

Total No. of Questions : 6]

SEAT No. :

PD11089

[Total No. of Pages :2

[6491]-60

First Year Pharm. D.

1.1T : HUMAN ANATOMY AND PHYSIOLOGY

(2019 Annual Pattern)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Draw a neat, labeled diagram wherever necessary.*
- 3) Figures to the right indicate full marks.*

SECTION -I

Q1) Attempt any one of the following (Any 1 out of 2): **[1×10=10]**

- a) Explain anatomy and physiology of nasal cavity and explain regulation on respiration.
- b) Draw a neat, labeled diagram of interior of heart, explain cardiac cycle and add a note on ECG.

Q2) Attempt any five of the following (Any 5 out of 7): **[5×3=15]**

- a) Write a note on nervous tissue.
- b) Write a note on erythropoiesis.
- c) Write anatomy and physiology of lymph node.
- d) Classify bones with suitable examples.
- e) Explain structure of artery and vein.
- f) Write note on heart sound.
- g) Explain morphology and functions of platelets.

Q3) Attempt any two of the following (Any 2 out of 4): **[2×5=10]**

- a) Write a note on carrier mediated transport.
- b) Explain regulation of blood pressure and define hypertension.
- c) Explain blood groups and add a note on Hemolytic disease of newborns.
- d) Write a note on different cell components and their functions.

P.T.O.

SECTION -II

Q1) Attempt any one of the following (Any 1 out of 2): **[1×10=10]**

- a) Describe in detail structure of alimentary canal and explain how structure of stomach differs from general structure.
- b) Describe in detail cranial nerves.

Q2) Attempt any five of the following (Any 5 out of 7): **[5×3=15]**

- a) Explain structure of skeletal muscle.
- b) Write note on contraceptive devices.
- c) Explain reflex arc.
- d) Explain hormones of thyroid gland.
- e) Explain functions of liver.
- f) Add note on renal clearance.
- g) Explain functions of skin.

Q3) Attempt any two of the following (Any 2 out of 4): **[2×5=10]**

- a) Explain structure and functions of medulla oblongata.
- b) Discuss process of spermatogenesis.
- c) Differentiate between sympathetic and parasympathetic nervous system.
- d) Explain structure and functions of eye.



Total No. of Questions : 6]

SEAT No. :

[Total No. of Pages : 2

PD11090

[6491]-61

**First Year Pharm. D.
1.2T : PHARMACEUTICS
(2019 Annual Pattern)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*
- 3) Draw a neat, labeled diagrams wherever necessary.*
- 4) Answer to the two sections should be written in separate answer book.*

SECTION - I

Q1) Attempt any one of the following (Any 1 out of 2) : **[1×10=10]**

- a) Define and classify monophasic dosage forms. Discuss in detail adjuvants use for formulation of monophasic dosage forms.
- b) Define prescription. Write in detail about the various parts and handling of prescription.

Q2) Attempt any five of the following (Any 5 out of 7) : **[5×3=15]**

- a) Write about various factors affecting dose selection.
- b) Write about advantages and disadvantages of powders.
- c) Discuss in short calculation involving percentage solution.
- d) Add a note on preparation of compound powders.
- e) Define dosage forms and give its classification with example.
- f) Define posology. Write about the calculation of children doses.
- g) Add a note on Indian Pharmacopeia.

Q3) Attempt any two of the following (Any 2 out of 4) : **[2×5=10]**

- a) Development of profession of pharmacy in India.
- b) Gargles and mouth washes.
- c) Give method of preparation of eutectic and explosive powders.
- d) Add a note on, British Pharmacopeia.

P.T.O.

SECTION - II

Q1) Attempt any one of the following (Any 1 out of 2) : **[1×10=10]**

- a) Define incompatibility and classify them. Explain therapeutic incompatibility and chemical incompatibility with the help of suitable example.
- b) Define and classify emulsion with example. Write in detail about the various methods of preparation and stability of emulsion.

Q2) Attempt any five of the following (Any 5 out of 7) : **[5×3=15]**

- a) Write about displacement value and its importance.
- b) Write about advantages and disadvantages of sutures and ligatures.
- c) Describe identification tests for emulsion.
- d) Explain Maceration process.
- e) Give merits and demerits of suspension.
- f) Add a note on tinctures.
- g) Discuss about surgical dressings.

Q3) Attempt any two of the following (Any 2 out of 4) : **[2×5=10]**

- a) With the help of a neat labeled diagram explain Soxhlet extraction process.
- b) Define and classify suppository. Add a note on suppository bases.
- c) Discuss various evaluation tests for emulsion.
- d) Explain various methods to overcome physical incompatibility.



Total No. of Questions : 6]

SEAT No. :

PD11091

[Total No. of Pages : 2

[6491]-62

First Year Pharm. D.

**1.3T: MEDICINAL BIOCHEMISTRY
(2019 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Answer to the two sections should be written in separate books.*
- 4) *Draw well labeled diagrams wherever necessary.*
- 5) *Do not write anything on question paper except seat number.*

SECTION - I

Q1) Attempt any one:

[1×10=10]

- a) Classify lipids. Explain the Beta oxidation of fatty acids with the energetics. Add a note on regulation of fatty acid metabolism.
- b) Discuss in detail the fate of carbohydrate metabolism. Explain the aerobic breakdown of glucose. Elaborate on the regulation and energetics involved in the pathway.

Q2) Attempt any five:

[5×3=15]

- a) Draw the cell and give the function of cell membrane, mitochondria.
- b) Classify enzymes with their examples and functions.
- c) Elaborate the Transamination mechanism in amino acid catabolism with examples.
- d) Explain Urea cycle and various disease conditions involved.
- e) Brief the components in ETC pathway with their importance.
- f) Discuss Nitrogen balance.
- g) Discuss the primary and secondary structure of protein with illustration.

Q3) Attempt any two:

[2×5=10]

- a) Define and explain the pathway for and resources for Gluconeogenesis.
- b) Explain various steps and enzymes involved in DNA replication.
- c) What are enzyme inhibitors? Classify and explain types of enzyme inhibitors.
- d) Enlist the types of RNA. Explain their role in protein synthesis.

P.T.O.

SECTION - II

Q4) Attempt any one: **[1×10=10]**

- a) Enlist some of immunochemical assays. Explain the principle and importance of Radio immuno assay (RIA) and ELISA.
- b) Explain the abnormal urine constituents. Add a note on creatinine clearance and Urea clearance rate.

Q5) Attempt any five: **[5×3=15]**

- a) Elaborate on Various Tests carried out for Jaundice.
- b) Explain Mutation and its types.
- c) Explain galactose metabolism and galactose tolerance test.
- d) Elaborate on urinary calculi(kidney stone).
- e) Elaborate on importance of cholesterol and its metabolism pathway.
- f) Explain phenylketonuria.
- g) Explain Porphyria.

Q6) Attempt any Two: **[5×2=10]**

- a) Write in brief about Jaundice.
- b) Elaborate on water and electrolyte balance.
- c) Discuss in brief the lipid profile tests.
- d) Discuss Glycogen storage disorders in brief.



Total No. of Questions : 6]

SEAT No. :

PD11092

[Total No. of Pages : 2

[6491]-63

First Year Pharm. D

1.4T : PHARMACEUTICAL ORGANIC CHEMISTRY

(2019 Pattern)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

SECTION-I

Q1) Define Nucleophile. Discuss reaction mechanism, kinetics of nucleophilic bimolecular reaction with suitable example. Differentiate SN_2 and SN_1 . **[10]**

OR

Define 1, 2-elimination reaction. Explain reaction mechanism for E1 elimination. Comment on stability of Carbocation. Explain any two evidences for E1 Elimination.

Q2) Solve any five **[15]**

- a) Draw structures of
 - i) 2 - pentanone
 - ii) 2 - methylhex-2-ene
 - iii) 3 - methoxypentane
- b) Define acid and bases as per Lowry Bronsted theory with example.
- c) Define boiling point. Explain why boiling point of sodium chloride is very high 1413°C .
- d) Discuss preparation methods of Cycloalkanes.
- e) Write a note on Polarity of molecules and Intramolecular forces.
- f) State Saytzeff Rule of elimination. Predict the preferred product in elimination reaction of 2-bromobutane.
- g) Elaborate in detail the Bayer strain theory.

P.T.O.

Q3) Write short note on any two: [10]

- a) Write a detailed note on Structural isomerism with examples.
- b) Explain reaction mechanism for E1 Elimination.
- c) State Markonikov's Rule and explain electrophilic addition mechanism with example.
- d) Discuss Free radical chain reactions of alkane.

SECTION-II

Q4) Discuss the mechanism of Aldol condensation and Crossed Aldol condensation with suitable examples. [10]

OR

Describe the reaction and mechanisms of the Cannizzaro and Crossed Cannizzaro reactions with examples.

Q5) Solve any five: [15]

- a) What is hyperconjugation? Explain with an example.
- b) Write the mechanism of sulphonation of benzene.
- c) Write the mechanism of nitration of benzene.
- d) Explain Kolbe reaction and its significance.
- e) Describe Sandmeyer's reaction with an example.
- f) State the mechanism of Perkin condensation.
- g) Describe Knoevenagel reaction with an example.

Q6) Write short note on any two: [10]

- a) Explain the orientation and reactivity of free radical addition to conjugated dienes.
- b) Discuss the effect of electron-withdrawing and electron-donating groups on the rate and orientation of electrophilic aromatic substitution.
- c) Outline the mechanism of Friedel-Crafts acylation and alkylation and state the limitations of the reaction.
- d) Describe the effect of substituents on the acidity of carboxylic acids with suitable example.

* * *

Total No. of Questions : 6]

SEAT No. :

PD11093

[Total No. of Pages : 2

[6491]-64

First Year Pharm. D.

1.5 : PHARMACEUTICAL INORGANIC CHEMISTRY

(2019 Pattern)

Time : 3 Hours]

[Max. Marks : 70

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.*

SECTION-I

Q1) Write of any 1 out of 2: [10]

- a) Classify different types of volumetric analysis and explain in detail acid base titration with example.
- b) State the principle of argentometric titration. Elaborate Mohr's and Gay-Lussac's method.

Q2) Attempt any 5 out of 7: [15]

- a) Discuss indicators used in non-aqueous titration.
- b) What is error? Explain different types of errors.
- c) Explain terms molarity and normality with examples.
- d) State the principle of redox titration.
- e) Explain the Ostwald Theory?
- f) Explain the term standardization, acidimetry and alkalimetry.
- g) How can we determine equivalence point in complexometric titration?

Q3) Write any 2 out of 4: [10]

- a) Summarize the solvents used in non-aqueous titration.
- b) Discuss Bromatometry and Iodometry in redox titration.
- c) State the principle of complexometric titration. Explain different types of complexometric titration.
- d) State the principle of gravimetric analysis. Explain precipitation and Co-precipitation in gravimetric analysis.

P.T.O.

SECTION-II

Q4) Write of any 1 out of 2: **[10]**

- a) Explain mechanism of action of antimicrobial agent. Discuss various pharmaceutical compounds which act as antimicrobial agent.
- b) Write in details about the principle of complexometric titration. Elaborate complexometric titration with examples.

Q5) Attempt any 5 out of 7: **[15]**

- a) Explain significance of limit test.
- b) Short note on acidifiers.
- c) What is dentifrices?
- d) Differentiate between absorbable and non-absorbable antacid.
- e) What is irritant laxative?
- f) Explain Copper as essential trace element.
- g) Short note on miscellaneous compound.

Q6) Write any 2 out of 4: **[10]**

- a) Briefing on medical gas tragedies.
- b) Summarize sodium and potassium replacement therapy.
- c) Discuss different compounds act as an antacid.
- d) What is radiopharmaceuticals? Explain labelling and storage of radioactive substances.

* * *

Total No. of Questions : 6]

SEAT No. :

PD-5794

[Total No. of Pages : 2

[6491]-219
First Year Pharm D
HUMAN ANATOMY AND PHYSIOLOGY (1.1T)
(2019 Pattern)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

SECTION - I

Q1) Long Answer questions (Any 1 out of 2) **[1 × 10 = 10]**

- a) Write composition and functions of blood. Write morphology of different types of white blood cells.
- b) Draw a neat, labeled diagram of heart, explain cardiac cycle and add a note on ECG.

Q2) Short Answers (Any 5 out of 7) **[5 × 3 = 15]**

- a) Define :
 - i) Hypoxia
 - ii) Asphyxia and
 - iii) Oxygen therapy and resuscitation.
- b) Write a note on Homeostasis
- c) Write anatomy and physiology of spleen.
- d) Classify joints with suitable examples.
- e) Write a note on RAAS
- f) Write a note on blood clotting.
- g) Explain functions of Platelets and define any one disorder of blood coagulation.

P.T.O.

Q3) Medium Answers (Any 2 out of 4)

[2 × 5 = 10]

- a) Write anatomy and Physiology of respiratory organs
- b) Explain cardiac cycle.
- c) Explain blood groupings, add a note on Hemolytic disease of newborns.
- d) Write a note on different cell components and their functions.

SECTION - II

Q4) Long Answers (Any 1 out of 2)

[1 × 10 = 10]

- a) Describe structure and functions of the male reproductive system.
- b) Describe the anatomical features of nephron. Add a note on micturition process.

Q5) Short Answers (Any 5 out of 7)

[5 × 3 = 15]

- a) Explain the structure of mature graafian follicle.
- b) Cerebrospinal Fluid (CSF) its circulation and functions.
- c) Explain the various stages in oogenesis.
- d) Explain the different phases of digestion.
- e) Explain the structure and function of medulla oblongata.
- f) Write a note on muscles in exercise.
- g) Explain the structure and function of cerebellum.

Q6) Short Answers (Any 2 out of 4)

[2 × 5 = 10]

- a) Explain the physiology of vision with help of neat labeled diagram.
- b) Explain the hormone secreted by adrenal cortex and adrenal medulla.
- c) Explain physiology of muscle contraction.
- d) Explain the structure and components of reflex arc.



Total No. of Questions : 6]

SEAT No. :

PD-5795

[Total No. of Pages : 2

[6491]-220

F. Y. Pharm D.

**1.2 : PHARMACEUTICS
(2019 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Draw a neat, labeled diagram wherever necessary.*
- 3) Figures to the right indicate full marks.*

SECTION - I

Q1) Attempt any one of the followings (Any 1 out of 2) : [1 × 10 = 10]

- a) Define posology. Discuss the various factors affecting the dose selection.
- b) Define prescription. Discuss in detail various parts and handling of prescription.

Q2) Attempt any five of the followings (Any 5 out of 7) : [5 × 3 = 15]

- a) Differentiate between liniments and lotions.
- b) Define idiosyncrasy with suitable example.
- c) Explain any four salient features of first edition of Indian Pharmacopoeia.
- d) How will you prepare 500ml of 50% alcohol from 90% alcohol?
- e) Define and classify solid dosage forms.
- f) Draw well labelled diagram of Soxhlet extraction apparatus.
- g) Differentiate between flocculated and deflocculated suspension.

P.T.O.

Q3) Attempt any two of the followings (Any 2 out of 4) : [2 × 5 = 10]

- a) Explain in detail about process of maceration.
- b) Define incompatibility. Explain the methods to overcome incompatibility.
- c) Define suppositories. Explain the various methods used for the preparation of suppositories.
- d) Explain the formulation aspect of Effervescent granules and importance of granulation.

SECTION - II

Q4) Attempt any one of the followings (Any 1 out of 2) : [1 × 10 = 10]

- a) Define and classify suspension. Explain the formulation adjuvants used in suspension.
- b) Elaborate historical aspect and development of pharmacy profession and industry in brief.

Q5) Attempt any five of the followings (Any 5 out of 7) : [5 × 3 = 15]

- a) Differentiate between simple and compound powder.
- b) Write a short note on ear drops.
- c) Calculate the actual strength of 45° U. P. (Under proof)
- d) What is imperial system? Give suitable example.
- e) Discuss any four identification tests of emulsions.
- f) Differentiate between mouthwash and gargle.
- g) Write the conversion of the following.
 - i) One drop = _____ ml
 - ii) One teaspoonful = _____ ml
 - iii) One tablespoonful = _____ ml

Q6) Attempt any two of the followings (Any 2 out of 4) : [2 × 5 = 10]

- a) Write a note on British Pharmacopoeia.
- b) Describe the dispersion aspects of eutectic and explosive powders.
- c) Explain the different steps involved in manufacturing of surgical catgut.
- d) Discuss the instability of suspensions.



Total No. of Questions : 6]

SEAT No. :

PD-5796

[Total No. of Pages : 2

[6491]-221

First Year Pharm D.

1.3 : MEDICINAL BIOCHEMISTRY

(2019 Pattern)

Time : 3 Hours]

[Max. Marks : 70

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, cycles and structures wherever necessary,

SECTION - I

Q1) Answer any 01 out of 02 :

[1 × 10 = 10]

- a) Explain the reactions sequence, significance and energetics of TCA cycle.
- b) What is carbohydrate metabolism and discuss HMP shunt in details with net energy calculation.

Q2) Answer any 05 out of 07 :

[5 × 3 = 15]

- a) Write the structure and significance of ATP.
- b) Explain in brief gluconeogenesis pathway.
- c) Give Michaelis-Menten equation and explain its significance.
- d) What is atherosclerosis?
- e) What is Line-Weaver Burk plot? Give its significance.
- f) Explain Semiconservative method of DNA replication.
- g) Discuss Ketogenesis

P.T.O.

Q3) Answer any 02 out of 04 :

[2 × 5 = 10]

- a) Explains galactose tolerance test and their significance.
- b) Define glycolysis? Describe the biochemical pathway for the breakdown of glucose to pyruvate and lactate.
- c) Write a note on urea cycle.
- d) What is ETC, Discuss uncouplers of ETC

SECTION - II

Q4) Answer any 01 out of 02 :

[1 × 10 = 10]

- a) Discuss Various mechanisms involved in amino acid catabolism with examples. Add a note on Nitrogen balance.
- b) Enlist some of the immunochemical assays, Explain the principle and importance of Radio immuno assay (RIA) and ELISA.

Q5) Answer any 05 out of 07 :

[5 × 3 = 15]

- a) Explain Alkapionuria and Phenyl ketonuria.
- b) Compare the distribution of electrolytes and their balance in the body.
- c) Outline the human cell and the importance of major components.
- d) Elaborate on urinary calculi.
- e) Discuss the types of RNA and its significance.
- f) Explain different types of mutation and its consequences.
- g) Discuss about porphyria.

Q6) Answer any 02 out of 04 :

[2 × 5 = 10]

- a) Explain types of lipoprotein and its significance.
- b) Elaborate on abnormal constituents of urine.
- c) Explain the importance of the creatinine clearance test and its method.
- d) Discuss Glycogen storage disorders in brief.



Total No. of Questions : 6]

SEAT No. :

PD-5798

[Total No. of Pages : 2

[6491]-223

F. Y. Pharm D.

**1.5 : PHARMACEUTICAL INORGANIC CHEMISTRY
(Theory)
(2019 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

SECTION - I

Q1) Write of any 01 out of 02 : [10]

- a) Write the principle of precipitation titration. Elaborate precipitation titration in details.
- b) Classify different types of volumetric analysis and explain the titration curves in acid base titration.

Q2) Attempt any 05 out of 07 : [15]

- a) Discuss photophilic solvents in non-aqueous titration.
- b) What is error? Explain different types of error.
- c) Explain primary standard solution.
- d) Write note on permanganometric titration?
- e) What is the levelling effect in non-aqueous titration?
- f) Define the term titrant, titrand and indicator.
- g) How can we determine equivalence point in complexometric titration?

P.T.O.

Q3) Write any 2 out of 4 : [10]

- a) Explain in detail about Chromophore theory.
- b) Discussed the indicators used in redox titration.
- c) What is complexometric titration? Explain significance of masking and demasking agent.
- d) What is the gravimetric analysis? Write in details about the impurities in precipitates.

SECTION - II

Q4) Write of any 01 out of 02 : [10]

- a) What is intracellular and extracellular fluid? Explain electrolyte combination therapy.
- b) Discuss mechanism action of antimicrobial agent. Explain hydrogen peroxide as an antimicrobial agent.

Q5) Attempt any 05 out of 07 : [15]

- a) Discuss anti-caries agent in dental products.
- b) Explain Iron as essential trace element.
- c) Short note on miscellaneous compound.
- d) Differentiate between systemic and non-systemic antacid.
- e) What is cathartics?
- f) Short note on acidifiers.
- g) What is the limit test? Explain limit test for Arsenic.

Q6) Write any 02 out of 04 : [10]

- a) Discuss medicinal uses of Helium and Nitrogen.
- b) Discuss mechanism of antacids. Summarize different compound acts as an antacid.
- c) Summarize pharmaceutical aid.
- d) What is radiopharmaceuticals? Explain measurement of radioactivity.



Total No. of Questions : 6]

SEAT No. :

PD5206

[Total No. of Pages : 2

[6491]-225

Second Year Pharm.D.

**2.2(T) : PHARMACEUTICAL MICROBIOLOGY
(2019 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Answers to the two sections should be written in separate answer book.*
- 3) *Neat labelled diagram must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

Q1) Attempt any one of the following (Any 1 out of 2) : **[1×10=10]**

- a) Define sterilization. Enlist different methods used for sterilization. Explain moist heat sterilization in detail.
- b) Define culture media & explain different types of culture media with suitable examples.

Q2) Attempt any five of the following (Any 5 out of 7) : **[5×3=15]**

- a) Define :
 - i) D-value
 - ii) Minimum inhibitory concentration (MIC)
 - iii) Z-value
- b) Write a note on acid fast staining method.
- c) What is fungus? Give its characteristic features.
- d) Differentiate between eukaryotes and prokaryotes.
- e) What are viruses? Give classification based on structural morphology.
- f) Summarize the special characteristics of spirochetes.
- g) Enlist major divisions of microbial kingdom.

Q3) Attempt any two of the following (Any 2 out of 4) : **[2×5=10]**

- a) Different modes of bacterial reproduction.
- b) Counting of bacteria -Total and Viable counting techniques.
- c) Detailed note on Pasteurization.
- d) Lytic & lysogenic cycle of viruses.

P.T.O.

SECTION - II

Q4) Attempt any one of the following (Any 1 out of 2) : **[1×10=10]**

- a) Define disinfection? Write the ideal properties of disinfectant? Explain any two methods used for evaluation of disinfectants.
- b) Define antibody. Explain in detail different types of antibodies.

Q5) Attempt any five of the following (Any 5 out of 7) : **[5×3=15]**

- a) Differentiate between active and passive immunity.
- b) Discuss the procedure and interpretation of Mantoux test.
- c) Explain in detail about symptoms, source and control of typhoid.
- d) Explain the principle of precipitation reaction.
- e) Define vaccines. List different types of vaccines with example.
- f) Explain in detail about role of complement system in host defence mechanism.
- g) How to determine MIC of unknown compounds?

Q6) Attempt any two of the following (Any 2 out of 4) : **[2×5=10]**

- a) Explain in detail about production and applications of monoclonal antibodies.
- b) Discuss cause, pathophysiology, diagnosis, treatment and prevention for hepatitis.
- c) Enlist the different blot techniques and explain Western Blot.
- d) Define and classify immunity? Explain any two types?



Total No. of Questions : 6]

SEAT No. :

PD5207

[Total No. of Pages : 2

[6491]-226

S.Y.Pharm D.

**2.3 T : PHARMACOGNOSY & PHYTOPHARMACEUTICALS
(2019 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

SECTION - I

Q1) Attempt any one out of two. **[10]**

- a) Write in detail about traditional systems of medicine and explain Asava, Arishta, and Bhasma with suitable examples.
- b) Explain the study of organized and unorganized crude drugs with examples.

Q2) Attempt any five out of seven. **[15]**

- a) Write any two example of primary metabolites.
- b) Give chemical tests for alkaloids.
- c) Give any three uses of jute fiber.
- d) What is the role of beeswax in formulations?
- e) What are parameters affecting quality of crude drug during storage?
- f) Define pharmacognosy and its importance.
- g) Give one example of each organized and unorganized drug.

Q3) Attempt any two out of four. **[10]**

- a) Describe plant fibers used in surgical dressings.
- b) Differentiate between primary and secondary metabolites.
- c) Write a note on Bhasma and its preparation.
- d) What is adulteration? Give methods of adulteration with examples.

P.T.O.

SECTION - II

Q4) Attempt any one out of two. **[10]**

- a) Write the chemistry, classification, and commercial applications of volatile oils from Clove and Coriander.
- b) Discuss the chemistry, therapeutic uses, and tests of Cinchona and Senna.

Q5) Attempt any five out of seven. **[15]**

- a) Give therapeutic uses of cinchona.
- b) Write about chemical tests for volatile oils.
- c) State uses of acacia and tragacanth.
- d) Write biological source and applications of castor oil.
- e) What are constituents and uses of ephedra.
- f) Write chemical tests for glycosides.
- g) What is extraction? Give methods of extraction.

Q6) Attempt any two out of four. **[10]**

- a) Write note on quality control of crude drugs.
- b) Describe chromatographic techniques used in identification of phytoconstituents.
- c) Explain adulteration of herbal drugs with examples.
- d) Describe pharmacognosy of Vinca.

* * *

Total No. of Questions : 6]

SEAT No. :

PD5208

[Total No. of Pages : 2

[6491]-227

S.Y. Pharm.D.

**2.4T: PHARMACOLOGY - I
(2019 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

SECTION - I

Q1) Long Answers (Any 1 out of 2)

[1×10=10]

- a) Define and classify antihypertensives with suitable examples. Add a note on diuretics.
- b) Define and classify anticholinergic drugs. Add a note on the pharmacology of acetylcholine.

Q2) Short Answers (Any 5 out of 7)

[5×3=15]

- a) Classify drugs used in the treatment of Parkinson's disease. Justify why levodopa is combined with carbidopa.
- b) Write brief pharmacology of adrenaline.
- c) Write a pharmacological account of antianginal drugs.
- d) Define and classify drug interactions with suitable examples.
- e) Write a note on drug toxicity.
- f) Give an account of drug metabolism.
- g) Define bioavailability and explain the methods of determination of bioavailability in short.

Q3) Medium Answers (Any 2 out of 4)

[2×5=10]

- a) Write a note on enzyme induction with a suitable example.
- b) Define mydriatics and miotics and write their examples and uses.
- c) Write a note on the renin-angiotensin-aldosterone system (RAAS).
- d) What is drug distribution? Enlist factors affecting distribution.

P.T.O.

SECTION - II

Q4) Long Answers (Any 1 out of 2) [1×10=10]

- a) Define and classify sedatives and hypnotics with examples and write pharmacological effects and uses of them.
- b) Describe biosynthesis, storage and release of insulin. Add note on insulin preparations.

Q5) Short Answers (Any 5 out of 7) [5×3=15]

- a) Define and classify general anesthetics and write a note on stages of anesthesia.
- b) Write a note on expectorants.
- c) Write a note on platelet-activating factors.
- d) Classify oral hypoglycemic drugs.
- e) Classify antipsychotic drugs with suitable examples and write adverse effects.
- f) Define Classify local anesthetic agents and write a note their uses.
- g) Write short note on the mechanism of action, uses and adverse effects of aspirin.

Q6) Medium Answers (Any 2 out of 4) [2×5=10]

- a) Classify Drugs used for hyperlipidaemias with examples, brief mechanism of action and clinical uses.
- b) Classify β blockers with examples, mechanism of action and uses.
- c) Define and classify adverse drug reactions with suitable examples. Write a note on Idiosyncrasy.
- d) Explain synthesis and physiological role of thyroid hormones. Classify antithyroid drugs with suitable examples and their clinical uses.



Total No. of Questions : 6]

SEAT No. :

[Total No. of Pages : 2

PD5209

[6491]-228

S.Y.Pharm.D.

**2.5T: COMMUNITY PHARMACY
(2019 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw a neat, labeled diagram wherever necessary.*
- 3) *Figures to the right indicate full marks.*

SECTION - I

Q1) Attempt any one of the followings (Any 1 out of 2): **[1×10=10]**

- a) Explain various barriers of patient counseling. Elaborate methods to overcome barriers in patient counseling.
- b) Define pharmaceutical care. Write in detail about the principles of pharmaceutical care.

Q2) Attempt any five of the followings (Any 5 out of 7): **[5×3=15]**

- a) Write about Role of community Pharmacist.
- b) Differentiate between ABC and VED analysis.
- c) Write note on essential drug list.
- d) Explain uses of computer and software in Community pharmacy.
- e) Define drug interactions. Discuss examples of drug-food interactions.
- f) Summarize clinical presentation and prevention of amoebiasis.
- g) Outline the prevention and treatment of tuberculosis.

Q3) Attempt any two of the followings (Any 2 out of 4): **[2×5=10]**

- a) Write guidelines for rational use of injections.
- b) Discuss life cycle of malarial parasite.
- c) Explain Advisory label for proton pump inhibitor.
- d) Elaborate the various factors leads to medication errors.

P.T.O.

SECTION - II

Q4) Attempt any one of the followings (Any 1 out of 2): **[1×10=10]**

- a) Elaborate screening process of Diabetes Mellitus in a community pharmacy.
- b) Explain the causative organism, clinical presentation and prevention for Hepatitis and Typhoid.

Q5) Attempt any five of the followings (Any 5 out of 7): **[5×3=15]**

- a) Discuss rational drug therapy for injections.
- b) Explain materials coding and stocking.
- c) Summarize autonomy and dignity.
- d) Mention significance of FARM.
- e) Outline the contents and layout of patient information leaflets.
- f) Organize clinical presentation and prevention of pain.
- g) Elaborate about care for pregnant women.

Q6) Attempt any two of the followings (Any 2 out of 4): **[2×5=10]**

- a) Identify factors affecting medication adherence.
- b) Explain the factors affecting the Patient Compliance.
- c) Discuss about Vitamin B12 deficiency.
- d) Define leprosy. Elaborate its pathogenesis, treatment and prevention methods.



Total No. of Questions : 6]

SEAT No. :

PD5210

[6491]-229

[Total No. of Pages : 2

Second Year Pharm. D.

2.6(T) - PHARMACOTHERAPEUTICS - I

(2019 Pattern) (Theory)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Write answers for section I and section II in separate answer sheets.*
- 3) Draw neat, labelled diagram wherever necessary.*
- 4) Figures to the right indicate full marks.*

SECTION - I

Q1) Explain in detail what is Heart failure and its complete management. **[10]**

OR

Elaborate on drug induced pulmonary diseases and its management. **[10]**

Q2) Solve any five : **[15]**

- a) What are the various trigger factors causing asthma attacks?
- b) Differentiate between COPD and Asthma.
- c) Based on pathogenesis differentiate various types of Anginas.
- d) Differentiate selective Vs non selective beta blockers with examples.
- e) Classify CCBs with examples.
- f) What is the first line treatment of hypertension in pregnant patient?
- g) What is the lipid profile and its clinical significance?

P.T.O.

Q3) Write short notes on any two : **[10]**

- a) Cor pulmonale and its treatment
- b) Antithrombotic in heart patients
- c) Electrical properties of heart and arrhythmias
- d) Steroid treatment in COPD

SECTION - II

Q4) Explain clinical presentations and management of Hyperthyroidism along with its complication. **[10]**

OR

Explain in detail management of T2DM. **[10]**

Q5) Solve any five : **[15]**

- a) Give clinical presentations of hyperthyroidism.
- b) What is the ADA criteria for diagnosis of DM?
- c) Give examples of different estrogen-progesterone combinations used in menopause.
- d) Give examples of any 3 drugs that are contraindicated in pregnancy.
- e) What are different types of Insulin?
- f) Differentiate between T1DM & T2DM.
- g) Classify glaucoma.

Q6) Write short notes on any two **[10]**

- a) Goals of therapy in geriatrics.
- b) Hormonal therapies in menopause.
- c) Oral contraceptives.
- d) Bacterial Conjunctivitis.



Total No. of Questions : 6]

SEAT No. :

PD5211

[Total No. of Pages : 2

[6491]-230

T.Y. Pharm.D.

**3.1 T: PHARMACOLOGY - II
(2019 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

SECTION - I

Q1) Attempt any one of the following (Any 1 out of 2): **[1×10=10]**

- a) Classify cephalosporin with examples. Highlight on difference in antimicrobial spectrum, adverse reactions, and therapeutic uses of each generation of cephalosporin.
- b) Classify anticoagulants with example. Explain pharmacology of heparin.

Q2) Attempt five of the following (Any 5 out of 7): **[5×3=15]**

- a) What is multidrug therapy? Give examples.
- b) Write a note on Plasma expanders.
- c) Discuss drugs used in treatment of tapeworm infection and round worm infection.
- d) Elaborate mechanism of action of vincristine.
- e) List out the uses of griseofulvin.
- f) Name any three uses of anti-diuretic hormone.
- g) Define and explain anaphylaxis.

Q3) Attempt two of the following (Any 2 out of 4): **[2×5=10]**

- a) Illustrate treatment of iron deficiency anemia with examples.
- b) Differentiate between streptokinase and urokinase with respect to source, mechanism of action and therapeutic uses.
- c) Write the mechanism of action, adverse effects and uses of 5 -fluorouracil (5-FC).
- d) What are diuretics? Classify them with examples.

P.T.O.

SECTION - II

Q4) Attempt any one of the following (Any 1 out of 2): **[1×10=10]**

- a) Describe the steps involved in recombinant DNA technology. Add a note on their pharmaceutical applications.
- b) Define cell signaling. Elaborate MAP and JNK cell signaling pathways.

Q5) Attempt five of the following (Any 5 out of 7): **[5×3=15]**

- a) Name the subcellular organelles with their functions.
- b) What are Biosensors? Outline the principle of biosensors.
- c) Differentiate between Eukaryotic and Prokaryotic chromosome.
- d) List out the diseases caused due to mutations.
- e) Define gene mapping, gene cloning and gene sequencing.
- f) What is difference between acute and chronic toxicity studies with examples?
- g) Discuss various check points in cell cycle.

Q6) Attempt any two of the following (Any 2 out of 4): **[2×5=10]**

- a) Elucidate the process of cell cycle regulation.
- b) Write in detail about the eukaryotic DNA replication.
- c) Explain various forms of cell signaling.
- d) Write the difference between immunosuppressants and immunostimulants.



Total No. of Questions : 6]

SEAT No. :

PD5212

[Total No. of Pages : 2

[6491]-231

Third Year Pharm D.

3.2 T : PHARMACEUTICAL ANALYSIS

(2019 Pattern)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Answer to the two sections should be written in separate books.*
- 4) *Draw well labeled diagrams wherever necessary.*

SECTION-I

Q1) Attempt any one.

[1×10=10]

- a) Discuss the principle, instrumentation, and application of HPTLC.
- b) Discuss the theory, instrumentation, advantages and application of HPLC.

Q2) Attempt any five.

[5×3=15]

- a) Explain sources of quality variation.
- b) Explain the technique of gel filtration chromatography.
- c) State the principle of TLC and explain R_f value?
- d) Describe how the choice of carrier gas is crucial in the success of GC.
- e) Discuss the application of paper electrophoresis.
- f) Explain the technique of affinity chromatography.
- g) Short note on gel electrophoresis.

Q3) Attempt any two.

[2×5=10]

- a) Define validation and explain the types of validation.
- b) Mention the types of ion exchange resins used in ion exchange chromatography.
- c) Summarize different types of paper chromatography and its development technique.
- d) Discuss instrumentation and application of GC.

P.T.O.

SECTION-II

Q4) Attempt any one.

[1×10=10]

- a) Describe the construction, working and applications of UV-Visible spectrophotometer.
- b) Write an exhaustive note on principle, instrument and application of flame photometer.

Q5) Attempt any five.

[5×3=15]

- a) Differentiate between AAS and AES.
- b) Short note on DTA.
- c) Differentiate between NMR and ESR.
- d) How do shielding and deshielding affect the chemical shift value?
- e) Short note on theoretical aspects of NMR spectroscopy.
- f) What is conductometry titration?
- g) Write a note on polarimeter.

Q6) Attempt any two.

[2×5=10]

- a) Discuss the indicator and reference electrodes used in potentiometry.
- b) Give the factors affecting fluorescence and write the concept of quenching effect.
- c) Explain the type of solvent and sample handling technique used in IR.
- d) What is metastable peak and McLafferty rearrangement in MS.



Total No. of Questions : 6]

SEAT No. :

PD5213

[Total No. of Pages : 2

[6491]-232

Third Year Pharm. D.

3.3 T : PHARMACOTHERAPEUTICS-II

(2019 Pattern)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Answers to the two sections should be written in separate answer book.*
- 3) *Neat labelled diagram must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

SECTION-I

Q1) Attempt any one of the following. (Any 1 out of 2) **[1×10=10]**

- a) Define Meningitis. Explain its pathophysiology, clinical features and pharmacotherapy approach.
- b) Elaborate etiopathogenesis, clinical features & Pharmacotherapy with algorithm of Rheumatoid Arthritis.

Q2) Attempt any five of the following. (Any 5 out of 7) **[5×3=15]**

- a) Give treatment algorithm for Gout.
- b) Describe in detail about DOTS Therapy.
- c) Draw structure of HIV and justify clinical features as per CD4 count and the role of Nucleoside Reverse transcriptase inhibitors and protease inhibitors with examples.
- d) Write the pharmacological and non-pharmacological therapy for spinal osteoarthritis. Add a comment on Kyphosis.
- e) Classify SSI as per Center of Drug Control (CDC) & comment on ASA Scale.
- f) Differentiate between URTI & LRTI.
- g) Illustrate the etiopathogenesis and treatment approach for septicaemia.

P.T.O.

Q3) Attempt any two of the followings (Any 2 out of 4). **[2×5=10]**

- a) Explain etiopathogenesis, clinical signs and symptoms & management of Endocarditis.
- b) Illustrate in detail any two Opportunistic infections.
- c) Describe etiopathogenesis, clinical features and management of Malarial infection.
- d) Elaborate the types, clinical manifestations and treatment of syphilis.

SECTION-II

Q4) Attempt any one of the followings (Any 1 out of 2) **[1×10=10]**

- a) Describe in detail etiopathophysiology, Clinical features, Topical and systemic therapy for psoriasis infection along with algorithm.
- b) Explain in detail progression of disease, causes, clinical features and Pharmacotherapy of Chronic Renal Failure.

Q5) Attempt any five of the followings (Any 5 out of 7) **[5×3=15]**

- a) Define difference between carcinoma & sarcoma. Write a note on stages and prognostic factors of cancer.
- b) Justify the role of corticosteroids as per potency, topical imidazole's in skin disorders.
- c) Discuss types of scabies and justify the role of Ivermectine in scabies.
- d) Give emetic classification as per risk and 1st & 2nd line management for CINV.
- e) Give two examples with destructive mechanism of drugs causing renal disorders.
- f) Give treatment algorithm for Eczema.
- g) Draw / Mention ECG findings in hyperkalaemia patient.

Q6) Attempt any two of the followings (Any 2 out of 4). **[2×5=10]**

- a) Classify Anti-neoplastic agents. Elaborate the management for early stage breast cancer.
- b) Write in detail treatment management of Acute Renal Failure.
- c) Write a note on etiopathogenesis and management of impetigo.
- d) Differentiate four types of leukemia based on its treatment management.



Total No. of Questions : 6]

SEAT No. :

PD5214

[Total No. of Pages : 2

[6491]-233

T.Y. Pharm. D.

3.4-T : PHARMACEUTICAL JURISPRUDENCE

(2019 Pattern)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

SECTION - I

Q1) Attempt any one of the following (Any 1 out of 2) : **[1×10=10]**

- a) Discuss sale & import of drugs according to D & C Act.
- b) Discuss objectives, constitution & functions of state pharmacy & central council. Describe the criteria & procedure for registration of pharmacist.

Q2) Attempt any five of the following (Any 5 out of 7): **[5×3=15]**

- a) Explain the classes of drugs & cosmetics prohibited from import.
- b) Discuss the code of ethics followed by pharmacist in relation to Medical Profession.
- c) Discuss 3 offences & penalties under medicinal & toilet preparation Act, 1955.
- d) Write in brief about Hathi committee report.
- e) Enumerate the main recommendations of Drug Enquiry Committee.
- f) Define rectified spirit, toilet preparation & manufacture.
- g) What are the duties of government analyst?

Q3) Attempt any two of the following (Any 2 out of 4) : **[2×5=10]**

- a) Write note on pharmaceutical legislation
- b) Write a note on code of pharmaceutical ethics.
- c) What are the offences and Penalties for the violation of medicinal and toilet preparations.
- d) Write the qualification, duties & responsibilities of Drug Inspectors.

P.T.O.

SECTION - II

Q4) Attempt any one of the following (Any 1 out of 2) : **[1×10=10]**

- a) Discuss in detail the powers of central government to prohibit, control & regulate certain operations under Narcotics Drugs & Psychotropic Substances Act 1985.
- b) Explain different forms of IPR.

Q5) Attempt any five of the following (Any 5 out of 7) : **[5×3=15]**

- a) Discuss Illicit traffic.
- b) What is hemp (cannabis), coca leaf & poppy straw?
- c) Write offences & penalties under Drugs & Magic Remedies Act 1954.
- d) What are the prohibitions of advertisements for treatment of certain diseases & disorders?
- e) What is patent & give classification.
- f) Discuss the procedure for filing of patent.
- g) What are the functions of narcotic commissioner according to NDPS Act 1985?

Q6) Attempt any two of the followings (Any 2 out of 4) : **[2×5=10]**

- a) Explain powers of State government to permit, control & regulate operations under Narcotics & Psychotropic Substances Act.
- b) Write a note on non-prescription products.
- c) What are the objectives of DPCO, 1995? Explain in detail DPCO 1995, explain in detail about the prices of bulk drugs & actual price as formulation.
- d) Write a note on essential commodities Act relevant to drug price control order.



Total No. of Questions : 6]

SEAT No. :

PD-5215

[Total No. of Pages : 2

[6491]-234

T.Y. Pharm D.

**3.5 (T) : MEDICINAL CHEMISTRY
(2019 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

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.*

SECTION - I

Q1) Write of any 1 out of 2 :

[10]

- a) What are Beta lacturn antibiotics? Explain MOA, chemistry, SAR and degradation of Penicillin.
- b) Classify Anti-neoplastic agents. Write MOA, chemistry and clinical applications of Antimetabolites.

Q2) Attempt any 5 out of 7 :

[15]

- a) Illustrate anthelmintics
- b) Explain MOA of methotrexate as anti-neoplastic agents
- c) Elaborate mechanism of action and mechanism of resistance of macrolides
- d) Classify Anti-tubercular agents.
- e) Illustrate Preservatives.
- f) Outline QSAR
- g) Classify anti-viral agent.

P.T.O.

Q3) Write any 2 out of 4 : [10]

- a) Write chemistry of Urinary track anti-infective agents.
- b) Azoles as antifungal agents
- c) Classify anti-malarial agents with examples; explain chemistry of Quinolines in detail.
- d) What are Sulphonamides? Elaborate Nomenclature, SAR, Mode of action and Therapeutic uses of Sulphonamide

SECTION - II

Q4) Write of any 1 out of 2 : [10]

- a) Define and classify anti-hypertensive agents? Write detailed note on diuretic class of anti-hypertensive agents.
- b) Discuss nomenclature of steroids and mechanism of action, chemistry, SAR and medicinal uses of progesterone.

Q5) Attempt any 5 out of 7 : [15]

- a) Draw structures of any two anti-thyroid agents.
- b) Write Mode of action of Angiotensin converting enzyme inhibitors.
- c) Illustrate HMG-CO-A reductase inhibitors.
- d) Draw structures of testosterone and 19-nor testosterone
- e) Elaborate uses of Diagnostic agents.
- f) Describe classification of Co-agulents with suitable example
- g) Elaborate Biological actions of mineralocorticoids

Q6) Write any 2 out of 4 : [10]

- a) Antianginals
- b) Loop diuretics
- c) Antiarrhythmic agents
- d) Write detailed note on hypoglycaemic agents



Total No. of Questions : 6]

SEAT No. :

PD5216

[Total No. of Pages : 2

[6491]-235

Third Year Pharm.D

3.6 T : PHARMACEUTICAL FORMULATIONS

(2019 Pattern)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Answers to the two sections should be written in separate answer book.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Figures to the right indicate full marks.

SECTION - I

Q1) Attempt any one of the followings (Any 1 out of 2) **[1×10=10]**

- a) Why tablet coating is required? Discuss in detail the different coating pans used in tablet coating process. **[10]**
- b) Discuss classification, formulation, and evaluation of emulsion. **[10]**

Q2) Attempt any five of the following (Any 5 out of 7) **[5×3=15]**

- a) Differentiate between hard gelatin and soft gelatin capsules. **[3]**
- b) Define disintegrates and super disintegrants with examples. **[3]**
- c) What are Type A and Type B gelatin? **[3]**
- d) Define dosage form and classify it. **[3]**
- e) Define Capsule. Describe in brief about capsule size. **[3]**
- f) Explain the theories of emulsification. **[3]**
- g) What is enteric coating? Discuss in brief about non enteric film forming polymers. **[3]**

Q3) Attempt any two of the followings (Any 2 out of 4) **[2×5=10]**

- a) Discuss defects in tablet with its remedies. **[5]**
- b) Explain about Stability of suspension. **[5]**
- c) Discuss evaluation of liquid orals. **[5]**
- d) Give a detail account on evaluation of granules. **[5]**

P.T.O.

SECTION - II

Q4) Attempt any one of the following (Any 1 out of 2) **[1×10=10]**

- a) Define ointment, classify, and explain ointment bases with examples and mention advantages, disadvantages, and limitations of ointments. **[10]**
- b) Discuss in detail various approaches for implantable drug delivery systems. **[10]**

Q5) Attempt any five of the following (Any 5 out of 7) **[5×3=15]**

- a) Define Controlled and sustained drug delivery system. **[3]**
- b) Add a note on displacement value for suppositories. **[3]**
- c) Write the advantages, disadvantages of nasal drug delivery system. **[3]**
- d) Define ocular, rectal, nasal and transdermal drug delivery system. **[3]**
- e) What is the full form of HEPA? Write its efficiency. **[3]**
- f) Describe the LAL test and rabbit method to determine the presence of pyrogens in parenteral products. **[3]**
- g) What is the significance of isotonicity in ophthalmic preparations. **[3]**

Q6) Attempt any two of the following (Any 2 out of 4) **[2×5=10]**

- a) Add a detail note on Transdermal drug delivery system. **[5]**
- b) Explain sterilization for parenteral. **[5]**
- c) Add a note on Suppositories and its bases. **[5]**
- d) Explain in detail glass containers used for parenteral with its quality test. **[5]**

