Total No. of Questions : 5]

SEAT No. :

P5488

[Total No. of Pages : 2

[5553]-1001
M. Pharmacy (Semester - I)
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labelled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Discuss principle, theory, instrumentation of Nuclear Magnetic Resonance spectroscopy. Draw the possible structure of the compound (Molecular formula C_3H_7Cl) that shows one doublet and one septet in proton NMR spectrum. **[15]**

OR

Explain in detail principle and applications of HPLC. Give an account of columns, degassers, pumps and detectors used in HPLC.

Q2) Attempt any two: **[15]**

a) Discuss various Ionization used in Mass spectroscopy and give fragmentation rules. Mass spectrum of pentane produced a molecular ion peak at m/e 72. It also showed peaks at m/e 57, 43 and 29. Identify these possible fragments of pentane.

b) Explain in detail gel electrophoresis.

c) Write about principle, theory, instrumentation and applications of HPTLC.

d) Enlist various Hyphenated analytical techniques. Explain any one.

Q3) Attempt any Three: **[15]**

a) Why are IR absorption bands inverted compared to those in uv-visible spectra? Why does Hydrogen molecule not give an IR spectrum?

b) Discuss on quenching and factors affecting fluorescence intensity.

c) Write a note on Derivative spectroscopy.

d) Write comparison of flame emission and Atomic Absorption spectroscopy.

e) Write about chemical shift and spin-spin coupling and add a note on the factors influencing them.

P.T.O.

Q4) Discuss bragg's law, different X-ray methods, types of crystals and applications of X-ray diffraction. **[15]**

OR

Write in detail principle, instrumentation, applications of Differential Thermal Analysis. Write a note on Derivative Differential Thermal Analysis. (DDTA.)

Q5) Write short notes on (any three) **[15]**

a) Ion selective electrodes.

b) Detectors in GC.

c) FTIR.

d) Thermo gravimetric analysis (TGA).

e) Principle and factors affecting separation of paper Electrophoresis.

Total No. of Questions : 5]

SEAT No. :

P5489

[Total No. of Pages : 2

[5553]-1002
M. Pharmacy (Semester - I) (Pharmacognosy)
(MPG - 101T) MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Give principle of FT-NMR and 13C NMR, with their applications in herbal research. **[15]**

OR

Discuss fundamental principle and various techniques of affinity chromatography. Describe different components used in affinity medium.

Q2) Attempt any two: **[15]**

a) Describe use of quantitative TLC in quantitation of phyto constituents

b) Illustrate various designs and modules of DSC along with its applications.

c) Explain various ionization techniques and mass analyzers in mass spectroscopy.

d) Elaborate types of fundamental vibrations in IR along with factors affecting on it

Q3) Attempt any Three: **[15]**

a) Explain choice of solvent and solvent effect in UV-VIS spectroscopy.

b) Enlist and explain and explain different solid sampling techniques in IR spectroscopy.

c) Describe principle and applications of Atomic Absorption Spectroscopy (AAS).

d) Explain principle and instrumentation of Flame Emission Spectroscopy (FES).

e) Give an account on types of ions formed in mass spectroscopy.

P.T.O.

Q4) Describe production of X-rays, methods of X-ray diffraction and significance of Bragg's law in finding crystal nature. **[15]**

OR

Describe principle, instrumentation and applications of Ultra Performance Liquid Chromatography (UPLC).

Q5) Write short notes on (any three) **[15]**

a) Instrumentation and applications of UV-VIS spectrophotometry.

b) Iso-electric Focusing.

c) Moving boundary electrophoresis.

d) Electrodes in potentiometry.

e) Factors having influence on Fluorescence.

Total No. of Questions : 5]

SEAT No. :

P5490

[Total No. of Pages : 2

[5553]-1003
M. Pharmacy (Pharmaceutics) (Semester - I)
(MPH 101T) MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (Theory)
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory. Internal choices are given.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagram and structures wherever necessary.***
4) ***Do not write anything on the question paper.***

Q1) Define chromatography. Enlist different types of chromatography. Elaborate on instrumentation and application of HPLC. **[15]**

OR

Explain the principle of UV-Visible Spectroscopy. Elaborate on instrumentation of double beam spectrophotometer. Add a note on type of transition of organic and inorganic molecule.

Q2) Attempt any two: **[15]**

a) Discuss principle and instrumentation of IR spectroscopy

b) Discuss general principle of flame photometry and add note on pharmaceutical applications of flame photometry.

c) Elaborate on detectors use in gas chromatography

d) Assign the structure to compound for the compound having spectral character:

Molecular weight: 58

UV: no absorption maxima above 210 nm.

IR: 2941-2857cm^{-1} CH stretch for alkene, 1458cm^{-1} CH bending.

NMR: δ-2.75 (quintet, J-7.1 cps, 14.6 squares) and

δ-4.75 (triplet, J-7.1 eps, 29.4 squares)

P.T.O.

Q3) Attempt any Three: **[15]**

a) Discuss applications of gas chromatography.

b) Elaborate on principle and applications of column chromatography.

c) Elaborate on atomic absorption spectroscopy.

d) Explain factors affecting fluorescence.

e) Compare between dispersive IR and FTIR.

Q4) Outline the fundamental principle underlying the mass spectrometry. Explain Mc Lafferty rearrangement and add a note on formation of metastable ions.**[15]**

OR

Discuss in detail principle and instrumentation of NMR spectroscopy.

Q5) Write short note on (any three) **[15]**

a) ELISA.

b) Application of X-ray diffraction.

c) Paper chromatograph.

d) Thin layer chromatography.

e) Zone electrophoresis.

Total No. of Questions : 5]

SEAT No. :

P5491

[Total No. of Pages : 2

[5553]-1004
M. Pharmacy (Semester - I) (Pharmacology)
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory. Internal choices are available***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except genuine seat number.***

Q1) Classify various techniques in chromatography. Draw a neat labeled diagram of an ideal chromatogram obtained in HPLC analysis of a two-component sample and label following parameters: Rt, 2σ, V_0, and K. **[15]**

OR

Draw a well labeled diagram of an instrument for Nuclear Magnetic Resonance spectrophotometer, and a high resolution spectrum obtained from PMR analysis of ethanol.

Q2) Attempt any two: **[15]**

a) Enlist the Factors affecting the chemical shift in a PMR spectrum.

b) Explain the process of 'Tailing' in HPLC. Give measures to overcome the problem.

c) Explain the term UV-cut off in the context of UV-spectroscopy. Give its significance.

d) Differentiate between HPLC and HPTLC.

Q3) Attempt any Three: **[15]**

a) What is a capacity factor? How to calculate it?

b) What is the significance of isotopic abundance in interpreting mass spectra?

c) Give detail account on combination bands in IR spectrum.

d) Enlist different types of ionization techniques in mass spectrometry.

e) Explain the process of Ion-exchange chromatography.

P.T.O.

Q4) Write detail account on stationary phases used in HPLC. HPTLC and GC. Give characteristic features of each. **[15]**

OR

Give the principle and working of Ion selective electrodes and write about pharmaceutical applications of potentiometry.

Q5) Write short note on (any three) **[15]**

a) C^{13} NMR

b) HEPT

c) DSC

d) Capillary electrophoresis

e) Applications of X-ray crystallography.

Total No. of Questions : 5]

SEAT No. :

P5492

[Total No. of Pages : 2

[5553]-1005
M. Pharmacy (Semester - I)
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on the question paper except seat number.***

Q1) Write principle of Infra - Red spectroscopy. Discuss instrumentation of FTIR. What are advantages of FTIR over dispersive IR? **[15]**

OR

Write principle of Flame Emission Spectroscopy. Discuss any two burners used in FES. Comment on ways to minimize interferences in FES.

Q2) Attempt any two: **[15]**

a) What factors should be considered while selecting solvent for UV spectroscopy experiment? What is the effect of solvent polarity on λmax value?

b) Explain the concept of spin-spin coupling in NMR with suitable examples.

c) Give an exhaustive account of APCI and ESI in Mass Spectrometry. What are different X-ray methods?

Q3) Attempt any Three: **[15]**

a) Explain the term "Coupling constant" using suitable examples.

b) What is the principle of Affinity chromatography?

c) Discuss factors affecting separation of mixture of components by GC.

d) Discuss principle and instrumentation of paper electrophoresis.

e) Radiation source in AAS.

P.T.O.

Q4) Write principle, instrumentation and applications of HPLC. **[15]**

OR

State principle and instrumentation of NMR. Add note on Magnetic Anisotropy.

Q5) Write short note on (any three) **[15]**

a) Quantum efficiency of fluorescence.

b) Columns in Gas chromatography.

c) Applications of X-ray diffraction.

d) McLafferty rearrangement.

e) Isoelectric focusing.

Total No. of Questions : 5]

SEAT No. :

P5493

[Total No. of Pages : 2

[5553]-1006
M. Pharmacy (Semester - I) (Pharmaceutical Chemistry)
ADVANCED ORGANIC CHEMISTRY- I
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Discuss briefly the following reactions with mechanism and giving relevant applications involved in the synthesis of drugs. **[15]**

a) Pinner Pyrimidine synthesis.

b) Bernthsen acridine synthesis.

c) Traube purine synthesis.

OR

Outline the mechanism and discuss the synthetic importance of the following:

a) Mannich reaction.

b) Brook rearrangement.

c) Ozonolysis.

Q2) Attempt any two: **[15]**

a) Explain the preparation, salient features of Aluminium Isopropoxide and diazopropane explain their applications in organic synthesis.

b) Discuss Stereochemistry and factors that influence the mechanism of bimolecular substituents.

c) Write synthesis of Miconazole and Quinine.

P.T.O.

Q3) Attempt any Three: **[15]**

a) Explain any two methods of determining reaction mechanisms.

b) Explain Combes Quinoline synthesis and Traube Purine Synthesis.

c) Strategies for synthesis of four membered ring systems through synthon approach.

d) Explain unimolecular elimination reaction with example.

e) Explain the preparation, salient features of diazomethane and mention its applications in organic synthesis.

Q4) Write synthesis of Metronidazole; Triamterene & Alprazolam. **[15]**

OR

Explain protection for Amino & Amino acids with suitable example.

Q5) Write short note on (any three) **[15]**

a) Discuss stability of carbanions.

b) Write a note on free radicals.

c) Explain Synthetic application of Wilkinson and Wittig reagent.

d) Discuss the Ugi reaction and its synthetic applications.

e) Write a note on sharpless asymmetric epoxidation with example.

Total No. of Questions : 5]

SEAT No. :

P5494

[Total No. of Pages : 2

[5553]-1007
M. Pharmacy (Semester - I) (Pharmacognosy)
MPG 102 T : ADVANCED PHARMACOGNOSY - I
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Discuss AYUSH guidelines for safety monitoring of natural medicine. **[15]**

OR

Discuss occurrence, isolation and characteristic features of flavonoids.

Q2) Attempt any two: **[15]**

a) Write method of isolation, chemical properties and medicinal and health benefits of Taxol

b) Discuss in detail Marine toxins.

c) Discuss the Current trends and future scope of neutraceuticals.

d) Write a note on Current good cultivation and collection practices.

Q3) Attempt any Three: **[15]**

a) Discuss the importance of pharmacognosy in herbal drug industry.

b) Discuss antioxidants as neutraceuticals.

c) Explain the isolation, medicinal and health benefits of Vitamins.

d) Write a note on Garlic

e) Discuss on Conservation of medicinal plants.

P.T.O.

Q4) Discuss the current trends and future scope of neutraceuticals. Add a note on green and herbal Tea. **[15]**

OR

Write method of isolation, chemical properties and medicinal and health benefits of

a) Shatavarins

b) Andrographolide

Q5) Write short note on (any three) **[15]**

a) Spirulina.

b) Carotenoids.

c) Regulatory aspects of neutraceuticals.

d) Isolation and uses of andrographolide.

e) Formulation of neutraceuticals.

Total No. of Questions : 5]

SEAT No. :

P5495

[Total No. of Pages : 2

[5553]-1008
M. Pharmacy (Semester - I) (Pharmaceutics)
DRUG DELIVERY SYSTEMS
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Discuss in detail challenges faced in ocular drug delivery and nanotechnology based ocular delivery systems. **[15]**

OR

Discuss various approaches for formulating gastro retentive drug delivery system.

Q2) Attempt any two: **[15]**

a) Write in detail about ophthalmic inserts.

b) Discuss formulation approaches for protein/peptide delivery.

c) Discuss structure of buccal mucosa and barriers to penetration across buccal mucosa.

d) Discuss feedback regulated drug delivery systems.

Q3) Attempt any Three: **[15]**

a) What is the drug selection criteria for transdermal drug delivery system (TDDS). Enumerate advantages and disadvantages of TDDS.

b) Explain the mechanisms of mucoadhesion.

c) Elaborate upon role of Ion exchange resins as controlled drug delivery carriers.

d) Discuss mechanism of action of penetration enhancers.

e) Elaborate upon “polymers used in mucoadhesion”.

P.T.O.

Q4) Discuss mechanism of drug release from SR/CR formulations. **[15]**

OR

Elaborate on the techniques for formulation of transdermal drug delivery system

Q5) Write short notes (any three) **[15]**

a) Microneedles.

b) Theriform Technology (3D Printing technology).

c) Personalised medicine.

d) Raft forming systems.

e) Mucosal delivery of vaccines.

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Total No. of Questions : 5]

SEAT No. :

P5496

[Total No. of Pages : 2

[5553]-1009
M. Pharmacy (Semester - I) (Pharmacology)
MPL-102T: ADVANCED PHARMACOLOGY - I
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except your number.***

Q1) Classify antihypertensive drugs. Explain the pharmacology of drugs acting on renin angiotensin system. **[15]**

OR

Classify sedatives and hypnotics. Give a detail account on the pharmacology of Benzodiazepines. **[15]**

Q2) Attempt any two: **[15]**

a) Classify antiparkinsonian drugs. Describe the pharmacology of L-dopa.

b) Classify antihyperlipidemic agents. Explain the therapeutic utility of statins in hyperlipidemia.

c) Describe the pharmacology of thiazide diuretics.

d) Explain the pharmacology of oral anticoagulants.

Q3) Attempt any Three: **[15]**

a) Write a note on Histamine.

b) Give an account on G-protein coupled receptors.

c) Write about stages of general anaesthesia.

d) Explain the pharmacology of vasodilators.

e) Give an account on haematinics.

P.T.O.

Q4) Give a detailed account on pharmacology of adrenaline. **[15]**

OR

Classify opioid analgesics. Explain in detail pharmacology of morphine.

Q5) Write short notes on (any three) **[15]**

a) Biotransformation of drug.

b) Pharmacology of 1-Dopa.

c) GABA.

d) 5 HT-antagonists.

e) Organophosphate compounds poisoning.

Total No. of Questions : 5]

SEAT No. :

P5497

[Total No. of Pages : 2

[5553]-1010
F.Y. M. Pharmacy (Pharmaceutical Quality Assurance)
QUALITY MANAGEMENT SYSTEM
(2018 Pattern) (Semester - I)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Explain the steps involved in ISO 9000 certification. What is ISO 9001: 2008? **[15]**

OR

Explain the customers' perception of quality. Explain dimensions of product and service quality. **[15]**

Q2) Attempt any two: **[15]**

a) Explain cost of quality and models of cost of quality

b) Highlight the process of quality risk assessment.

c) Explain IPQC testing

d) Discuss benchmarking process

Q3) Attempt any Three: **[15]**

a) Elaborate concept of process capability.

b) Explain role of self inspection in pharmaceutical quality management

c) Discuss need and implementation of vendor certification process.

d) Define and give the advantages of statistical process control

e) Describe HACCP in brief.

P.T.O.

Q4) Describe the principles, types and applications of six sigma. **[15]**

OR

Discuss ICH Q10 guidelines

Q5) Write short note on any four: **[15]**

a) McKinsey 7S Model

b) Line Clearance

c) Quality by Design

d) NABL Certification

e) Out of specifications

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Total No. of Questions : 5]

SEAT No. :

P5498

[Total No. of Pages : 2

[5553]-1011
M. Pharmacy
PHARMACEUTICAL CHEMISTRY
MPC 103T : Advanced Medicinal Chemistry
(2018 Pattern) (Semester - I) (Theory)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Give the classification and detail account of first generation H_1 receptor antagonists. **[15]**

OR

Discuss about Target identification and validation in drug development. What are the challenges encountered in developing a clinically useful drug? **[15]**

Q2) Attempt any two: **[15]**

a) Describe anticonvulsants interacting with $GABA_A$ receptor.

b) Give focus on antineoplastic antibiotics.

c) Classify antivirals with suitable example. Write chemistry and mode of action of amantadine.

d) Theories of drug receptor interaction.

Q3) Attempt any Three: **[15]**

a) Comment on neuraminidase inhibitors as antivirals

b) What is drug resistance? Explain its causes in light of antibiotics.

c) Explain lead identification and optimization.

d) How aspirin is selective COX_1 antagonist? Write mode of action of salicylates.

e) Explain chemistry of prostaglandins.

P.T.O.

Q4) Classify antihypertensive agents with examples and mechanism of action. Give an account of calcium channel blockers. **[15]**

OR

Which are the types of peptidomimetics? Explain functional mimetics with examples. Add a short note on designing of peptidomimetics.

Q5) Write short notes on (any three) : **[15]**

a) Carrier linked prodrugs.

b) Stereochemistry and pharmacokinetics of drug.

c) Selective α-adrenergic antagonists.

d) ACE inhibitors as antihypertensive agents.

e) Explain the significance of High Throughput Screening in drug development.

Total No. of Questions : 5]

SEAT No. :

P5499

[Total No. of Pages : 2

[5553]-1012
F.Y. M. Pharmacy (Semester - I)
PHYTOCHEMISTRY
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***All questions are compulsory.***

Q1) Elaborate a detail account of spectroscopic characterization for structural elucidation of Glycyrrhizin. **[15]**

OR

Elaborate a detail account of phytochemical finger printing in the characterization of herbal extracts using LCMS along with its application in structure elucidation of phytoconsituents.

Q2) Attempt any two: **[15]**

a) Explain in detail the lead structure selection process and structure development in drug discovery and development.

b) Explain isolation, purification, characterization and industrial importance of Bacosides.

c) Explain in detail separation of phytoconstituents by preparative HPLC.

d) Elaborate a detail account of spectroscopic characterization of Nicotine for structural elucidation.

Q3) Attempt any three: **[15]**

a) Explain isolation, purification and industrial importance of guggulosterone.

b) Explain in detail spectroscopic characterization for structural elucidation of citral.

c) Explain application of HPTLC in characterization of herbal extracts.

d) Provide principle and working of microwave assisted extraction.

e) Explain in detail drug registration.

P.T.O.

Q4) Describe in detail principle, working, Applications of CCCET along with its merits and demerits. **[15]**

OR

Describe in detail Biosynthesis, isolation, purification, characterization and industrial importance of piperine.

Q5) Write short note on (any three) : **[15]**

a) Artemesin in drug discovery and development.

b) Umbelliferone.

c) Structural Elucidation of Ka empferol.

d) Methods of fractionation.

e) Protocol design for clinical studies of head molecules.

Total No. of Questions : 5] **SEAT No. :**

P5500 **[Total No. of Pages : 2**

[5553] - 1013
M.Pharmacy (Semester - I)
MPH 103T - MODERN PHARMACEUTICS
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) What is the importance of preformulation studies? Explain preformulation studies for dispersion. Give an account of theories of dispersion. **[15]**

OR

Define Validation. Discuss Validation and Calibration of Master plan.

Q2) Answer **any two** : **[15]**

a) Discuss cGMP requirements regarding building premises, sanitation and hygiene for pharmaceutical products.

b) Differentiate between compression and consolidation. Highlight effect of friction and discuss about distribution of forces in compression and consolidation.

c) Explain validation using any one unit process in the manufacture of solid dosage form.

d) Explain ICH & WHO guidelines for calibration and validation of equipments.

P.T.O.

Q3) Attempt **any three** : **[15]**

a) Drug excipients compatibility studies.

b) TQM.

c) Sales forecasting.

d) Heckel plot.

e) Concept and objectives of stability of pharmaceuticals.

Q4) Describe the use of 'students T-test' and 'standard deviation' in evaluation of data. **[15]**

OR

Describe briefly the importance of experimental design. Add note on contour plots.

Q5) Write short notes on **any three** : **[15]**

a) Stability testing.

b) Inventory management and control.

c) Handling of rejected material.

d) Application of Factorial designs in formulation.

e) Physics of tablet compression.

Total No. of Questions : 5]

SEAT No. :

P5501

[Total No. of Pages : 2

[5553] - 1014

M.Pharmacy (Semester - I)

PHARMACOLOGY

MPL 103T - Pharmacological and Toxicological Screening Methods - I

(2018 Pattern)

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***

Q1) Discuss the various methods employed in the screening of anti-hypertensive agents. **[15]**

OR

Discuss the various methods employed in the screening of anti-inflammatory agents. **[15]**

Q2) Attempt **any two** : **[15]**

a) Describe in detail the different in vivo models employed in the screening of anti-arrhythmic drugs.

b) Discuss the various methods employed in the screening of anti-diabetic agents.

c) Discuss the various methods employed in the screening of analgesic agents.

d) Describe the screening methods for anti-parkinsonian agents.

P.T.O.

Q3) Attempt **any three** : **[15]**

a) Write the screening methods of anti-emetic drugs.

b) Describe the advantages of alternative experimental models.

c) Write the screening methods for antipsychotic agents.

d) Write the screening methods for hepatoprotective agents.

e) Explain various methods used in screening of immunomodulators.

Q4) Discuss the various methods employed in the screening of antiepileptic agents. **[15]**

OR

Discuss the various methods employed in the screening of sedative, hypnotic and anxiolytic agents. **[15]**

Q5) Write short note on **any three** : **[15]**

a) Transgenic animals.

b) General principles of bioassay.

c) Screening methods of nootropics.

d) CPCSEA guidelines.

e) Immunoassay.

Total No. of Questions : 5]

SEAT No. :

P5502

[Total No. of Pages : 2

[5553] - 1015

M.Pharmacy (Semester - I)

PHARMACEUTICAL QUALITY ASSURANCE

MQA 103T - Quality Control and Quality Assurance

(2018 Pattern) (Theory)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) What is Pharmaceutical manufacturing documentation? Write about objectives, importance and storage of documents. **[15]**

OR

Explain IPQC and FPQC for capsule dosage form in Pharma Industry according to Indian Pharmacopoeia.

Q2) Attempt **any two** : **[15]**

a) Discuss the components of Quality Assurance and Quality Control.

b) Comment on scope and importance of various intellectual property rights.

c) Explain Purchase specifications and maintenance of stores for raw materials.

d) Write principle of Quality Audit. How checklists are important during audits?

P.T.O.

Q3) Attempt **any three** : **[15]**

a) State precautions to avoid mix-ups and cross contamination during manufacturing.

b) Write a note on "Waste and Scrap disposal".

c) Discuss significance of Calculation of yield at various stages of manufacturing.

d) State procedure of release of finished goods.

e) Briefly describe the importance of Training in Pharmaceutical manufacturing.

Q4) Discuss in detail CPCSEA guidelines for non clinical testing along with protocol for the same. **[15]**

OR

Discuss in detail the location, design and plant layout of Pharmaceutical industry.

Q5) Write short note on **(any three)** : **[15]**

a) Three tier documentation.

b) Drug Product salvaging.

c) CTD and eCTD.

d) Environmental control in sterile areas.

e) Time limitations on Production.

Total No. of Questions : 5]

SEAT No. :

P5503

[Total No. of Pages : 2

[5553] - 1016

M.Pharmacy (Pharmaceutical Chemistry) (Semester - I)

MPC-104T : CHEMISTRY OF NATURAL PRODUCTS

(2018 Pattern) (Theory)

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Draw well labelled diagrams wherever necessary.***
4) ***Do not write anything on the question paper except seat number.***

Q1) What are alkaloids? Explain general methods of isolation and classification of alkaloids with examples from each class. Elucidate the structure of reserpine. **[15]**

OR

What are terpenoids? Explain isolation methods and classification of terpenoids with examples. Comment on isoprene rule and general methods of structural elucidation of drugs containing terpenoids. **[15]**

Q2) Attempt any two : **[15]**

a) What are glycosides? Explain chemistry of cardiac glycosides.

b) Write elaborative note on neuromuscular blocking drugs.

c) Write elaborative note on macrolidantibiotics.

d) Discuss chemistry of Adrenocorticoids.

P.T.O.

Q3) Attempt **any three** : **[15]**

a) Write note on curare alkaloids.

b) Note on β-lactum antibiotics.

c) Explain principle of RNA and DNA estimation.

d) Elucidate structure of morphine.

e) Explain active chemical constituents of curcuma longa with antitumor view point.

Q4) What are flavonoids? Explain general methods of structure determination of flavonoids. Elucidate structure of quercetin. **[15]**

OR

What is gene therapy? Write elaborative note on gene therapy. Explain various advancement of gene therapy and various applications of gene therapy. **[15]**

Q5) Write short note on any three : **[15]**

a) Explain physiological importance of Vitamin A and Vitamin C.

b) Explain chemical constituents of Swertia chiratain diabetic therapy.

c) Explain significance of IR spectroscopy in structure elucidation.

d) Comment on stereochemistry and structure elucidation of ephedrine.

e) Comment on natural CNS drugs.

Total No. of Questions : 5]

SEAT No. :

P5504

[Total No. of Pages : 2

[5553] - 1017

M.Pharmacy (Pharmacognosy) (Semester - I)

MPG 104T - INDUSTRIAL PHARMACOGNOSTICAL TECHNOLOGY

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labelled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Describe WHO guidelines for quality assessment of herbal drugs. **[15]**

OR

Describe Indian and international patent laws and amendments applicable to herbal and natural products and their process. **[15]**

Q2) Attempt **Any Two** : **[15]**

a) Explain national and international regulatory status of herbal drugs.

b) Write note on Foreign Trade Policy of India.

c) How stability testing of natural products is performed?

d) What are set of international standards on quality management?

P.T.O.

Q3) Attempt **Any Three** : **[15]**

a) Describe Procedure for Indian Patent filing.

b) What are pilot plant and scale up techniques?

c) What are Rights of patents?

d) How natural local resources are protected legally?

e) What are the methods of selecting projects?

Q4) Describe in detail about the Good Manufacturing Practices (GMP) for the production of herbal formulations. **[15]**

OR

Explain requirements of herbal industry involved in production of phytomedicines. **[15]**

Q5) Write short note on **Any Three** : **[15]**

a) Monograph of herbal drugs.

b) Constraints of herbal formulations.

c) Total Quality Management.

d) Plant Design Steps.

e) Trade-Related Aspects of Intellectual Property Rights.

Total No. of Questions : 3]

SEAT No. : ____

P5505

[Total No. of Pages : 2

[5553] - 1018

M.Pharmacy (Semester - I)

REGULATORY AFFAIRS

(2018 Pattern)

Time : 3 Hours ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures at right indicate full marks.***

Q1) Answer the following : **[20]**

a) What kind of application can be submitted as a 505(b)(2) application?

b) Highlight the examples of changes to approved drug products for which 505(b)(2) application should be submitted?

c) Give the chemical classification codes for NDA.

d) What are the differences between NDA and 505 (b)(2) application?

e) What is a Marketing Authorization Application?

f) Explain what is an ASMF.

g) What are the types of active substances for which ASMFs are submitted?

h) Give the difference between DMF and ASMF (with respect to submission).

i) What is ICH?

j) Focus on CTD.

P.T.O.

Q2) Solve **Any Two** : **[20]**

a) Give the regulatory requirements for product approval API and Biologics.

b) Give detail account on Investigator Brochure (IB).

c) Explain in details about Regulation for combination products and medical devices.

Q3) Answer the following **Any Five** : **[35]**

a) Regulatory requirements of EU.

b) ICH guidelines for S.

c) Give DMF and its types.

d) Institutional review board.

e) Note on CRO.

f) ICH guidelines of M.

g) Focus on various regulatory agencies for the drug.

Total No. of Questions : 5]

SEAT No. :

P5506

[Total No. of Pages : 2

[5553] - 1019

M.Pharmacy (Pharmacology) (Semester - I)

CELLULAR & MOLECULAR PHARMACOLOGY

(2018 Pattern)

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Define Pharmacogenomics. Explain in details the role of genetic variation in Pharmacology. **[15]**

OR

Define and classify receptors. Discuss in detail molecular structure and signal transduction via GPCRs. **[15]**

Q2) Attempt **Any Two** : **[15]**

a) Explain the role of Caspases in apoptosis.

b) Explain in detail principles and applications of cell viability assay.

c) Discuss the techniques for western blot with its applications.

d) Write detailed account on gene therapy and its clinical applications.

P.T.O.

Q3) Attempt **Any Three** : **[15]**

a) Explain in detail gene expression and its regulation.

b) Write the types of immunotherapeutic.

c) Discuss in details cell cycle and its regulation.

d) Explain the principles and applications of flow cytometry.

e) Discuss in detail intercellular signaling.

Q4) Discuss the principles and applications of recombinant DNA technology. **[15]**

OR

Explain the types of ELISA with its advantages and disadvantages. Write note on its applications. **[15]**

Q5) Write short note on **Any Three** : **[15]**

a) JAK/STAT Signaling pathway.

b) Organization of genome.

c) Humanization of antibody therapy.

d) Nitric Oxide Signaling.

e) SDS PAGE.

Total No. of Questions : 5]

SEAT No. :

P5507

[Total No. of Pages : 2

[5553] - 1020

M.Pharmacy (Pharmaceutical Quality Assurance) (Semester - I)

MQA 104T - PRODUCT DEVELOPMENT & TECHNOLOGY TRANSFER

(2018 Pattern)

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) What is product registration? Discuss registration of bulk drugs and finished formulations in India as per CDSCO. **[15]**

OR

How is technology transferred from R & D to production? Give detailed overview of various quantitative models in technology transfer.

Q2) Attempt **Any Two** : **[15]**

a) What are Phase IV studies? How do they differ from Phase I/II/III clinical studies.

b) What is importance of Technology Transfer? What are the factors influencing Technology Transfer?

c) Write a note on medical Device packing.

d) Discuss the challenges in scale up of new drug products.

P.T.O.

Q3) Attempt **Any Three** : **[15]**

a) What is polymorphism? Discuss any two techniques for evaluation of crystal properties.

b) Describe the registration guidelines for dosage forms as per USFDA.

c) Enlist types of Pharmaceutical Packaging. Discuss any two Quality control tests for secondary packing material.

d) Discuss various issues faced in modern drug packaging.

e) Differentiate INDA, ANDA and NDA.

Q4) What are SUPAC and BACPAC? Discuss in detail SUPAC guidelines for changes in formulation, site, equipment and process along with suitable examples. **[15]**

OR

Describe large scale manufacturing techniques including formula, equipment, process, stability and quality control for semi solid dosage forms in detail.

Q5) Write short notes on **Any Three** : **[15]**

a) Quality control tests for plastic and rubber container-closure systems.

b) Qualitative technology models for technology transfer.

c) Importance of micromeretics and flow properties in preformulation.

d) SUPAC.

e) Design of Pilot plant.

Total No. of Questions : 5] **SEAT No. :**

P5508 **[Total No. of Pages : 3**

[5553] - 2001

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

MPC 201T - ADVANCED SPECTRAL ANALYSIS

(2018 Pattern)

Time : 3 Hours ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right side indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***

Q1) Discuss the mass fragmentation patterns for the following class of organic compounds **[15]**

a) Alcohols.

b) Alkyl benzenes.

c) Carbonyl compounds.

OR

Give mass fragmentation patterns for the following compounds.

a) n-Butane.

b) Benzaldehyde.

c) Cyclohexanone.

d) Benzamide.

Q2) Attempt **Any Two** : **[15]**

a) Predict and explain the NMR spectra of following compounds

i) m-cresol.

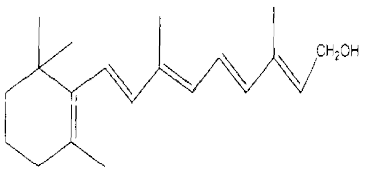
ii) p-anisidine.

iii) butanol.

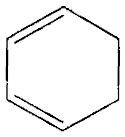
iv) 2-chloropropane.

P.T.O.

b) The UV spectra of following compounds displayed λ max at 256, 318, 282 and 325 nm. Assign the appropriate λ max for the compounds shown below with justification.



A



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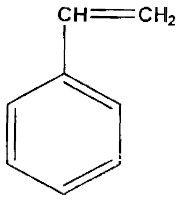
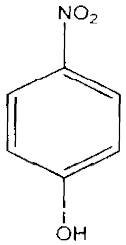


C

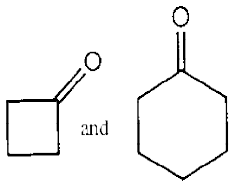


D

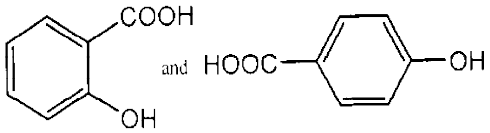
c) Discuss NOESY and COSY techniques.

d) How will you distinguish between following pairs of compounds on the basis of IR spectroscopy?

1)



2)



Q3) Attempt **Any Three** : **[15]**

a) How will you calculate the wavelength of maximum absorption for dienes using Woodward's rule?

b) Write a note on Mc-Lafferty rearrangement.

c) Discuss suitable atmospheric pressure ionization interfaces in LC-MS.

d) 1-3, pentadiene absorbs at higher wavelength in UV spectroscopy than 1,4 pentadiene. Explain.

e) Write a note on TGA.

Q4) **Answer the following** : **[15]**

a) Elucidate the structure of the unknown organic compound from following data.

Molecular formula : C_8H_8O

IR : 1703cm^{-1}, 2733cm^{-1}, 2828cm^{-1}, 2922cm^{-1}, 3048cm^{-1}.

^{1}H NMR : 2.4 δ (singlet, 3H)

7.3-7.8 δ (symmetric multiplets, 4H)

9.9 δ (singlet, 1H)

b) Write a detailed note on 2D NMR.

OR

Answer the following :

Explain in detail principle, instrumentation and applications of HPTLC.

Q5) Write short notes on **Any Three** : **[15]**

a) Write a note on radioimmunoassay of digitalis.

b) Discuss how LC-FTIR technique can assist in structural elucidation of an unknown compound.

c) Explain the instrumentation in SFC.

d) Add a note on Raman spectroscopy.

e) Explain instrumentation and applications of DSC.

Total No. of Questions : 5]

SEAT No. :

P5509

[Total No. of Pages : 2

[5553] - 2002

M.Pharmacy (Semester - II)

PHARMACOGNOSY

MPG 201T - Medicinal Plant Biotechnology

(2018 Pattern)

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to right indicate full marks.***
3) ***Draw well labelled diagram wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Describe different plant tissue culture techniques and role of plant tissue culture in biosynthesis of secondary metabolites. **[15]**

OR

Describe in detail enzyme immobilization and its applications.

Q2) Attempt **Any Two** : **[15]**

a) Explain recombinant DNA technique.

b) What is protoplast? Explain isolation and culture of protoplast.

c) What are applications of biotechnology in Pharmacognosy?

d) What is organogenesis? Describe factors affecting organogenesis.

P.T.O.

Q3) Attempt **Any Three** : **[15]**

a) Write about RAPD markers for genetic mapping.

b) What are gene transfer techniques in transgenic plants?

c) What are different parameters that can be measured during bioprocessing?

d) What are applications of rDNA technology in pharmaceutical field?

e) Write note on 'Biosensors'.

Q4) How secondary metabolite production in plant cell culture is manipulated? **[15]**

OR

What are different types of bioreactors used in fermentation technique for production of secondary metabolites?

Q5) Write short notes on **Any Three** : **[15]**

a) Hairy root culture.

b) RFLP.

c) Gene sequencing.

d) Molecular pharmacognosy.

e) Transgenic plants.

Total No. of Questions : 5]

SEAT No. :

P5510

[Total No. of Pages : 2

[5553] - 2003

M.Pharmacy (Pharmaceutics) (Semester - II)

(MPH 201T) MOLECULAR PHARMACEUTICS (Nano Tech. and Targeted DDS)

(2018 Pattern)

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Compare and Contrast various approaches for development of novel drug delivery systems. **[14]**

Q2) Solve any two : **[2 x 8 = 16]**

a) Describe barriers to brain targeted drug delivery system.

b) What are the advantages of Dry Powder Inhalers?

c) Describe different techniques for preparation of nano particles with special reference to large scale manufacturing.

Q3) Write Short Notes on (any three) : **[3 x 5 = 15]**

a) Monoclonal Antibodies.

b) Therapeutic antisense molecules.

c) Propellents.

d) Intra Nasal Route.

P.T.O.

Q4) Explain pressurized meter dose inhalers with reference, to formulation, packaging and evaluation. **[15]**

Q5) Explain in detail gene therapy. **[15]**

Total No. of Questions : 5]

SEAT No. : ____

P5511

[Total No. of Pages : 2

[5553] - 2004

M.Pharmacy (Semester - II)

MPL 201T - ADVANCED PHARMACOLOGY - II

(2018 Pattern)

Time : 3 Hours ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Explain in detail mode of action, mechanism for development of resistance, adverse effects and therapeutic uses of Penicillins. **[15]**

OR

Classify anticancer agents with examples. Discuss in detail pharmacology of alkylating agents.

Q2) Attempt any **TWO** questions : **[15]**

a) Write in detail pharmacotherapy of bronchial asthma.

b) Discuss mode of action, adverse effects and therapeutic uses of Ciprofloxacin.

c) Describe role of immunomodulatory in Immunopharmacology.

P.T.O.

Q3) Attempt any **THREE** questions : **[15]**

a) Classify antiemetic drugs. Write pharmacology of prokinetic agents.

b) Explain in detail clinical practice guidelines of Tuberculosis.

c) Describe mode of action, toxicities and uses of aminoglycoside antibiotics.

d) Give a detailed account on oral hypoglycemic agents.

e) Explain role of parathyroid hormone, calcitonin and vitamin D in maintaining calcium homeostasis.

Q4) Classify antiviral agents. Discuss in detail pharmacotherapy of HIV. **[15]**

OR

Write pharmacological actions, mode of action, adverse effects and therapeutic applications of Corticosteroids.

Q5) Write short note on **Any Three** : **[15]**

a) Oral contraceptives.

b) Antithyroid agents.

c) Explain the therapeutic applications of antioxidants.

d) Management of constipation.

e) Imidazoles as antifungal agent.

Total No. of Questions : 5]

SEAT No. :

P5544

[Total No. of Pages : 2

[5553]-2005

M. Pharmacy (Pharmaceutical Quality Assurance) (Semester - II)

HAZARDS AND SAFETY MANAGEMENT (MQA - 201T)

(2018 Pattern)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Define Industrial hazard and risk. Discuss sources of fire hazards and control strategy for preventive and protective management from fires and explosions. **[15]**

OR

Discuss in detail the air circulation maintenance in pharmaceutical company for sterile area. Add a note on HVAC system.

Q2) Attempt any Two : **[15]**

a) Explain in detail the TLV concept. Discuss its significance and various threshold limits.

b) Explain components of Fire triangle and classification of Fire.

c) Discuss various control measures while handling flammable material, dust explosions and pyrophoric material.

d) Write a note on sources and management of air based hazards.

Q3) Attempt any Three : **[15]**

a) Write a note on various self-protective measures against workplace hazards.

b) Explain role of Emergency services in Hazard management.

c) Discuss the hazards and control strategies while using sulphonating reagents.

d) Write in brief about BOD and COD.

e) Enlist and explain various renewable and non-renewable natural resources.

P.T.O.

Q4) Explain in detail the various hazards which can occur due to soil and radioisotopes and suitable measures to prevent them. **[15]**

OR

Discuss the hazards associated with organic solvent. Add a note on safety measures taken while handling organic solvents.

Q5) Write short note on (any three) : **[15]**

a) Explain various control strategies to prevent chemical hazards.

b) Explain various Elements of Safety Management Programme.

c) Elaborate in brief about factory act and rules.

d) Explain in brief about Preliminary Hazard Analysis.

e) Discuss the functions of ecosystem.

Total No. of Questions : 5]

SEAT No. :

P5512

[Total No. of Pages : 2

[5553] - 2006

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

MPC 202T - ADVANCED ORGANIC CHEMISTRY - II

(2018 Pattern) (Theory)

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Draw well labelled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Elaborate on methods of asymmetric synthesis using chiral pool and chiralauxiliaries with suitable examples. Add a note on asymmetric catalysis. **[15]**

OR

What is solid phase synthesis? Explain various solid supports and linkers used for the solid phase synthesis. Add a note on Fmoc strategy for protection. **[15]**

Q2) Attempt Any Two : **[15]**

a) Explain working principle and applications of Continuous flow reactors.

b) Discuss [3, 3] Sigmatropic rearrangement with respect to it stereochemistry and applications.

c) Elaborate on the twelve Principles of Green Chemistry.

d) Explain the methods of racemic resolution.

P.T.O.

Q3) Attempt Any Three : **[15]**

a) Describe the solution phase peptide synthesis.

b) Explain the mechanism of cycloaddition-Diels Alder reaction with respect to its Frontier Orbitals.

c) Explain how the Ziegler-Natta catalyst is used for polymerization of alkenes.

d) Give synthetic applications of Ultrasound assisted reactions.

e) Discuss the CIP sequence rules.

Q4) Elaborate on homogenous catalysis with respect to hydroformylation. Explain the advantages and disadvantages of homogenous catalysis and heterogeneous catalysis. **[15]**

OR

Describe the principle involved in Microwave assisted reactions. Write applications of Microwave assisted reactions in heterocyclic synthesis. **[15]**

Q5) Write short notes on Any Three : **[15]**

a) Phase Transfer catalysis.

b) Use of enzymes in organic synthesis.

c) Electrocyclic reactions.

d) Photochemical reactions.

e) Transition metal catalysed reactions.

Total No. of Questions : 5]

SEAT No. :

P5513

[Total No. of Pages : 2

[5553] - 2007

M.Pharmacy (Semester - II)

MPG 202T - ADVANCED PHARMACOGNOSY - II

(2018 Pattern)

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Discuss in detail *in vivo* screening techniques of anticancer herbal drugs with suitable examples. **[15]**

OR

Elaborate natural products that make them appropriate in new drug discovery. **[15]**

Q2) Attempt Any Two : **[15]**

a) Write impact of pesticide residue, heavy metals and microbial contamination on natural drugs.

b) Explain herbals versus convention drugs.

c) Discuss analytical profile of *Emblica officinalis*.

d) Discuss the role of validation in herbal products.

P.T.O.

Q3) Attempt Any Three : **[15]**

a) Discuss adulteration and its types with suitable examples.

b) Write *in vitro* evaluation techniques for antioxidants.

c) Write comment on analytical profile of Turmeric.

d) Explain different causes and measures of adulteration.

e) Comment on pharmacodynamic and pharmacokinetic drug interactions with suitable examples.

Q4) Discuss the impact of ethnobotany in development of new drugs from natural origin. **[15]**

OR

Explain OECD guidelines for acute toxicity studies. **[15]**

Q5) Write short notes on Any Three : **[15]**

a) DNA Fingerprinting.

b) Analytical profile of *Andrographis paniculata*.

c) Reverse pharmacology.

d) Sampling techniques.

e) Screening of antidiabetic activity.

Total No. of Questions : 5]

SEAT No. :

P5514

[Total No. of Pages : 2

[5553] - 2008

M.Pharmacy (Semester - II)

MPH 202T - ADVANCED BIOPHARMACEUTICS AND PHARMACOKINETICS

(2018 Pattern)

Time : 3 Hours *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***

Q1) Discuss various factors that affect the drug absorption from gastrointestinal tract. **[15]**

OR

Describe two compartment open model and estimate hybrid first order constants (α and β).

Q2) Attempt any two : **[15]**

a) Describe in detail protein and tissue binding drug interactions.

b) What is the purpose of BA|BE studies? Describe methods for assessment of bioavailability.

c) Describe in detail active transport of drug.

d) How dissolution profiles of two dosage forms are compared?

P.T.O.

Q3) Attempt any three : **[15]**

a) Biosimilar drug products.

b) Presystemic metabolism.

c) Levels of IVIVC.

d) Study designs in BA|BE studies.

e) Tight junction complex.

Q4) What is non linear kinetics? Give reasons and examples for non-linear kinetics. Add a note on estimation of V_{max} and K_m. **[15]**

OR

Discuss BCS and add a note on in vitro methods for permeability studies.

Q5) Write notes on any three : **[15]**

a) pH-partition hypothesis.

b) Wagner-Nelson method.

c) Noyes-Whitney equation.

d) Compartment modeling.

e) Pharmacokinetic applications to modified drug release products.

Total No. of Questions : 5]

SEAT No. :

P6102

[Total No. of Pages : 2

[5553]-2009
M. Pharmacy (Semester - II)
PHARMACOLOGICAL & TOXICOLOGICAL SCREENING METHODS - II
(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labelled diagrams wherever necessary.***
4) ***Do not write anything in question paper except seat number.***

Q1) Discuss importance of documents to be submitted to the regulatory authorities as per schedule 'Y' before carrying out the clinical trial of a new drug in India. **[15]**

OR

Explain toxicokinetic evaluation in preclinical studies with its importance.

Q2) Attempt Any two. **[15]**

a) Discuss OECD principles of good laboratory practices.

b) Explain in brief acute dermal toxicity studies.

c) Explain various studies for carcinogenecity testing.

d) Discuss acute inhalation toxicity studies.

Q3) Attempt any three. **[15]**

a) Describe in brief male reproductive toxicity studies.

b) Discuss occular toxicity studies.

c) Explain in brief genotoxicity studies.

d) Write in brief about female reproductive toxicity studies.

e) Explain concept and importance of safety pharmacology.

P.T.O.

Q4) Describe in detail acute oral toxicity studies as specified in the OECD guidelines. **[15]**

OR

Enumerate and explain alternative methods to animal toxicity studies.

Q5) Write short note on (Any three) **[15]**

a) Teratogenicity studies.

b) ICH guidelines.

c) Schedule Y

d) Applications of INDs

e) Emergency use INDs

Total No. of Questions : 5]

SEAT No. : [ ]

P5560

[Total No. of Pages : 2

[5553] - 2010

M.Pharmacy (Pharmaceutical Quality Assurance) (Semester - II)

MQA 202T - PHARMACEUTICAL VALIDATION

(2018 Pattern)

Time : 3 Hours ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right side indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***

Q1) Elaborate types of process validation. Explain process validation of coated tablets. **[15]**

OR

Elaborate the concept of Intellectual Property, Intellectual Property Protection and Property Intellectual Rights in pharmaceutical industry.

Q2) Attempt any **Two** : **[15]**

a) Discuss cleaning validation protocol.

b) Explain Validation Master Plan.

c) Explain qualification of tablet compression machine.

d) Explain computer system validation.

P.T.O.

Q3) Attempt any **Three** : **[15]**

a) Explain significance of Transfer of Technology (TOT).

b) Explain qualification of autoclave.

c) Discuss Site Acceptance Test (SAT) and Factory Acceptance Test (FAT).

d) Explain difference between Calibration and Validation.

e) Elaborate qualification of Hardness Tester.

Q4) Discuss validation of HVAC system in detail. **[15]**

OR

Explain types of qualification. Describe qualification of HPLC.

Q5) Write short note on (Any **Three)** : **[15]**

a) Qualification of pure steam system.

b) Process validation of ointment.

c) LOD and LOQ of an analytical method.

d) Media fill validation.

e) Selection of acceptance limits for contamination during cleaning validation.

Total No. of Questions : 5]

SEAT No. :

P5515

[Total No. of Pages : 2

[5553]-2011

M.Pharmacy (Pharmaceutical Chemistry)

(MPC203T) : COMPUTER AIDED DRUG DESIGN (Theory)

(2018 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory. Internal choices are given.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams and structures wherever necessary.***
4) ***Do not write anything on the question paper.***

Q1) State the parameters which are commonly used as measures of electronic and liphophilic properties in QSAR study. Elaborate on experimental and theoretical approaches for determination of these properties. **[15]**

OR

Explain the methodology and applications of molecular docking in drug design. Discuss with examples of drugs acting on choline esterase or HMG CoA reductase.

Q2) Answer **any two** of the following : **[15]**

a) Outline the fundamental principle underlying the 2D-QSAR approach to drug design.

b) Discuss structure based in silico virtual screening protocols and its significance.

c) Elaborate on the concept of de novo drug design and its applications.

d) Write a note on 3D – QSAR and contour map analysis.

P.T.O.

Q3) Write short notes on **any three** of the following : **[15]**

a) Homology modelling.

b) Fragment based drug design.

c) Importance of ADMET in drug design

d) Free Wilson Analysis.

e) Quantum mechanics.

Q4) What is QSAR? Give advantages and disadvantages of QSAR. Explain Hansch analysis and its applications in drug design. **[15]**

OR

What is pharmacophore mapping? Elaborate on its process, advantages, limitations and applications in drug design.

Q5) Answer **any three** of the following : **[15]**

a) How steric features of the drug molecule are important in QSAR study?

b) What is in silico drug design? Explain its principle.

c) What is Craig plot? What is its use in drug design?

d) Add an account on statistical parameters in QSAR equation.

e) Discuss various methods of energy minimization.

Total No. of Questions : 5]

SEAT No. :

P5516

[Total No. of Pages : 2

[5553]-2012

M.Pharmacy (Pharmacognosy)

(MPG 203T) : INDIAN SYSTEM OF MEDICINE

(2018 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labelled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Elaborate fundamental principle of treatment in Ayurvedic systems of Medicines. **[15]**

OR

Elaborate GMP components for ISM with its objectives.

Q2) Attempt **any two** : **[15]**

a) What are the challenges for monitoring safety aspects of herbal medicines?

b) What are 'Astang Yoga'? Elaborate it.

c) What is 'aromatherapy'? Explain its benefit for ailments.

d) Explain Homeopathic Science and describe potentization method for homeopathic medicines.

Q3) Attempt **any three** : **[15]**

a) Explain GAP with respect to quality assurance aspects for herbals.

b) Brief about 'Government bills' in AYUSH.

P.T.O.

c) Brief about various 'Asanas' techniques in Yogic science.

d) Write in short about Siddha Gunapadam.

e) How documents are prepared for new drug application and export registration for herbals?

Q4) Elaborate stability studies of ISM formulations. **[15]**

OR

Explain Naturopathy principle and treatment modalities in detail.

Q5) Write Short note on (Any three) : **[15]**

a) TKDL.

b) Standard Operating Procedures as per GMP.

c) Meditation and relaxation Techniques.

d) Unani principles of treatment.

e) CCRH.

Total No. of Questions : 5]

SEAT No. :

P5517

[Total No. of Pages : 2

[5553]-2013

F.Y. M.Pharmacy

(MPH 203T) : COMPUTER AIDED DRUG DELIVERY SYSTEM

(2018 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer the following (any one) : **[1 × 15 = 15]**

a) Explain CADD. Write history of computers in pharmaceutical research and development and elaborate population modeling in detail.

b) Elaborate regulatory and industry view on QbD in pharmaceutical development.

Q2) Answer the following (any two) : **[2 × 7.5 = 15]**

a) Write a note on computational modeling of drug disposition.

b) Explain in detail Nucleoside Transporters, OCT and OATP.

c) Explain in detail Development of pharmaceutical emulsion & microemulsion as drug carriers.

d) Write a note on gastrointestinal absorption simulation.

Q3) Answer the following (any three) : **[3 × 5 = 15]**

a) Write a short note on *In -vitro* dissolution and IVIVC.

b) Explain in detail Computer simulation in Isolated Tissues and organ.

c) Write the advantage, disadvantage and Current challenges for Robotics.

P.T.O.

d) Write a short note on P-gp and BBB-Choline Transporter.

e) Explain in detail Artificial Intelligence (AI)

Q4) Answer the following (any one) : **[1 × 15 = 15]**

a) Explain in detail Fed vs. Fasted state and Bio Waiver Considerations.

b) Explain in detail Clinical data collection and management. Short note on Proteins and gene.

Q5) Write Short note on (Any three) : **[3 × 5 = 15]**

a) Sensitivity analysis and Optimal design.

b) Optimization and factorial design.

c) ICH Q8 guideline.

d) Modeling techniques.

e) Ethics of computing in pharmaceutical research and computer in market analysis.

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Total No. of Questions : 5]

SEAT No. :

P5110

[Total No. of Pages : 2

[5553]-2015

M. Pharmacy (Pharmaceutical Quality Assurance) (Semester - II)

AUDITS AND REGULATORY COMPLIANCE

(2018 Pattern)

Time : 3 Hours] ***[Max. Marks : 75***

Instructions to the candidates:

1) ***All questions are compulsory..***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Write the role of quality systems and audits in Pharmaceutical Manufacturing. **[15]**

OR

Discuss in details about auditing of vendors and production department.

Q2) Attempt any two : **[15]**

a) Discuss cGMP regulations regarding premises, sanitation, personnel and manufacturing of sterile preparations.

b) Describe quality assurance functions in Pharmaceutical manufacturing.

c) Describe the audit checklist for drug industries.

d) Explain the cGMP requirements with respect to labels and printed materials.

Q3) Attempt any three : **[15]**

a) Describe management responsibilities in the audit of Pharmaceutical manufacturing.

b) Comment on designing of water and steam system for manufacturing of sterile preparations.

c) Discuss the significance of Corrective and Preventive Action (CAPA).

d) Describe the importance of contents of Standard Operating Procedure (SOP).

e) Describe audit components of HVAC System.

P.T.O.

Q4) Discuss the measures for auditing of Microbiological laboratory. **[15]**

OR

Enlist the documents related to Materials Management in Pharmaceutical Industry.

Q5) Write short note on (Any Three) : **[15]**

a) Regulatory guideline to Personal qualification and training.

b) Classification of deficiencies.

c) ETP (Effluent Treatment Plant) and audit components.

d) Quality Assurance Maintenance.

e) Transitioning of quality system approach.

Total No. of Questions : 5]

SEAT No. :

P5519

[Total No. of Pages : 2

[5553]-2016

M.Pharmacy (Pharmaceutical Chemistry)

MPC 204T : PHARMACEUTICAL PROCESS CHEMISTRY

(2018 Pattern) (Semester - II) (Theory)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on the question paper except seat number.***

Q1) Give an account of different stages, equipments involved in the large scale manufacturing of APIs with suitable examples. **[15]**

OR

Write about principle of extraction process in the manufacturing of APIs and discuss in details about counter current extraction.

Q2) Attempt any Two : **[15]**

a) Elaborate on Industrial halogenation process with suitable examples.

b) Write an account of different types of oxidation reactions. Discuss mechanism of oxidation process.

c) Discuss various types of crystallization techniques. Comment on various factors affecting crystallization.

d) Give an account of different types of impurities in API and discuss about their sources and strategies to reduce impurities of API.

Q3) Attempt any Three : **[15]**

a) Discuss in-process Quality Control tests for APIs.

b) Discuss role of Industrial Centrifuges in API manufacturing process.

c) Elaborate ISO-14001 guidelines.

P.T.O.

d) Explain route selection strategies in chemical process during API synthesis.

e) Write in detail about industrial reduction scale up process including mechanism, examples.

Q4) Write in detail account of principle and process involved in fermentation process. Explain production of Penicillin and streptomycin using fermentation process. **[15]**

OR

Discuss the principle and mechanism involved in Nitration reaction. Comment on nitrating agents. Write about scale up process for manufacturing of products containing nitro group.

Q5) Write short notes on (Any three) : **[15]**

a) Ozonolysis.

b) Importance of effluent treatment for API manufacturing plant.

c) MSDS for API.

d) Fire hazards, types and its prevention.

e) Catalysts used in oxidation process.

Total No. of Questions : 5]

SEAT No. :

P5520

[Total No. of Pages : 2

[5553]-2017

M.Pharmacy

HERBAL COSMETICS

(2018 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Discuss in details Regulatory Provisions in relation to manufacturing of cosmetics. **[15]**

OR

Explain in details toxicity screening and test methods for analysis of cosmetics.

Q2) Attempt any Two : **[15]**

a) Write in details about preparation and standardization of Tooth pastes.

b) Explain Herbal Hair Growth formulation.

c) Explain in details manufacturing and evaluation of Cleansing cream.

d) Write a note on preservatives used in herbal cosmetics.

Q3) Attempt any Three : **[15]**

a) Elaborate a detail account on Lipstick as a herbal cosmetics.

b) Elaborate a detail account of Quality control methods for herbal shampoo.

c) Explain different functional herbs used in cosmetics.

d) Explain in details Natural Colourants for cosmetics.

e) Explain in details export of herbal/natural cosmetics.

P.T.O.

Q4) Explain in details designing of herbal cosmetic. **[15]**

OR

Explain Physiology and chemistry of Skin and pigmentation.

Q5) Write a short note on (Any three) : **[15]**

a) Industries involved in production of herbal cosmetics.

b) Vanishing cream.

c) Offences in relation to herbal cosmetics.

d) Deodorants.

e) Quality control of herbal cosmetics for Hairs.

Total No. of Questions : 5]

SEAT No. :

P5521

[Total No. of Pages : 2

[5553]-2018

M.Pharmacy (Pharmaceutics)

MPH 204T: COSMETICS AND COSMECEUTICALS

(2018 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw well labeled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Write in detail about the ingredients used in the preparation of herbal skin care cosmetics. Add a note on challenges in formulating herbal cosmetics. **[15]**

OR

What is shampoo? Give the desired properties of shampoo and explain the formulation development of shampoo.

Q2) Attempt any Two : **[15]**

a) Discuss about the building blocks for cream formulation.

b) Discuss in detail about the common problems associated with oral cavity and cosmetics used to tackle them.

c) Write in detail about the thickeners used in cosmetic industry.

d) Explain about the Surfactants used in cosmetics.

Q3) Attempt any Three : **[15]**

a) Explain in detail about the Dental Products.

b) Discuss about the Sunscreen cosmetics.

c) Describe in detail about anti acne formulation.

d) Elaborate on classification of cosmetics with examples.

e) Write in detail about the moisturizing cream.

P.T.O.

Q4) What do you mean by Misbranded and spurious cosmetics. Write in detail about the Indian regulatory requirements for labeling of topical cosmetics. **[15]**

OR

Explain antimicrobial preservatives with their merits and demerits. Elaborate the factors influencing efficacy of preservatives. **[15]**

Q5) Write short note on (Any three) : **[15]**

a) Conditions for Loan license for cosmetics manufacturing.

b) Enlist the emollients used in skin care cosmetics with their mechanism of action.

c) Lipsticks-preparation and evaluation.

d) COSMOS members and their rules.

e) Herbal hair care products.

Total No. of Questions : 5]

SEAT No. :

P5522

[Total No. of Pages : 2

[5553]-2019

M.Pharmacy (Semester - II)

EXPERIMENTAL PHARMACOLOGY PRACTICAL - II

(Clinical Research and Pharmacovigilance

(2018 Pattern) (MPL204T)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) What do you mean by clinical research? Describe phases of clinical research. **[15]**

OR

What do you mean by Adverse Drug Reactions? Explain its types and factors affecting Adverse Drug Reactions.

Q2) Attempt any Two : **[15]**

a) Comment on ethical issues related to clinical trials.

b) What do you mean by safety monitoring in clinical research?

c) Discuss methods of detection and reporting of Adverse Drug Reactions.

d) Comment on roles and responsibilities of clinical trial personnel.

Q3) Attempt any Three : **[15]**

a) Explain the role of Institutional Review Board in clinical research.

b) Write note on severity and seriousness assessment.

c) Explain the guidelines for preparation of documentation of clinical trials.

d) Discuss aggregate report.

e) What do you mean by passive and active surveillance?

P.T.O.

Q4) Define Pharmacovigilance. Write about data collection and reporting methods in pharmacovigilance. **[15]**

OR

Discuss in detail periodic safety update report of marketed product. **[15]**

Q5) Write short note on (Any three) : **[15]**

a) Pharmacoepidemiology.

b) International classification of diseases.

c) Vigiflow and Argus.

d) Methods of causality assessment of Adverse Drug Reactions.

e) The Nuremberg Code.

Total No. of Questions : 5]

SEAT No. :

P5111

[Total No. of Pages : 2

[5553]-2020

M. Pharmacy (Pharmaceutical Quality Assurance) (Semester - II)

PHARMACEUTICAL MANUFACTURING TECHNOLOGY

(2018 Pattern) (Theory)

Time : 3 Hours] *[Max. Marks : 75*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right side indicate full marks.***
3) ***Draw well labelled diagrams wherever necessary.***
4) ***Do not write anything on question paper except seat number.***

Q1) Discuss in detail how to select pharmaceutical plant location? Explain factors influencing plant locatian and plant layout. **[15]**

OR

Describe the process of film coating. Describe in detail problems encountered in tablet coating alongwith remedies to each problem.

Q2) Attempt any two : **[15]**

a) Explain primary drying and secondary drying in lyophilization.

b) Describe wet granulation process in tablet manufacturing technology.

c) Describe types of containers and qualities of good container.

d) Describe extrusion - spheronization process.

Q3) Attempt any three : **[15]**

a) Describe IPQC tests for sterile emulsion and suspensions.

b) Describe coating pans used in tablet coating.

c) What are closure liners? Explain factors to be considered While selecting closure liners.

d) Describe materials used for making containers.

e) Explain drug-plastic interactions.

P.T.O.

Q4) Describe in detail environment control in sterile product manufacturing. Explain area planning in sterile product manufacturing with advantages. **[15]**

OR

What is Quality by Design (QbD)? Explain its necessity, advantages and elements. Also describe various terminologies used with examples.

Q5) Write short note on any three : **[15]**

a) Clean in place (CIP)

b) Types and quality of glass for containers

c) Blister packs and bubble packs

d) PAT

e) Production Planning