

Q.P. Code :01438

[Time: 3 Hours]

[Marks:70]

Please check whether you have got the right question paper.

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

- Q.1 A** Define any five: 5
- i. 'Repatriate' as per Pharmacy act
 - ii. 'New drug' as per D & C act.
 - iii. 'Advertisement' as per DMR (OA) act.
 - iv. 'Manufactured drugs' as per NDPS act
 - v. 'Formulation' as per DPCO
 - vi. 'Contaminant' as per food safety and standards act.
- B** Define 'Medicinal preparations', 'Alcohol' and 'Restricted preparation' as per MTP(ED) act. Distinguish between 5 manufacture in bond and manufacture outside bond 5
- C**
- i. What do you mean by bail? What do you understand by bailable offences? 3
 - ii. Elaborate on Narcotic Drugs and Psychotropic Substances consultative committee. 2
- Q.2 A** Explain the process and calculation of fixation of ceiling price of scheduled formulations 4
- B** Define 'Patent' as per Indian Patent act. Elaborate on process of grant of patent in India. 4
- C** Enlist duties of government analyst. 3
- OR**
- C** Write note on export under bond. 3
- Q.3 A** Enlist the various offences and penalties under NDPS act. 4
- B** Write a note on labelling and packaging of cosmetics. 4
- C** Describe role of ISO 3
- OR**
- C** Comment on special provision under the 'factories act'. 3
- Q.4 A** Write a note on manner of labeling and packaging of ayurvedic drugs. 4
- B** Write a note on 'forms and manners of manufacture of drugs for sale or distribution'. 4
- OR**
- B** Write a note on PCI: compositions and functions. 4
- C** Write the duties and functions of food authority under FSSA 2006. 3
- Q.5 A** Give the additional labelling for following as per D & C Act. 4
- 1) Schedule O
 - 2) Schedule FF
 - 3) Schedule X
 - 4) Schedule G

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- B Elaborate on savings on advertisements as per DMR (OA) act. 4
OR
- B Give the general labelling of tin packed food articles as per FSSAI. 4
C Who was the chairman of DEC? Describe recommendations given by DEC. 3
- Q.6 A i. Define spread over. How is the registration of establishment done as per Bombay shop establishment act? 2
ii. State the offences and penalties under Pharmacy act. 4
- B Elaborate on qualifications and functions of drug inspector 4
C Mr XYZ was caught at Mumbai airport along with 500 doses of medicines to cure depression. Comment on above situation. 3
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Please check whether you have got the right question paper.

- N.B:
1. All questions are compulsory
 2. Write all sub questions together
 3. Draw structures & diagrams wherever necessary.

- Q.1 Answer the following. 15
- a) Give structure and sources of catechin
 - b) Give chemical constituents and source of olive oil
 - c) Give source & specific chemical test for detection of Purine alkaloids
 - d) Give biological source and uses of Hypericum.
 - e) List the advantages of natural pesticides with a suitable example.
 - f) Define Iodine value and its applications in evaluation of fixed oils.
 - g) Give the biological source and use of alfa-alfa.
 - h) Name any one acetylene compound and give the sources of the same.
 - i) What are glycolipids? Give sources of the same.
 - j) Name any two alkaloids derived from phenyl alanine.
 - k) Give the sources of spermaceti wax and its substitutes.
 - l) Name composition and use of any one marketed preparation containing Aloes.
 - m) Give the structure and sources of any one thiophene derivative.
 - n) What are protoalkaloids? Give a suitable example.
 - o) Give composition and uses of any one marketed nutraceutical preparation.
- Q.2 a) Give biosynthesis and source of opium alkaloids. 4
- b) Give biological source, chemical constituents and preparation of castor oil. 4
- c) Discuss 'Momordica' as nutraceutical. 3
- Q.3 a) Give biological sources active constituent and use of cochineal 4
- b) Give an account of 'Pyrethrum' as a natural pesticide. 4
- c) Draw a neat callused diagram of histology of 'Datura'. 3
- Q.4 a) Give sources and method of extraction and uses of 'Pale Catechu'. 4
- b) Give an account of 'Isothiocyanate glycosides'. 4
- c) Give the tests for detection of alkaloids. 3
- Q.5 a) Give an account of 'Ergot alkaloids'. 4
- b) Give an account of 'Alkana'. 4
- c) Write a note on Bortrager's test. 3
- Q.6 a) Give the pharmacognosy of 'Vasaka'. 4
- b) Give an account of Ginseng. 4
- c) Give methods of preservation of fixed oils. 3

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- N.B:
1. All questions are compulsory.
 2. Figures to the right indicate full marks.

- Q.1 a) Answer the following: 12
- (i) State the adverse effects of aspirin on the stomach and kidneys.
 - (ii) Explain the MOA of Sucralfate.
 - (iii) List the adverse effects of atypical antipsychotic agents.
 - (iv) When is ORS therapy indicated?
 - (v) Classify general anesthetic agents.
 - (vi) Compare COX 1 vs COX 2
- Q.1 b) Answer the following: 3
- (i) _____ is used to treat anxiety.
 - (ii) Give the biological actions of platelet activating factor.
 - (iii) How does Senna exert a laxative effect?
- Q.2 a) Discuss the pharmacology of any two the following: 8
- (i) Chlorpromazine
 - (ii) Phenytoin
 - (iii) Diazepam
- Q.2 b) Write a short note on (any one): 3
- (i) Selective serotonin reuptake inhibitors
 - (ii) Theophylline
- Q.3 a) Discuss the pharmacotherapy of any two the following: 8
- (i) Asthma
 - (ii) Migraine
 - (iii) Gout
- Q.3 b) Answer any one of the following: 3
- (i) Give the therapeutic indications of NSAIDs.
 - (ii) What are the side effects of H₁ receptor blockers?
- Q.4 a) Answer any two of the following: 8
- (i) Discuss the pharmacotherapy of IBD.
 - (ii) Classify the drugs used for the treatment of constipation. Add a note on bulk purgatives.
 - (iii) Comment on proton pump inhibitors.
- Q.4 b) Write a short note on any one of the following: 3
- (i) Nonsystemic antacids
 - (ii) Antimotility agents in treatment of diarrhea

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- Q.5 a) Describe the mechanism of action and adverse effects of any two: 8
(i) Ethanol
(ii) Morphine
(iii) L-Dopa
- Q.5 b) Write a short note on (any one): 3
(i) Preanesthetic agents
(ii) Lithium carbonate
- Q.6 a) Answer any two of the following: 8
(i) Give symptoms of opium poisoning. Add a note on its specific antidote.
(ii) Discuss in brief pharmacotherapy of Alzheimer's disease.
(iii) Write a note on arsenic poisoning.
- Q.6 b) Write a short note on (any one): 3
(i) Selective COX 2 inhibitors
(ii) Bradykinin

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[Time: Three Hours]

[Marks:70]

Please check whether you have got the right question paper.

- N.B:
1. All questions are compulsory.
 2. Figures to the right indicate full marks.
 3. Answer all sub questions together
 4. Draw neat labelled diagrams wherever necessary.

Q.1 A Do as directed (any 7):

07

- i) Name two types of columns used in gas chromatography.
- ii) Name two solvents used in $^1\text{H-NMR}$ spectroscopy.
- iii) If compound A is less polar than compound B, which compound will be eluted first in RP HPLC?
- iv) Name any one ion pairing reagent used in HPLC.
- v) Name the technique used in analysis of residual solvents.
- vi) Name one internal standard used in $^1\text{H-NMR}$ spectroscopy.
- vii) Give m/z value of base peak in mass spectrum of benzene.
- viii) Name two solute property detectors in HPLC.

Q.1 B Explain the terms (any 4):

08

- i) FT-NMR
- ii) MALDI
- iii) Capacity factor in HPLC
- iv) Coupling constant
- v) Asymmetry factor.

Q.2 A Answer the following (any 2):

08

- i) With the help of suitable diagram, explain construction and working of reciprocating pumps used in HPLC. Write its one disadvantage.
- ii) Explain the principle involved in separation of ions by ion exchange chromatography.
- iii) Enlist various interfaces used in LC-MS. Discuss any one in detail.

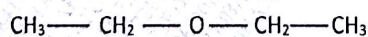
Q.2 B Retention time of a compound when analyzed by HPLC was found to be 15.47 minutes. The peak width at the base was 0.75 min. If the length of the column is 30cm, calculate number of theoretical plates and plate height.

03

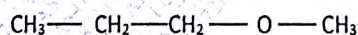
Q.3 A Answer the following (any 2):

08

- i) Distinguish the following pair of compounds with the use of suitable spectroscopic technique. Justify your answer giving its spectral characteristics.



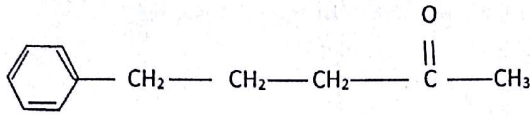
And



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- ii) Depict any two fragmentation pathways for the following compound in mass spectrometry



- iii) Explain the splitting pattern for protons of ethyl methyl Ketone.

Q.3 B Draw a diagram depicting two dimensional chromatographic technique in TLC. Give its advantage. 03

Q.4 A Answer the following (any 2) : 08

- With the help of a suitable diagram explain working of quadrupole mass analyzer.
- Explain any two factors affecting chemical shift in $^1\text{H-NMR}$ spectroscopy.
- Enlist various parameters for validation of analytical method as per ICH guidelines. Explain determination of any one parameter in detail.

Q.4 B Draw the diagram of rheodyne injector in 'LOAD' and 'Inject' position used in HPLC. 03

Q.5 A Answer the following (any 2): 08

- With the help of suitable diagram explain the working of thermal conductivity detector in Gas Chromatography.
- Predict the structure of compound giving following spectral characteristics Molecular formula of the compound is $\text{C}_3\text{H}_8\text{O}_2$
IR absorption : 3500 cm^{-1} , 2941 cm^{-1} , 1213 cm^{-1}

$^1\text{H-NMR}$ (δppm)

4.8 (bs, 2H)

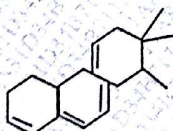
4.05 (t, 4H), $J(\text{Hz})=7.1$

2.75 (quintet, 2H), $J(\text{Hz})=7.1$

Give proper justification for the same.

- Predict the structure of following compound
Molecular formula $\text{C}_4\text{H}_7\text{N}$.
Spectral characteristic of compound are as follows
IR (cm^{-1}) = 2941, 2273, 1460
 $^1\text{H-NMR}$ δppm =
2.72 (septet, 1H), $J(\text{Hz})=6.7$
1.33 (doublet, 6H), $J(\text{Hz})=6.7$
Give appropriate justification for the same.

Q.5 B Predict λ_{max} for the following compound showing UV absorbance. Justify your answer. 03



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Q.6 A Answer the following (any 2):

08

- i) Draw block diagram showing various components of Gas chromatography instrumentation. Explain any two applications of this technique.
- ii) Differentiate between TLC and paper chromatography based on
 - a. Stationary phase.
 - b. Visualization techniques.
- iii) Discuss simultaneous equation method used in UV spectroscopic analysis of a multicomponent formulation.

Q.6 B Give IR absorption Frequencies for the following functional groups:

03

- a) O – H stretch of primary aliphatic alcohol.
- b) N – H stretch of primary aliphatic amine.
- c) C=O stretch of aliphatic acid.

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[Marks:70]

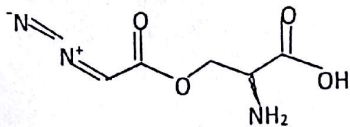
[Time: Three Hours]

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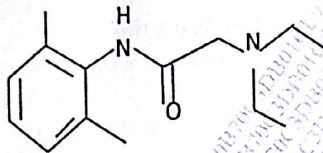
N.B: 1. All Questions are compulsory.

Q.1 Answer the following questions.

i. Identify the structure given below, indicate its use and mechanism of action.



- ii. Give the name of a non-nucleoside reverse transcriptase inhibitor. 01
- iii. Give an example of a cardiac glycoside drug and indicate its use. 01
- iv. Give the structure of a nitrite containing cardiovascular drug. 01
- v. Identify the following structure and indicate its salt form. 01



- vi. Give an example of a potassium sparing diuretic along with its structure. 01
- vii. What is aliskiren? Indicate its use. 01
- viii. Give the structure and biological activity of 3,5-dimethyl 2,6-dimethyl-4-(2-nitrophenyl)-1,4-dihydropyridine-3,5-dicarboxylate. 01
- ix. Give an example with structure of an anticoagulant drug. 01
- X. Give the structure and mechanism of action of 5-(2,5-dimethylphenoxy)-2,2-dimethyl-pentanoic acid. 01
- xi. Give an example of a drug belonging to H₂ receptor antagonist class and indicate its use. 02
- xii. Indicate the chemical class of mepivacaine and its use. 04
- xiii. Give the structure of a thiazolidinedione and name two drugs in this class and indicate their use. 04

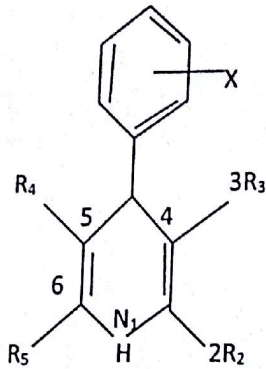
Q.2

- A. Give the structure of the following drugs, classify them into appropriate mechanistic class and discuss their mechanism of action: 04
- Oxaliplatin, 6-thioguanine, procarbazine and 5-fluorouracil
 - B. Discuss HMG - COA reductase inhibitors in detail and support your answer with relevant structure. 04
 - C. Match the following and support your answer with suitable structures of the drugs. 03

S. no.	Drug	IUPAC name
1	Tolbutamide	a. 1-[2-[2-Hydroxy-3-(propylamino)propoxy]phenyl]-3-phenylpropan-1-one
2	Furosemide	b. Adamantan-1-amine
3	Amantadine	c. 4-Chloro-2-[(furan-2-ylmethyl)amino]-5-sulfamoylbenzoic acid
4	Propafenone	

Q.3 A. With respect to the structure given below, answer the following questions. 04

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- a. Identify this structure and name two drugs belonging to this class of compounds.
 b. Indicate the nature of substituents on the 4-phenyl ring and indicate their impact on activity
 c. Ester substitute at C-3 & 5 positions are identical. say true or false. Justify
 d. indicate the effect on activity if the heterocyclic ring is oxidized.
- B. Give the synthesis of glyburide indicating the reagents and reaction conditions used. 03
 C. With respect to antihistaminics, discuss the SAR of H₁ receptor antagonists and indicate the advantages of the second generation H₁ antagonists over the first generation drugs. Support your answer with suitable structures. 04

Q.4 A. Classify diuretics giving suitable structures. Discuss the mechanism of action of site 4 diuretics. 04

B. Give the synthesis of melphalan indicating the reagents and reaction conditions used. 03

C. Give the metabolites of the following drugs. 04

- a. Nifedipine c. Minoxidil e. Benzocaine
 b. Propranolol d. Enalapril

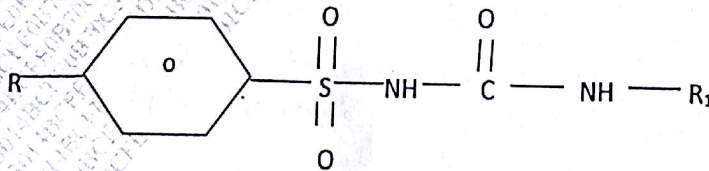
Q.5 A. Classify local an aesthetics giving suitable examples of drugs along with structures belonging to each class. 04

B. Give the synthesis of aziidothymidine indicating the reagents and reaction conditions used. 03

C. Discuss in detail. (any two) 04

1. Vasodilators
 2. Angiotensin II receptor blockers

Q.6 A. With respect to the following structure, answer the questions given below. 04



- a. Identify the chemical class of the above structure and its therapeutic use.
 b. Indicate the substitutions at R-position that will increase activity.
 c. Give the impact of having R₁ =-ethyl and -propyl on the activity

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d. Give the number of chiral centres in the above structure

B. Indicate to which mechanistic class do the following drugs belong. Structure to be given (any 3)

03

- Sotalol
- Quinidine
- Tocainide
- Verapamil

C. Answer the following questions (any 2)

04

- Aspirin is used as an antiplatelet agent say T/F. Justify
- Minoxidil is a calcium channel blocker. Say T/F. Justify
- Mannitol is a site-2 diuretic say T/F. Justify.

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Q.P. Code :01380

[Time: Three Hours]

[Marks:70]

Please check whether you have got the right question paper.

- N.B: 1. All questions are compulsory.
2. Figures to the right indicate full marks.

1. a) i) State the principle of leak test. (02)
ii) State the importance of particulate matter testing in parenteral formulations. (02)
b) Discuss composition of Ophthalmic suspensions. (04)
- OR
- Discuss packaging and labelling of ophthalmic ointments.
- c) Discuss limitations of conventional drug delivery systems and need for sustained release systems. (04)
d) i) State limitations of Arrhenius equation. (02)
ii) State the formulae for calculating Half-life and shelf life of a product. (01)
2. a) Discuss various routes of parenteral administration and significance of pyrogens in parenteral formulations. (04)
b) Write the composition of tear films and its significance. (03)
c) Discuss oxidative degradation pathway and methods to prevent it (04)
- OR
- Discuss photolytic degradation pathway and methods to overcome it.
3. a) Write a note on glass as packaging material for parenterals and methods to distinguish between types of glass. (04)
- OR
- Discuss form, fill, Seal technology utilized for packaging of parenteral formulations.
- b) Describe the physicochemical properties of drugs to be considered during formulation of oral sustained release systems. (04)
c) Discuss significance of accelerated stability studies and importance of ICH guidelines for conducting Accelerated stability studies. (03)

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4. a) Write a note on freeze drying process used in parenteral formulations. (04)
 b) Discuss evaluation tests performed on empty collapsible tubes used for ophthalmic ointments (03)
 c) Describe diffusion controlled sustained release systems. (04)

OR

Describe matrix type sustained release systems

5. a) Discuss composition of large volume parenterals. (04)
 b) How will you evaluate sustained release dosage forms? (03)
 c) Write a note on interaction between parenteral formulation and its container. (04)
6. a) Discuss environmental control in parenteral production facility. (04)
 b) Write about the precautions taken by personnel working in sterile product manufacturing unit. (03)
 c) Discuss various types of contact lens solutions and their packaging (04)