromatherapy. [15]
- Q3)** Discuss the technology involved in production of. [15]
- a) Emetine
  - b) Diosgenin
  - c) Cocaine
- Q4)** Express in brief the Global regulatory requirements for Herbal Medicines.[15]

**SECTION-II**

- Q5)** Elaborate in detail salient features of Indian Patent Act. [10]
- Q6)** Give in brief the classification of Medicinal Plants based industries for medicinal and aromatic plants in India. [15]
- Q7)** Comment on  
"Technical steps involved in extraction of Medicinal Plants" [15]
- Q8)** Clarify the contribution of Medicinal Plants in economic growth potential of India. [15]



Total No. of Questions : 8]

SEAT No. :

P3591

[Total No. of Pages : 2

[4750] - 31

M.Pharmacy (Semester - II)

QUALITY PLANNING AND ANALYSIS

(2008 Pattern)

*Time :3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:-*

- 1) *Question numbers 1 and 5 are compulsory.*
- 2) *Out of the remaining attempt any two questions from each section.*
- 3) *Answers to the two sections should be written in separate answer books.*
- 4) *Figures to the right indicate full marks.*

**SECTION - I**

*Q1)* Define 'Control' and list universal sequence of steps to achieve control.  
Add a note on self control. [12]

*Q2)* Discuss steps in structuring an audit program. Write a note on audit report.  
[14]

*Q3)* How is quality measured in manufacturing operations? Comment on  
'Quality culture'. [14]

*Q4)* Write the criteria for 'self inspection' and comment on inspection accuracy.  
[14]

*P.T.O.*

## SECTION - II

- Q5)* How is Quality related to Productivity, cost, cycle time and value? [12]
- Q6)* State two quality dimensions. What are the ways to motivate for quality as per Maslow's theory? [14]
- Q7)* What criteria must be met while setting operational goal? Highlight advantages of statistical process control. [14]
- Q8)* While developing quality culture, why is it necessary to provide evidence of management leadership? Explain the concept of Error-Proofing the process. [14]



Total No. of Questions : 8]

SEAT No. :

P3592

[Total No. of Pages : 2

[4750]-32

**M. Pharmacy (Semester - I & II)**

**ACTIVE PHARMACEUTICAL INGREDIENTS (APIS)**

**Manufacturing Technology**

**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Q. no. 1 and 5 are compulsory. Out of remaining questions solve any two questions from Section - I and any two questions from Section - II.*
- 2) *Section - I and Section - II should be answered in separate Answer books.*
- 3) *Draw well labeled diagrams wherever necessary.*

**SECTION - I**

**Q1)** Give an account of manufacturing technology by Alkylation and Hydrolysis process. [12]

**Q2)** Write detail account of manufacturing methods, flow charts for Benzocaine and Aspirin. [14]

**Q3)** Give an account of Unit process in synthesis. Discuss about fine chemicals in industry. [14]

**Q4)** Write short note on. (Any Two) [14]

- a) Heavy chemicals
- b) Nitration
- c) Biochemical process in synthesis

**P.T.O.**

## SECTION - II

**Q5)** Write an account of Industrial noise, noise measuring equipments. [12]

**Q6)** Give an account of forms of Atmospheric contaminants in manufacturing industry. [14]

**Q7)** Write detail account of Radiation hazards in manufacturing unit. [14]

**Q8)** Write short notes on (Any two): [14]

- a) Flow chart for Rifampicin
- b) Industrial centrifuges.
- c) Chemical mixtures.



Total No. of Questions : 8]

SEAT No. :

P3593

[Total No. of Pages : 2

[4750]-33

**M. Pharmacy (Semester - I & II)**

**SAFETY PHARMACOLOGY**

**(2008 Pattern)**

*[Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Q. no. 1 and 5 are compulsory. Out of remaining attempt any 2 questions from section - I & 2 questions from section - II*
- 2) *Separate answer book should be used for separate sections.*
- 3) *Figures to right indicate full marks.*

**SECTION - I**

**Q1)** Explain the new drug safety assessment as per ICH guidelines. [10]

**Q2)** Discuss in details various in vitro? In vivo studies for genotoxicity. [15]

**Q3)** Write the importance and study design for repeat dose toxicity. [15]

**Q4)** Write notes on [15]

- a) Risk benefit assessment in clinical trials.
- b) Periodic safety update reports (PSUR)

**P.T.O.**



## SECTION - II

**Q5)** Discuss the Importance, scope and principles of safety pharmacology. [10]

**Q6)** Define pharmacovigilance. Write the process of collection and reperting of pharmacovigilance data. [15]

**Q7)** Discuss in detail the study design and importance of carcinogenicity. [15]

**Q8)** Write notes on [15]

- a) Ocular toxicity testing.
- b) Analysis of safety pharmacological data.



Total No. of Questions : 8]

SEAT No. :

P3594

[Total No. of Pages : 2

[4750]-34

**M. Pharmacy (Semester - I & II)**  
**CHEMISTRY OF MEDICINAL NATURAL PRODUCTS**  
**(2008 Pattern)**

*[Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Q. no. 1 and 5 are compulsory. Out of remaining solve any two from section I and any two from section II.*
- 2) *Answers to the two sections should be written on separate answer books.*
- 3) *Figures to the right indicate full marks.*

**SECTION - I**

**Q1)** Write the biogenetic pathway for Tryptophan and Tyrosine derived alkaloids. [10]

**Q2)** Describe chemistry of Saponin glycosides and isolation of Glycerhizin. [15]

**Q3)** Focus on spectral data to explain structure of Caffein. [15]

**Q4)** Write short note on. (Any Two) [15]

- a) Secondary metabolites
- b) Analytical methods for Atropine.
- c) Cardiac glycosides.

**P.T.O.**

## SECTION - II

**Q5)** Explain the structure of Diosgenine by spectral study. [10]

**Q6)** Define and classify flavonoids. Add note on Anthocyanins. [15]

**Q7)** Classify terpenoids. Explain methods of extraction of essential oils. [15]

**Q8)** Write short note on (Any two) [15]

- a) Plant pigments
- b) Monosacharides
- c) Oleogum resins.



Total No. of Questions : 8]

SEAT No. :

P3595

[Total No. of Pages : 1

[4750]-35

**M. Pharmacy (Semester - I)**  
**NATURAL PRODUCT MANAGEMENT**  
**(2008 Pattern)**

*[Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Q. No. 1 and 5 are compulsory. Out of remaining solve any two from section I and any two from section II.*
- 2) *Answers to the two sections should be written on separate answer books.*
- 3) *Figures to the right indicate full marks.*

**SECTION I**

- Q1)* Describe the relationship between demand and supply of material in market. [10]
- Q2)* Explain management of crop using Land, Labour and Machine. [15]
- Q3)* Write a detail note on various plans by Indian Government for development of medicinal plants. [15]
- Q4)* Explain in detail the essential factors for cultivation of preoritize medicinal plants in India. [15]

**SECTION II**

- Q5)* Explain the legal method for trading of herbal cosmetics in and across the country. [10]
- Q6)* Describe in detail the procedure for patenting herbal products. [15]
- Q7)* Brief on design and development of herbal extraction unit. [15]
- Q8)* Write a detail note on trading of Nutraceuticals in international market. [15]



Total No. of Questions : 8]

SEAT No. :

P3596

[Total No. of Pages : 2

[4750] - 36

**M. Pharmacy (Semester - I)**

**CLINICAL TRIALS**

**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Question No.1 and 5 are compulsory. Solve any two questions from the remaining in section I and section II.*
- 2) *Write answers for section - I and section - II in separate answer sheets.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw well labeled diagrams wherever necessary.*

**SECTION - I**

**Q1)** Discuss various steps involved in clinical trial design. **[10]**

**Q2)** Justify role of informed consent and institutional review board in ethical conduct of clinical trials. **[15]**

**Q3)** What is new drug development process? Explain in detail different phases of clinical trials. **[15]**

**Q4)** Write short notes on (any two) **[15]**

- a) Role of FDA in clinical trial.
- b) Types of clinical research.
- c) Advantages and disadvantages of clinical trial designs.

**P.T.O**

## SECTION - II

**Q5)** Discuss Clinical trial protocol. **[10]**

**Q6)** Explain role and responsibility of various stakeholders of clinical trials. **[15]**

**Q7)** Explain concept and importance of Therapeutic drug monitoring. **[15]**

**Q8)** Write short notes on (any two) **[15]**

- a) Case report forms.
- b) ICH-GCP guidelines.
- c) Laboratory certification.



Total No. of Questions : 6]

SEAT No. :

P3597

[Total No. of Pages : 1

[4750] - 37

**M. Pharmacy (Semester - I)**

**PHARMACEUTICAL PLANT DESIGN AND OPERATIONS**

**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) Answer 2 questions from Section - I and 2 questions from Section - II.*
- 2) Answers to the two sections should be written in separate answer books.*
- 3) Neat diagrams must be drawn wherever necessary.*
- 4) Figures to the right indicate full marks.*

**SECTION - I**

**Q1)** Discuss the design, layout and operational facilities for Liquid orals. [20]

**Q2)** Discuss the design, layout and operational facilities for Capsule. [20]

**Q3)** Discuss in detail regulatory requirements of Pharma facilities with reference to cGMP. [20]

**SECTION - II**

**Q4)** What is effluent ? Write importance of effluent treatment plant. Explain in detail its design. [20]

**Q5)** Explain design of pharmaceutical plant support services. [20]

**Q6)** Explain design of water stream and compressed air as utility services. [20]



Total No. of Questions : 10]

SEAT No. :

P3598

[Total No. of Pages : 2

[4750] - 38

M. Pharm.

**MEDICINAL PLANT BIOTECHNOLOGY**

(2008 Pattern)

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *This question paper consist of two sections; Section - I and Section - II.*
- 2) *Use two separate answer books for the Section - I & Section -II.*
- 3) *Solve any four questions from section I & Solve any four questions from section II*
- 4) *Enter the question number clearly in the margin of the answer book beside each of your answer.*
- 5) *Figures to the right indicate full marks.*

**SECTION - I**

- Q1)** a) What is *Agrobacterium tumefaciens* ?  
b) Write down principle involved in the *agrobacterium tumefaciens* gene transfer to plant cell. **[10]**
- Q2)** What is Somatic embryogenesis ? What are its applications ? What are different steps required in plant regeneration via somatic embryogenesis ? Enlist the Problems associated with somatic embryogenesis. **[10]**
- Q3)** What is an 'Endemic Species' ? What is paleoendemism and neoendemism ? What is the meaning of *Ex-situ* conservation?  
What is the meaning of *In-situ* conservation ? What are benefits of *in-situ* conservation ? **[10]**

**P.T.O.**



**Q4)** Chloroplasts have their own DNA, often abbreviated as ctDNA, or cpDNA. Briefly explain Molecular structure of ctDNA, or cpDNA.

What is the translocon on the outer chloroplast membrane (TOC) & The translocon on the inner chloroplast membrane (TIC) ? [10]

**Q5)** Write short notes on (any two): [10]

- a) Polyploidy
- b) Classification of Elicitors for Production of Secondary metabolites
- c) Micro RNA
- d) A Mutation & Induced Mutation

### **SECTION - II**

**Q6)** What are Genetically modified crops (GMCs, GM crops, or biotech crops)? Write down Applications of Transgenic Plants. [10]

**Q7)** What is an Immobilized Enzyme ? What are its commercial uses ? What are different ways by which one can immobilize an enzyme. [10]

**Q8)** What are restriction enzymes ? What are its types ? [10]

**Q9)** What are Plasmids ? Write a brief note on Plasmid as vectors. What is Horizontal & Vertical gene transfer mechanism ? [10]

**Q10)** Write short note on (any two): [10]

- a) Edible vaccines: current status and future.
- b) Advances in Plant Chromosome Analysis.
- c) Papain.
- d) Bromelain.



Total No. of Questions : 6]

SEAT No. :

P3599

[Total No. of Pages :2

[4750]-39

M.Pharmacy (Semester - I)

**QUALITY CONTROL AND ASSURANCE OF  
PHARMACEUTICALS  
(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Question number 1 and 4 are compulsory. Out of remaining solve any one question from section - I and section - II.*
- 2) *Answer to the two sections should be written in separate answer book.*
- 3) *Draw well labeled diagrams wherever necessary.*

**SECTION - I**

**Q1)** Highlight various aspects of user requirement specification, design, size, construction and maintenance of dry powder mixer. **[20]**

**Q2)** a) Discuss the sources of contamination in sterile formulations and methods followed to control the contamination. **[10]**

b) Describe various aspects of self inspection. **[10]**

**Q3)** Write short note on : **[20]**

a) Master validation plan and calibration

b) Provide contents of typical Batch packaging record

**P.T.O.**

**SECTION - II**

**Q4)** Provide typical MPCR for enteric coated tablet formulation. **[20]**

**Q5) a)** Provide SOP on "Product Recall" and formats required to comply the procedure as per GMP. **[10]**

b) Describe in detail quality manual by typical pharmaceutical organisation. **[10]**

**Q6)** Write note on : **[20]**

a) IPQC in manufacturing of sterile dosage forms and QA relevance

b) Returned goods and waste materials management-Documentation and Role of QA

