

( 3 Hours )

[Total Marks : 75]

- N.B.:**
1. All question are compulsory
  2. Draw diagram whether necessary.
  3. Figure to right indicate full marks.

**Q.1 MCQ: All questions are compulsory**

**20M**

- 1 For a tablet weighing 75 mg, the limit of weight variation as per IP is  $\pm$  \_\_\_\_\_ w/w
  - a. 5%
  - b. 10%
  - c. 7.5%
  - d. 2.5%
- 2 Binder is used in
  - a. shampoo
  - b. lipstick
  - c. toothpaste
  - d. cold cream
- 3 \_\_\_\_\_ is an example of glidant.
  - a. Microcrystalline cellulose
  - b. Sorbitol
  - c. Avicel
  - d. Aerosil
- 4 Analytical method for characterization of solid crystalline forms
  - a. separating funnel
  - b. Differential scanning calorimetry
  - c. sieving
  - d. sedimentation

5 Water based systems of Aerosols consist of \_\_\_\_\_ phases.

- a. Two
- b. One
- c. Four
- d. Three

6 Tamper resistant packaging provides \_\_\_\_\_

- a. visible evidence if tampered
- b. no visible evidence if tampered
- c. easy tampering
- d. child resistant packaging

7 Distillation is one of the methods of preparation of

- a. Water for Injection
- b. Emulsion
- c. Eye drop
- d. Ear drops

8 Tap density apparatus is used to determine

- a. Partition coefficient
- b. Flow property
- c. organoleptic property
- d. Intrinsic dissolution

9 LAL stands for

- a. Limulus Amebocyte Lysate
- b. Limulus Amebocyte Liquid
- c. Limulus Amebocyte Litre
- d. Limulus Aqueous Liquid

- 10 Which of the following process is used to fill powdered dry solid into soft gelatin capsules
- Accogel
  - Rotofil
  - Rotoweigh
  - Rotosort
- 11 Ophthalmic dosage forms administered adjacent to the eye are called?
- Topical
  - Intraocular
  - Periocular
  - Interocular
- 12 Which of the following capsule size number has the maximum capacity?
- 0
  - 1
  - 2
  - 5
- 13 Ethylene Oxide is most commonly used for
- Membrane sterilisation
  - Moist heat sterilisation
  - Dry heat sterilisation
  - Gaseous sterilisation
- 14 Sealing of soft gelatin capsules is achieved at \_\_\_\_\_
- 77°C -80°C
  - 57°C -60°C
  - 37°C -40°C
  - 97°C -100°C

- 15 Large volume parenteral is administered by using
- IV route
  - IM route
  - SC route
  - SM route
- 16 Bulk characterization test include
- partition coefficient
  - polymorphism
  - pKa determination
  - Dissolution
- 17 Tablet coating defect related to inadequate spreading of coating solution before drying is called as \_\_\_\_
- Marbling
  - Blistering
  - Orange Peel Effect
  - Lamination
- 18 Oil and water phase are mixed at 70 °C in the manufacturing of
- vanishing cream
  - shampoo
  - toothpaste
  - lipstick
- 19 In a multi station tablet press \_\_\_\_ guides the movement of punches.
- Recompression Roller
  - Cam track
  - Capacity Control
  - Feed frame

- 20 Wet gum method is used to manufacture
- syrup
  - suspension
  - aromatic waters
  - emulsion

Q.2 Answer **any two** questions

**20M**

- What are the advantages of granulation? Elaborate on wet granulation technique with examples of equipment used in each step. **10**
- Discuss formulation of parenterals and add a note on importance of isotonicity **10**
- Discuss the compatibility studies and solid state stability studies done during preformulation stage of drug development **10**

Q.3 Answer **any seven** questions

**35 M**

- Give an account of polymers used for film coating of tablets. **5**
- Explain pressure filling method of propellant in Aerosols. **5**
- Write a short note on different types of plastics used as a packaging material for pharmaceuticals. **5**
- Explain pyrogen testing for parenteral preparation **5**
- Write a note on labelling and packaging of Ophthalmic products **5**
- Explain quality control test for soft gelatin capsules **5**
- Explain various studies done to determine solubility profile of a drug **5**
- Write a formula of lipstick. Explain in detail on manufacturing of Lipstick **5**
- Discuss extrusion spheronization process. **5**

Time: 3 hours

Total marks:75

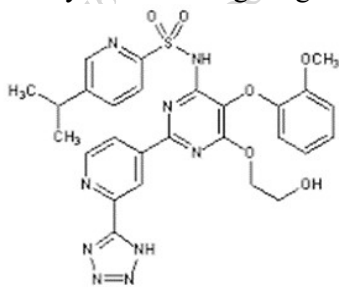
- N.B. : 1. All questions are compulsory**  
**2. Figures to right indicate full marks**

- I. Choose appropriate option for following multiple choice based questions. 20**
  - 1** The piperazine nucleus is present in all of the following drugs except
    - a. Cetirizine
    - b. Chlorocyclizine
    - c. Meclizine
    - d. Phenindamine
  - 2** The gauche conformer of histamine has a preferred affinity for \_\_\_\_\_receptor/s
    - a. H1
    - b. H2
    - c. H3
    - d. H1 and H2
  - 3** The active intermediate of proton pump inhibitors that is responsible for inhibiting the H<sup>+</sup>/K<sup>+</sup> ATPase pump is
    - a. Sulphonamide
    - b. Sulphonyl
    - c. Sulphacetamide
    - d. Sulfenamide
  - 4** Anticancer drug metabolized by Xanthine Oxidase is \_\_\_\_\_
    - a. Allopurinol
    - b. Methotrexate
    - c. Vincristine
    - d. 6-Mercaptopurine
  - 5** Identify the correct pair from the following.
    - a. Thiotepa: Mesna
    - b. Busulfan: Aziridinium ion
    - c. Chlorambucil: L-isomer
    - d. 5-Flurouracil: False substrate
  - 6** Choose the correct non-dihydropyridine calcium channel blocker
    - a. Nifedipine
    - b. Felodipine
    - c. Bepridil
    - d. Nicardipine
  - 7** Chlorthiazide inhibits
    - a. Carbonic anhydrase
    - b. Na<sup>+</sup>/K<sup>+</sup>/2Cl<sup>-</sup> cotransporter
    - c. Na<sup>+</sup>/Cl<sup>-</sup> symporter
    - d. Ca<sup>+2</sup> transporter

- 8 Isoquinoline ring is present in \_\_\_\_.
- Enalapril
  - Captopril
  - Lisinopril
  - Quinapril

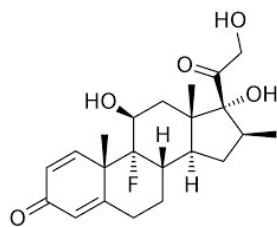
- 9 Amyl nitrite is an ester of \_\_\_\_ & \_\_\_\_.
- Amyl alcohol & nitrous acid
  - Isoamyl alcohol & nitrous acid
  - Amyl alcohol & nitric acid
  - Isoamyl alcohol & nitric acid

- 10 Identify the following drug



- Nesiritide
  - Tozesentan
  - Bosentan
  - Disopyramide
- 11 Select the incorrect statement. Sotalol acts by \_\_\_\_.
- Potassium channel blockage
  - Increasing repolarization phase
  - Shortening repolarization phase
  - Inhibition of  $\beta$  stimulation
- 12 Clopidogrel acts by
- Inhibiting platelet aggregation
  - Antagonizes Vitamin K
  - Inhibits carboxylation of precursor protein
  - Stimulating coagulation
- 13 Antihyperlipoproteinemics like statins mimic -----.
- Mevalonic acid
  - Tetrahedral intermediate in Mevalonic acid pathway
  - HMG CoA
  - Mevastatin

14 Identify the drug



- Dexamethasone
- Prednisolone
- Betamethasone
- Hydrocortisone

15 Hydrocortisone is a reduced form of cortisone. Reduction takes place at

- \_\_\_\_\_.
- 3-one
  - 11-one
  - Double bond between C3 and C4
  - 20-one

16 To which chemical class does Tolbutamide belong to

- Sulphonyl ureas
- Meglitinides
- Thiazolidinediones
- Biguanides

17 The starting material for the synthesis of Benzocaine

- p- amino benzoic acid
- p- amino benzoate
- m-nitro benzoic acid
- o-nitro benzoic acid

18 Sildenafil contains \_\_\_\_\_ ring.

- Pyrazolopyridoindole
- Pyrazolopyrimidine
- Pyrazinopyridine
- Imidazoindole

19 Synthetic thyroxine is available in \_\_\_\_\_ form.

- Levo
- dextro
- meso
- racemic

20 The primary mechanism of action of local anesthetic is

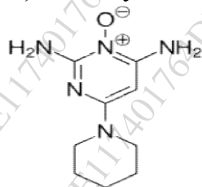
- Activation of ligand-gated potassium channels
- Blockade of voltage-gated sodium channels
- Stimulation of voltage-gated N-type calcium channels
- Blockade the GABA-gated chloride channels



**II. Long Answer Questions (Answer any 2 out of 3) 20**

- Q1** A) Indicate the mechanistic class of cyclophosphamide. Illustrate the chemistry behind its mechanism of action and depict its activation pathway in detail. 4  
 B) Outline the mechanism of action of Doxorubicin and Vincristine. (structure not required) 4  
 C) 5-Fluorouracil is a prodrug. State true or false. Justify 2

- Q2** A) Discuss rationale development of ACE inhibitor containing thiol group. 4  
 B) Outline the synthesis of furosemide mentioning the reagents, intermediates and the reaction conditions. 4  
 C) Identify the structure given below & depict its bioactivation. 2



- Q3** A) Classify local anaesthetic chemically with one structure of each class and describe its mechanism of action. 4  
 B) Discuss 4 structural modifications in corticosteroids to enhance glucocorticoid activity. Support your answer with relevant structures. 4  
 C) Give an example of hypoglycemic containing sugar moiety. Name the mechanistic class to which it belongs. 2

**III. Short Answer Questions (Answer 7 out of 9) 35**

- Q1** Write target enzyme of Pantoprazole and highlight the advantage of proton pump inhibitors over other drugs used in hyperacidity. Depict the activation of Pantoprazole. 5

- Q2** i) Match the following: 3

	Name		Nucleus		Mechanistic class
1	Diltiazem	a	Steroid Lactones	i	Calcium channel blocker
2	Spirolactone	b	Benzothiazepine derivative	ii	Carbonic anhydrase inhibitor
3	Dichlorphenamide	c	1,3-disulfonamide derivative	iii	Aldosterone antagonist

- ii) Give schematic representation of binding interactions between ACE inhibitors/substrate and angiotensin converting enzyme 2

- Q3** Explain mode by which the following drugs exert their action. Mention the clinical condition in which they are used. 5

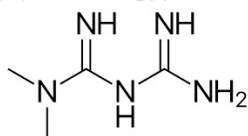
- a. Nesiritide  
 b. Menadione

- Q4** Draw the structure of estradiol and give its IUPAC nomenclature. What is the effect of the following: 5

- i) Addition of hydroxyl group at 6,7 and 11 position  
 ii) Substitution of 17 $\alpha$  position with ethynyl group  
 iii) Removal of-OH group at C3

**Q5** Answer the following questions with respect to given structure.

**5**



- Identify the drug.
- Which class this drug belongs to?
- Comment on mechanism of action of the drug
- Write its therapeutic use
- Write the prominent adverse effect.

**Q6** Classify antiarrhythmic drugs based on mechanism of action. Give one example and structure of each class.

**5**

**Q7** Outline the synthesis of Tolbutamide with reaction conditions and necessary reagents and write its mechanism of action and use.

**5**

- Outline synthesis of Warfarin mentioning the reagents and reaction conditions.
- Outline the mechanism of fibrates and give an example and structure of drug belonging to this class.

**3**

**2**

- What is the advantage of 2<sup>nd</sup> generation H1 antagonist over 1<sup>st</sup> generation. Which structural characteristics contribute to these advantages. Draw the structure of any one 2<sup>nd</sup> generation H1 antagonist.

**3**

- Why o,o-dichloro substitution is necessary in clonidine? Justify.

**2**

**Duration: 3 hrs**

**Total marks: 75**

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

**Q.1** Choose the appropriate option for following multiple choice based questions. (Write the correct option and the correct answer.) **20**

- 1** What is adulterated drug
  - a) Whole or in part of any filthy, putrid or decomposed substance
  - b) Misbranded drug
  - c) Drug in Phase I trial
  - d) Drug in Phase II trial
- 2** Condition to be fulfilled for import of Schedule X drugs (Narcotics & Psychotropic substances) by the importer is-
  - a) The licence granted even before should not be suspended or cancelled
  - b) Must have good source of income
  - c) Must have good relationship with drug inspector
  - d) Only patented products are sanctioned to import
- 3** Requirements and guidelines of factory premises, plants, and equipment are found in \_\_\_\_\_ of Drug and Cosmetic Act'1940.
  - a) Schedule P
  - b) Schedule Q
  - c) Schedule L
  - d) Schedule M
- 4** A person (applicant) who does not have his own arrangement (factory) for manufacture but who wish to use manufacturing facilities own by another licences is called as-
  - a) Manufacturing licence
  - b) Repackaging licence
  - c) Loan licence
  - d) Proprietary licence
- 5** For the wholesale of drug specified in schedule C & CI licence is issued in form?
  - a) 20 A
  - b) 20 B
  - c) 21 B
  - d) 21 C

- 6 The Schedule H on the label denotes
- Biologicals
  - Ophthalmic
  - To be sold by retail on the prescription of registered medical practitioner only
  - Good manufacturing Practices
- 7 Which of the following is the advisory administrative body appointed by the Central government for execution of Drug and cosmetic act 1940?
- Drug Consultative committee
  - Central drug laboratory
  - licensing authority
  - drug analyst
- 8 The functions of the CDL in respect of Homoeopathy medicines carried out at
- Homoeopathic pharmacopoeia laboratory Ghaziabad
  - Homoeopathic pharmacopoeia laboratory Noida
  - National institute of virology
  - Central drug laboratory at kolkata
- 9 As per Pharmacy Act, First register of state for Pharmacist was prepared by?
- Drugs controller of India
  - central government
  - local FDA
  - Dr. B. Mukerjee
- 10 Find the odd one out with reference to the MTP (ED) Act 1955?
- Azithromycin Tablets
  - Deodorants and perfumes
  - Skin products
  - Hair products
- 11 Medicinal cannabis is also known as
- Opium
  - Hemp
  - Heroin
  - Charas
- 12 The Drugs and magic remedy (OA) Act was passed in \_\_\_\_\_.
- 1954
  - 1948
  - 1985
  - 1972

- 13** Animal welfare board is established by
- Central council
  - State council
  - PCI
  - Central government
- 14** NLEM stands for ----
- National laboratory of essential medicines
  - National list of essential medicines
  - New list of essential medicines
  - New laboratory of essential medicines
- 15** R. N. Chopra was the chairperson of
- DEC
  - Hathi Committee
  - Mudaliar Committee
  - Study of drugs enquiry committee
- 16** Pharmacy ethics provide a framework for
- Pharmacist, pharmacy technician
  - IT
  - Deputy commissioner
  - Registrar
- 17** What is MTP an abbreviation for
- Medical Termination of Pregnancy
  - Menstrual Termination of pregnancy
  - Medical Term of Pregnancy
  - Medical testing of pregnancy
- 18** \_\_\_\_\_ act focuses on building better informed citizens
- Right to information
  - Indian penal code
  - Drug and cosmetic act 1940
  - National list of laboratory testing
- 19** Patent protects
- New Invention
  - Discovery
  - Experiment
  - Invention
- 20** Which of the following is the geographical indication property right
- Bandhani print
  - Textile printing
  - Tattoo making
  - Research publication

<b>Q. 2</b>	Answer <b>any two</b> questions	<b>20</b>
<b>I a.</b>	Define Drug and misbranded drugs as per D and C Act 1940 and discuss the classes of drugs which are prohibited for manufacture and sale.	<b>6</b>
<b>b.</b>	Give composition and function of PCI.	<b>4</b>
<b>II a.</b>	Define Opium derivative. Describe power of the central government to control certain operations w.r.t. opium.	<b>5</b>
<b>b.</b>	Elaborate on procedure to conduct experiments on animals as per Prevention of cruelty to animals act.	<b>5</b>
<b>III a.</b>	Enlist required qualifications for Drug inspector and elaborate powers and	<b>6</b>
<b>b.</b>	duties of drug inspector as per D and C act 1940.	
	Elaborate about the minimum requirements to run a Pharmacy as per schedule N of D & C Act.	<b>4</b>
<b>Q. 3</b>	Answer <b>any seven</b> questions.	<b>35</b>
<b>I</b>	Discuss about the conditions to be fulfilled by the importer of the drug to issue an import licence.	<b>5</b>
<b>II</b>	What do you mean by Loan licence? Describe the forms and provisions required to issue a loan licence.	<b>5</b>
<b>III</b>	Give legislative intent of DMR (OA) Act. Define advertisement and magic remedy under DMR (OA) Act.	<b>5</b>
<b>IV</b>	a) Describe the constitution and functions of the institutional animals ethics committee.	<b>2.5</b>
	b) Explain the ceiling price fixation for scheduled formulations and elaborate on the maximum retail price.	<b>2.5</b>
<b>V</b>	What is DEC and discuss the recommendations given by Drug enquiry committee.	<b>5</b>
<b>VI</b>	Define ethics and elaborate the role and responsibilities of Pharmacists in society.	<b>5</b>
<b>VII</b>	Discuss the provisions made for termination of pregnancy as per MTP Act.	<b>5</b>
<b>VIII</b>	Define the term "Right to Information". What are the obligations of public authorities towards the right to information	<b>5</b>
<b>IX</b>	Define Invention and discuss the inventions which are not patentable as per the provisions of Indian Patent Act.	<b>5</b>

\*\*\*\*\*

(3 Hours)

[Total Marks 75]

**Q.1. Choose an appropriate option for the following multiple choice based questions (20M)**

- 1 Digitalis increases force of contraction by \_\_\_\_\_
  - a Accumulating potassium intracellularly
  - b Enhancing opening of sodium potassium ATPase pump
  - c Extruding calcium
  - d Inhibiting sodium potassium ATPase pump
- 2 The \_\_\_\_\_ agents decrease cholesterol absorption and increase its excretion
  - a Bile acid binding resins
  - b Statins
  - c Fibrates
  - d PPAR agonists
- 3 The \_\_\_\_\_ class of drugs are the type of vasodilator
  - a Calcium channel blocker
  - b Sodium potassium ATPase pump
  - c Vasopressin
  - d Fibrates
- 4 Organic nitrates exert their action by
  - a Phosphorylation of myosin light chain kinase
  - b Phosphorylation of myosin
  - c Dephosphorylation of myosin light chain kinase
  - d Dephosphorylation of myosin
- 5 \_\_\_\_\_ is indicated in Diabetes insipidus
  - a Thyroxine
  - b Desmopressin
  - c Bromocriptine
  - d Thyrotropin
- 6 The \_\_\_\_\_ class of diuretics acts mainly on the collecting tubule
  - a Potassium sparing diuretics
  - b Thiazide diuretics
  - c Osmotic diuretics
  - d Loop diuretics

- 7 \_\_\_\_\_ promotes coagulation, thus indicated in haemorrhagic states
- a Warfarin
  - b Heparin
  - c Menadione
  - d Lepirudin
- 8 Thrombolytic therapy is contraindicated in \_\_\_\_\_
- a Acute myocardial infarction
  - b Deep vein thrombosis
  - c Pulmonary embolism
  - d Peptic ulcer
- 9 Aspirin in low doses produces long lasting inhibition of platelet cyclooxygenase (COX) because:
- a Platelets contain low quantity of COX
  - b Platelets cannot synthesize fresh COX
  - c Platelets bind aspirin with high affinity
  - d Platelet COX is inducible
- 10 Mechanism of action of colchicine is \_\_\_\_\_
- a Inhibits gout inflammation, release of chemotactic factor and granulocyte migration
  - b Inhibit absorption of calcium
  - c Reduced preload and afterload
  - d Inhibits platelet generation of thromboxane A<sub>2</sub>, resulting in an antithrombotic effect
- 11 Activation of H<sub>2</sub> receptor results in \_\_\_\_\_
- a Gastric acid secretion
  - b Smooth muscles contraction
  - c Platelet aggregation
  - d Constrict cranial blood vessels
- 12 The \_\_\_\_\_ class of drugs inhibit specific cytokines which play key role in inflammatory cascade of rheumatoid arthritis
- a Immunosuppressants
  - b Immunomodulators
  - c Biological TNF alpha inhibitors
  - d Colchicine



- 13 The COX-2 inhibitors exert \_\_\_\_\_ action
- a Gastric mucosal damage
  - b Lack cardioprotective effect
  - c Inhibit platelet aggregation
  - d Inhibit thromboxane A<sub>2</sub>
- 14 \_\_\_\_\_ is the radioactive isotope of Iodine used in the treatment of Hyperthyroidism
- a Iodine 135
  - b Iodine 127
  - c Iodine 129
  - d Iodine 131
- 15 \_\_\_\_\_ is an insulin secretagogues
- a Acarbose
  - b Miglitol
  - c Glimepiride
  - d Pioglitazone
- 16 Somatostatin and its analogues are indicated in the treatment of \_\_\_\_\_
- a Addison's disease
  - b Acromegaly
  - c Prader-Willi syndrome
  - d Turner syndrome
- 17 The pharmacological action of oral contraceptives is mainly achieved by \_\_\_\_\_
- a Suppression of fertility
  - b Stimulation of fertility
  - c Increasing testosterone level
  - d Inhibition of sperm transport
- 18 Hormone replacement therapy is useful in \_\_\_\_\_
- a Vaginal atrophy
  - b Coronary heart disease
  - c Glomerulonephritis
  - d COPD

- 19 The \_\_\_\_\_ hormone in males triggers sertoli cells to synthesize androgen binding globulin (ABG)
- a Gonadotropin releasing hormone (GnRH)
  - b Luteinizing hormone (LH)
  - c Oxytocin
  - d Follicle-stimulating hormone (FSH)
- 20 Estrogen basic mechanism of action is
- a To stimulation of glucose uptake
  - b To regulate the development and function of the uterus
  - c To stimulates the production of red blood cells
  - d To regulate the glucocorticoid (steroid) hormone cortisol

**Q.2. Long answers (Answer any 2 questions out of 3 questions) (20M)**

- 1 Classify antiarrhythmic. Give detailed account on sodium channel blockers as antiarrhythmic drugs.
- 2 Define and classify anti-coagulants. Give mechanism of action, therapeutic uses and adverse effects of Coumarin anti-coagulants.
- 3 Give any two pharmacological uses of Angiotensin, Leukotrienes, Thromboxane, Substance P and Bradykinin.

**Q.3. Short answers (Answer any 7 questions out of 9 questions) (35M)**

- 1 Give detailed account on Statins in treatment of hyperlipidaemia.
  - 2 Give mechanism of action of Thiazide and Loop diuretics.
  - 3 Give a detailed account on Prostaglandins.
  - 4 Discuss in detail 5-hydroxy tryptamine antagonists.
  - 5 Give mechanism of action and adverse effects of Biguanides.
  - 6 Classify Corticosteroids and discuss any one class in detail.
  - 7 Write a note on growth hormone and its inhibitor.
  - 8 Discuss in detail bioassay of oxytocin.
  - 9 Write a short note on Anabolic steroids.
-

(3 hours)

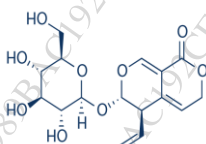
[Total marks: 75]

**N.B.: 1. All questions are compulsory****2. Figures to right indicate full marks****Q. I Choose appropriate option for following multiple choice-based questions. 20**

- 1 Which of the following is not a precursor in shikimic acid pathway.  
a Prephenic acid  
b Mevalonic acid  
c Chorismic acid  
d Quinic acid
- 2 Shinoda, Alkaline reagent and Zinc HCl test are used to identify \_\_\_\_\_.  
a Lignans  
b Alkaloids  
c Flavonoids  
d Glycosides
- 3 Which of the following is the source of Rutin?  
a *Ruta graveolens*  
b *Podophyllum emodi*  
c *Camellia sinensis*  
d *Mentha spicata*
- 4 Diosgenin is used as raw material for synthesis of \_\_\_\_\_.  
a Corticosteroids  
b Paracetamol  
c Acyclovir  
d Insulin
- 5 Which of the following is the source of fennel?  
a *Foeniculum vulgare*  
b *Coriandrum sativum*  
c *Mentha Piperita*  
d *Cinnamomum cassia*
- 6 Which of the following drug consist of phenyl propanoidal constituent in volatile oil?  
a *Foeniculum vulgare*  
b *Coriandrum sativum*  
c *Mentha spicata*  
d *Eugenia caryophyllus*
- 7 Which of the following test is confirmatory test for catechu?  
a Ferric chloride test  
b Gold beater's test  
c Matchstick test  
d Gelatine test

8. \_\_\_\_\_ plant is known as Indian Kino is use for its astringent activity
- Taxus brevifolia*
  - Pterocarpus marsupium*
  - Picrorhiza kurroa*
  - Uncaria gambier*
9. Following are the examples of pathological resin containing drug except
- Benzoin
  - Asafoetida
  - Colophony
  - Guggul
10. Which of the following drug will give combined umbelliferon test positive?
- Benzoin
  - Asafoetida
  - Colophony
  - Guggul
11. Atropine is
- l*-hyoscyamine
  - d*-hyoscyamine
  - dl*-hyoscyamine
  - d*-hyoscine
12. \_\_\_\_\_ enzyme plays main role in conversion of 3 -Hydroxy-3 -methylglutaric acid to mevalonic acid
- HMG Co-A Synthase
  - Aceto acetyl Synthase
  - Mevalonic acid Synthase
  - HMG Co-A Reductase
13. Which of the following drug will give positive modified Bontrager's test?
- Senna
  - Aloe
  - Bitter almond
  - Digitalis
14. \_\_\_\_\_ is the source of Dianthrone glycosides.
- Senna
  - Aloe
  - Bitter almond
  - Digitalis

15. Identify the given structure



- a Picroside
  - b Forskolin
  - c Taxine
  - d Gentiopicroin
- 16 \_\_\_\_\_ metabolite of *A. annua* shows 7-member ring structure.
- a Artemisinic acid
  - b Artemisinic aldehyde
  - c Artemisinin
  - d Dihydroartemisinic acid
- 17 Carotenoids are \_\_\_\_ compounds.
- a C-10
  - b C-20
  - c C-30
  - d C-40
- 18 In the extraction of Sennosides \_\_\_\_\_ is prepared in-situ by addition of Calcium chloride and liquor ammonia 30%.
- a HCl
  - b  $\text{CaCO}_3$
  - c CaOH
  - d  $\text{NH}_4\text{Cl}$
- 19 Microwaves are electromagnetic radiations with a frequency from \_\_\_\_ GHz
- a 0.3 to 300
  - b 300 to 3000
  - c 0.003 to 0.3
  - d 3000 to 300000
- 20 Which of the following is not true about SFE?
- a SCF is easily recoverable from the extract due to its volatility
  - b Low boiling components are extracted at relatively high temperatures.
  - c Non-toxic solvents leave no harmful residue
  - d Thermally labile compounds can be extracted with minimal damage as low temperatures can be employed by the extraction

**Q. II A Answer any TWO out of THREE**

**20**

- 1 a. Give example of an acid resin. Mention it's source, preparation & Chemical tests. 10
- b. Enlist 4 methods use in tracer techniques and explain any 1 method with suitable example.
- 2 Write a short note on the following 10
  - a. HPTLC in phytochemical analysis
  - b. Electrophoresis in drug identification
- 3 Write a short note on source, industrial production, estimation and uses of following. 10
  - a. Sennosides
  - b. Digoxin

**Q.II B. Answer any SEVEN out of NINE 35**

- 1 Write a note on various methods for feeding radioactive precursors. 5
  - 2 Discuss in detail collection & chemistry of Opium alkaloids. 5
  - 3 Illustrate pathway for biosynthesis of GPP with suitable structures. 5
  - 4 Discuss phytochemistry of Cardiac glycosides, illustrate your answer with appropriate structures. 5
  - 5 Discuss the following phytoconstituents with respect to their isolation and identification. 5
    - a. Rutin
    - b. Caffeine
  - 6 Write a note on the analysis of following phytoconstituents 5
    - a. Citral
    - b. Podophyllotoxin
  - 7 Explain in short with suitable example the modern method of extraction for Volatile oils. 5
  - 8 Write a note on drugs containing iridoids (Any two). 5
  - 9 Write a note on UV Spectroscopy in the identification of crude drugs. 5
-