

Duration: 3 Hrs

Total marks: 75

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

Q. 1 Choose appropriate option for following multiple choice based questions. 20

- 1 The example of essential fatty acid is _____.
 - a Linolenic acid
 - b Palmitic acid
 - c Stearic acid
 - d Oleic acid

- 2 The amino acid containing indole group is _____.
 - a Leucine
 - b Tryptophan
 - c Histidine
 - d Lysine

- 3 The process of change in optical rotation from dextrorotatory (+) to levorotatory (-) is referred to as
 - a Mutarotation
 - b Epimerization
 - c Racemization
 - d Inversion

- 4 _____ is the regulatory enzyme in glycolysis.
 - a Phosphofructokinase
 - b Enolase
 - c glucose-1,6 biphosphatase
 - d aldolase

- 5 The reaction catalyzed by pyruvate dehydrogenase complex involves _____.
 - a Oxidative Phosphorylation
 - b Oxidative decarboxylation
 - c Oxidative carboxylation
 - d Oxidative dephosphorylation

- 6 Intermediate that is common in glycolysis, glycogenesis and glycogenolysis:
 - a Glucose 1,6 biphosphate
 - b Glucose- 1 phosphate
 - c Glucose- 6 phosphate
 - d Fructose 1,6 biphosphate

- 7 NADPH is produced by _____.
- a Krebs cycle
 - b Anaerobic glycolysis
 - c Uronic acid pathway
 - d Hexose monophosphate pathway
- 8 _____ is liberated when Citrate converted to Cis Aconitate.
- a water
 - b hydrogen
 - c hydrogen peroxide
 - d carbon dioxide
- 9 _____ separates the two strands of DNA during replication.
- a Gyrase
 - b Helicase
 - c Topoisomerase
 - d DNA polymerase
- 10 _____ is a termination codon.
- a UAG
 - b UUA
 - c UUG
 - d AUA
- 11 Transcription of _____ strand of DNA results in mRNA formation.
- a Template
 - b Anti-template
 - c Coding
 - d Transcript
- 12 Carbamoyl phosphate synthetase II is inhibited by _____.
- a ATP
 - b PRPP
 - c GTP
 - d Biotin
- 13 _____ is the end product of purine metabolism, that has been implicated in the gout disorder.
- a Uric acid
 - b Urea
 - c Hypoxanthine
 - d Carbon dioxide

- 14 _____ is the cofactor involved in regulating step of fatty acid synthesis.
- a Biotin
 - b Pyridoxal phosphate
 - c Ascorbate
 - d Aspartate
- 15 Conversion of acetoacetyl CoA to acetyl CoA is catalyzed by_____.
- a Thiolase
 - b hydratase
 - c enolhydratase
 - d Hydrolase
- 16 Hydration step in β -oxidation of fatty acids is catalyzed by_____.
- a Enoyl CoA hydratase
 - b Acyl CoA hydratase
 - c Succinyl CoA hydratase
 - d Enoyl CoA hydrolase
- 17 Bile acids are synthesized from _____.
- a Fatty acids
 - b Cholesterol
 - c Bilirubin
 - d Proteins
- 18 Urea cycle occurs in
- a cytoplasm
 - b endoplasmic reticulum
 - c ribosomes
 - d mitochondria
- 19 The relative affinities of the substrate and inhibitor with the enzyme determines the degree of _____ inhibition.
- a Competitive
 - b Non-competitive
 - c Uncompetitive
 - d Suicide
- 20 Aldolase enzyme belongs to _____ class according to IUB.
- a Oxidoreductase
 - b Transferase
 - c Hydrolase
 - d Lyase

- Q. 2 Answer any two questions** **20**
- a i) Describe the three rate limiting steps for reversal of glycolysis with respect to gluconeogenesis. **3**
 ii) Outline Pentose phosphate pathway and state its importance. **3**
 iii) Explain glycogenesis with respect to names of the intermediates, enzymes and cofactors. **4**
- b i) Discuss the synthesis of AMP and GMP from IMP with respect to name and structures of intermediates and enzymes involved. **5**
 ii) Explain the steps involved in prokaryotic replication in brief. **5**
 iii) Name the disorders of purine metabolism and give one example of xanthine oxidase inhibitor. **5**
- c i) Discuss enzyme inhibition with respect to Michealis plot along with suitable examples. **5**
 ii) Explain secondary structure of protein. Draw the structure of lecithin. **5**
- Q. 3** **35**
- i) Draw the structure of Sucrose and Palmitic acid. Explain the term anomer with suitable examples.
- ii) Write a note on phospholipid with respect to classification with structures.
- iii) Give the names and structures of substrate and product for the following enzyme catalysed reactions : a) Pyruvate kinase b) HMG CoA synthase
- iv) Discuss the steps involved in β -oxidation of saturated fatty acid.
- v) Explain Urea cycle and give its physiological importance.
- vi) Give the reactions catalysed by FAS complex in the biosynthesis of fatty acid.
- vii) Discuss deamination and decarboxylation reactions involved in amino acid metabolism.
- viii) Outline the steps involved in prokaryotic translation.
- ix) Classify enzymes based on the IUB system with suitable examples.
-

Time- 3 hrs

Marks 75

Q. I	MCQ	Mark
1	cell swelling is a result of	1
a	decrease activity of sodium pump	
b	increase glycogen production	
c	decrease protein synthesis	
d	decrease lactic acid secretion	
2	Which of the following is the hallmark of programmed cell death?	1
a	Apoptosis	
b	Coagulation Necrosis	
c	Fibrinoid necrosis	
d	Liquefaction necrosis	
3	Wound contraction is mediated by ?	1
a	Epithelial tissue	
b	Myofibroblast	
c	Collagen	
d	Elastin	
4	Cells while crossing the blood vessel wall may pass through the endothelial cellular gaps. This transport is called as _____	1
a	Intracellular Transport	
b	Transcellular Transport	
c	Paracellular Transport	
d	Symport	
5	A purulent exudate, is an inflammatory exudate rich in leukocytes, cell debris and, in many cases, microbes is called as _____	1
a	Lymph	
b	Transudate	
c	Plural Fluid	
d	Pus	
6	Hypertension caused by chronic kidney disease is called as _____	1
a	Primary Hypertension	
b	Secondary Hypertension	
c	Nonlethal Hypertension	
d	Essential Hypertension	
7	Heart attack occurs when there is blood clotting in	1
a	Renal Artery	
b	Mesenteric artery	
c	Hepatic artery	
d	Coronary artery	

- 8 Inability of the kidneys to perform excretory function leading to retention of nitrogenous waste products from the blood is called as _____ 1
- a Renal Failure
b Renal calculi
c Urinary Tract Infection
d Kidney stone
- 9 The Primary cause of heart failure is _____ 1
- a Arterial hypertension
b Coronary atherosclerosis
c Myocardial dysfunction
d Valvular dysfunction
- 10 The acini are uniformly enlarged from the level of the respiratory bronchiole to the terminal alveoli in _____ emphysema 1
- a Pan acinar
b Para septal
c Irregular
d Distal
- 11 A _____ is a mucosal perforation that penetrates the muscularis mucosae and lamina propria, usually produced by acid-pepsin aggression 1
- a Ischemic heart disease
b Peptic ulcer disease
c Brain stroke
d Schizophrenia
- 12 A lack of which of these will result in abnormally large red blood cells and a condition called megaloblastic anemia? 1
- a Oxygen
b Vitamin C
c Carbon dioxide
d Vitamin B-12 and folic acid
- 13 Parkinson's disease is primarily associated with the gradual loss of _____ in the substantia nigra of the brain 1
- a Cholinergic neurons
b Dopaminergic neurons
c Serotonergic neurons
d Adrenergic neurons
- 14 In _____, the pancreas makes little or no insulin 1
- a Type 1 diabetes mellitus
b Type 2 diabetes mellitus
c Nephrogenic diabetes insipidus
d Cranial diabetes insipidus.
- 15 The _____ occurs basically due to excessive firing of the neurons and fast spread of these impulses over the brain 1
- a delusions
b hallucinations
c epilepsy
d thought disorder

- 16 Which is correct regarding IBD 1
- a Toxic megacolon occurs Crohn's and Ulcerative colitis
 - b Risk of developing ulcerative colitis is higher in smokers than non-smokers
 - c Cobblestone appearance on bowel wall is more characteristic of Crohn disease
 - d Patients with Crohn disease are more at a risk of colorectal cancer than UC patients
- 17 These factors increase risk of osteoporotic fracture: 1
- a High bone mineral density
 - b Poor muscle strength
 - c High body weight
 - d High lean mass
- 18 Choose the odd one with respect to physical carcinogens 1
- a Tobacco smoke
 - b Gamma rays
 - c UV rays
 - d X-rays
- 19 _____ is a chronic inflammatory disease caused by the 1
- pathogenic bacterium *Mycobacterium tuberculosis*.
- a Arthritis
 - b Asthma
 - c Tuberculosis
 - d Pulmonary hypotension
- 20 Which of the following is the cause of Syphilis. 1
- a *Entamoeba histolytica* is a type of parasite
 - b *C. botulinum* is a type of bacteria
 - c *Plasmodium* parasite
 - d The parasite *Treponema pallidum*
- II. Long Answers (Answer 2 out of 3) 2 x 10 =20
- A What are the causes of cell injury? Write a short note on Cell Death Acidosis & Alkalosis and Electrolyte imbalance
 - B Describe the different types of angina in detail. Discuss Major Risk factors and pathophysiology of Angina pectoris.
 - C Discuss in detail signs and symptoms, etiology and pathogenesis of epilepsy.
- III. Short Answers (Answer 7 out of 9) 7 x 5 =35
- A Explain in detail the process of WBC migration.
 - B Define bronchial asthma and mention types, pathological causes and etiopathogenesis asthma
 - C Discuss pathogenesis of type 1 and type 2 diabetes mellitus
 - D Discuss signs, symptoms and etiology of schizophrenia
 - E Enlist Carcinogenic Factors. Discuss the mechanism of carcinogenesis.
 - F Define IBD. Differentiate between Ulcerative Colitis and Crohn's Disease as per signs, symptoms, etiology and pathogenesis
 - G Discuss Various symptoms, causes and pathogenesis of rheumatoid arthritis

- H Discuss symptoms and pathogenesis of typhoid
- I Write a note on etiology, transmission, and symptoms of Gonorrhoea

Duration: 3 Hours

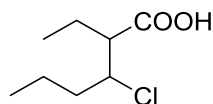
Total marks: 75

N.B.: 1. All questions are compulsory

2. Figures to right indicate full marks

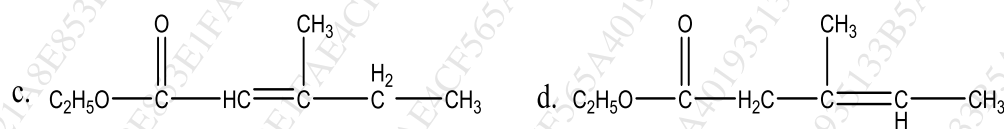
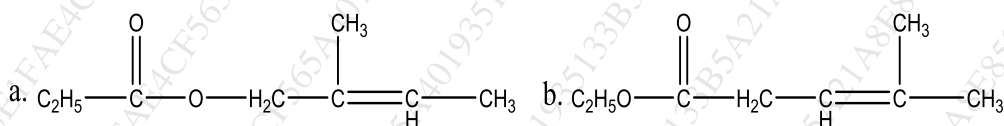
Q. 1 Choose appropriate option for following multiple choice based questions. 20

1 What is the IUPAC Name for the following compound?



- a 4-chloro-3-heptanoic acid
 b 2-chloro-1-ethylpentanoic acid
 c 3-chloro-2-ethylpentanoic acid
 d 3-chloro-2-ethylhexanoic acid

2 Identify the correct structure for ethyl 3-methylpent-3-enoate



- a a
 b b
 c c
 d D

3 Which of the following nitro compounds will show tautomerism?

- a Cl_3NO_2
 b $\text{C}_6\text{H}_5\text{NO}_2$
 c $(\text{CH}_3)_3\text{CNO}_2$
 d $\text{CH}_3\text{CH}_2\text{NO}_2$

4 Methyl propyl ether and diethyl ether are the example of

- a Chain isomerism
 b Metamerism
 c Functional group isomerism
 d Chain isomerism

5 Select correct IUPAC nomenclature for neohexane.

- a 2-methylbutane
 b 2-methylpentane
 c 2,2-dimethylbutane
 d 2,2-dimethylpropane

- 6 Chlorination of methane to give CCl_4 is an example of
- electrophilic addition
 - free radical substitution
 - nucleophilic addition
 - electrophilic substitution
- 7 Why isotope effect is observed in E_2 reaction?
- because it is bi molecular reaction
 - because it is second order reaction
 - because breaking of B carbon-hydrogen occur in rate determining step
 - none of these
- 8 Which of the following reacts with HBr in presence of a peroxide to give anti Markovnikoff's product
- 1-butene
 - 2,3 dimethyl 2 butene
 - 2- butene
 - 3 hexene
- 9 Which one of the following has sp^2 hybridization?
- methane
 - ethane
 - acetylene
 - Ethylene
- 10 Which statement best describes the mechanism of $\text{S}_{\text{N}}2$ reaction?
- Front side attack with retention of configuration
 - Front side attack with inversion of configuration
 - Back side attack with retention of configuration
 - Back side attack with inversion of configuration
- 11 Which of the following will be least reactive in an $\text{S}_{\text{N}}2$ reaction?
- 1-chloro-4-methylhexane
 - 1-chloro-2-ethylhexane
 - 3-chloroheptane
 - 1-chloro-3-ethylpentane
- 12 Which nucleophile is required to convert 1-bromobutane to butyl methyl ether?
- ethoxide ion
 - methoxide ion
 - butoxide ion
 - hydroxide ion
- 13 Acetone reacts with methyl magnesium bromide in an inert solvent to give an adduct, which, on acidic hydrolysis gives --
- An alcohol which gives turbidity almost immediately with Lucas reagent
 - An aldehyde
 - An alcohol which gives turbidity in 10 min with Lucas reagent
 - An alcohol which gives no visible turbidity with Lucas reagent

- 14 Tollen's reagent is --
- 2,4 Dinitrophenylhydrazine in H₂SO₄
 - Sodium carbonate, Sodium citrate & Copper sulphate pentahydrate
 - Chromium trioxide with dilute H₂SO₄
 - Silver nitrate with NaOH and Ammonium hydroxide
- 15 Which statement about the carbonyl group is not true?
- The carbonyl carbon is sp² hybridised
 - The bond angles among the three atoms attached to the carbonyl carbon are 120 degree.
 - The three atoms attached to the carbonyl carbon form a non-planar geometry
 - The carbonyl group forms resonance structures
- 16 What type of reaction takes place upon treatment of a ketone with HCN to form a cyanohydrin?
- Nucleophilic addition
 - Nucleophilic substitution
 - Electrophilic addition
 - Electrophilic substitution
- 17 On heating aldehydes with Fehling's solution, _____ coloured precipitate is formed
- Pink
 - Black
 - Yellow
 - Brick red
- 18 Arrange the following compounds in order of decreasing acidity?
BrCH₂CH₂COOH (2) CH₂CH(Br)COOH (3) CH₃CH(F)COOH
- (1) > (2) > (3)
 - (3) > (2) > (1)
 - (3) > (1) > (2)
 - (2) > (1) > (3)
- 19 Which of the following compound is expected to be most basic?
- Aniline
 - Methylamine
 - Hydroxylamine
 - Ethylamine
- 20 The products of the reaction of a carboxylic acid & an alcohol would be
- ketone & water
 - amide & water
 - acid chloride & water
 - ester & water

- Q. 2 Answer any TWO questions** **20**
1. a) Explain the mechanism for the formation of 2-Bromo, 2-methyl propane and 1-Bromo, 2-methyl propane from 2-methyl propene on reaction with HBr. Comment on the stabilities of intermediates and products. **10**
 b) Write a note on dehydration of 2-butanol. Give detailed reaction mechanism.
 2. a) A. Predict the product of the reaction of neopentyl bromide and methanol. Depict the suitable mechanism for the same. **10**
 b) Give reason: Why polar solvents favors S_N1 and polar aprotic solvents favors S_N2 reaction.
 3. Write the products and detailed reaction conditions for the following reactions- **10**
 - i. 2-Methyl pentanal + Dilute NaOH
 - ii. 1-Phenylpropanone + Dilute NaOH
 - iii. Methanal + Concentrated NaOH
 - iv. 2,2-Dimethylbutanal + Concentrated NaOH
 - v. Benzaldehyde + Acetic Anhydride
- Q. 3 Answer any SEVEN questions** **35**
1. With a help of a suitable aldehyde or a ketone as a starting material, discuss the mechanism of synthesis of the following compounds (1) 2-Methyl-2-butanol (2) 2-Butenal **5**
 2. Give any two methods of synthesis of aliphatic carboxylic acids. Depict the mechanism for any one of these methods. **5**
 3. a) Draw structures for the following compounds. (Any 3) **5**
 - i. 1-ethoxy-2-nitropropane
 - ii. 5-chlorohex-3-en-2-one
 - iii. 3-cyclopentylbutanamide
 - iv. 5-fluorohex-3-yn-1-ol
 b) Which type of tautomerism but-1-en-1-amine exhibit? Draw a structure of its tautomer.
 4. Discuss in detail halogenation of alkanes with example. Give use of paraffin **5**
 5. Explain SP^2 hybridization in Ethene. Give shape and geometry. **5**
 6. Give the name of reagents to carry out following conversions. **5**
 - i. Ethyl alcohol to acetic acid
 - ii. 1-propanol to propene
 - iii. 2-bromo-2-methylpropane to 2-methylpropene
 - iv. 2-bromopropane to propane
 - v. Propene to 1-bromopropane
 7. Explain **any three** methods for synthesis of alcohols. **5**
 8. Write structures and uses of (1) Hexamine (2) Vanilin (3) Acetone (4) Benzaldehyde (5) Cinnamaldehyde **5**
 9. Give reasons - Alkyl amines are more basic than ammonia Write a note on Hinsberg test. Write structure and uses of ethanolamine & amphetamine **5**

Duration: 3 hours

Total Marks : 75 M

N.B. 1. All questions are compulsory

2. Figures to the right indicate full marks.

Q1. Choose the appropriate option for following multiple choice based questions. 20M

- 1 _____ is an extension of dura mater that separates two hemispheres of the cerebrum.
 - a Falx cerebri
 - b Falx cerebelli
 - c Tentorium cerebelli
 - d Tentorium cerebri

- 2 The majority of the water from the indigestible food is absorbed in the _____.
 - a Stomach
 - b Esophagus
 - c Small Intestine
 - d Large Intestine

- 3 Gaseous exchange takes place in which of the following part of the respiratory System?
 - a Alveoli
 - b Pharynx
 - c Larynx
 - d Trachea

- 4 Kidney is located between _____.
 - a 5th thoracic vertebrae to 3rd lumbar vertebrae
 - b 8th thoracic vertebrae to 12th lumbar vertebrae
 - c 10th thoracic vertebrae to 5th lumbar vertebrae
 - d 12th thoracic vertebrae to 3rd lumbar vertebrae

- 5 _____ is an example of Exocrine gland.
 - a Sudoriferous
 - b Thymus
 - c Pancreas
 - d Ovaries

- 6 _____ is the process by which the fetus is expelled from the uterus through the vagina.
 - a Implantation
 - b Parturition
 - c Gestation
 - d Embryogenesis

- 7 Which of these neuroglial cells are star shaped, largest and most numerous having many processes?
- a Oligodendrocytes
 - b Astrocytes
 - c Microglia
 - d Ependymal cells
- 8 _____ portion of the stomach opens into the small intestine.
- a Cardiac
 - b Fundic
 - c Pyloric
 - d Body
- 9 _____ reduces friction between the membranes in the lungs and thus allow them to slide easily over one another during breathing.
- a Pericardial fluid
 - b Pleural fluid
 - c cerebrospinal fluid
 - d Peritoneal Fluid
- 10 Capillary hydrostatic pressure during filtration is built in the glomerulus as_____.
- a size of Bowman's capsule is significantly large
 - b an afferent arteriole is narrow compared to efferent
 - c Bowman's capsule is cup-shaped
 - d an efferent arteriole is narrow compared to afferent
- 11 Which of the following hormones are known as gonadotropins?
- a LH and Oxytocin
 - b LH and vasopressin
 - c LH and FSH
 - d FSH and Oxytocin
- 12 The ducts of the seminal vesicles produce _____.
- a Mucus
 - b Testosterone
 - c An alkaline, viscous fluid that contains fructose
 - d Milky, slightly acidic fluid
- 13 _____ is a layer of simple epithelium that covers the surface of the ovary.
- a Tunica vaginalis
 - b Tunica albuginea
 - c Germinal epithelium
 - d Serosa

- 14 _____ is one of the enlargements seen when the spinal cord is viewed externally.
- a Thoracic enlargement
 - b Cervical enlargement
 - c Caudal enlargement
 - d Sacral enlargement
- 15 _____ helps in emulsifying fats.
- a Pancreatic Juice
 - b Bile
 - c Salivary Gland
 - d Gastrin
- 16 In which of the following structure, C shaped horizontal rings of hyaline cartilage is observed?
- a Trachea
 - b Lungs
 - c Bronchus
 - d Esophagus
- 17 Fertilization of secondary oocyte occurs in _____ of the oviduct.
- a Ampulla
 - b Fimbriae
 - c Isthmus
 - d Infundibulum
- 18 _____ hormone increases the flexibility of the pubic symphysis, and dilates cervix during labor.
- a Relaxin
 - b Inhibin
 - c Progesterone
 - d Estrogen
- 19 _____ hormone is thought to promote sleepiness.
- a Thymosin
 - b Melatonin
 - c Inhibin
 - d Glucocorticoids
- 20 _____ phase of the female reproductive cycle is also known as proliferative phase.
- a Menstrual
 - b Post ovulatory
 - c Pre ovulatory
 - d Ovulation

Q2. Attempt the following (Any TWO)

20M

- a. Explain the formation, composition, circulation and functions of Cerebrospinal fluid, add a note on spinal meninges.
- b. Draw a neat labeled diagram of the respiratory system. Explain the process of oxygen transport in blood, and factors affecting affinity of Haemoglobin for oxygen.
- c. Draw a neat labeled diagram of pituitary gland. Write a note on anterior pituitary cells and their hormones.

Q3. Attempt the following (Any SEVEN)

35M

- a. Explain the structure of the reflex arc with a neat labeled diagram.
- b. Describe the structure of a Neuron, and give the classification of neurons.
- c. Elaborate on the role of pancreas in digestion.
- d. Describe in detail the anatomy and structure of the small intestine.
- e. With the help of a neat labeled diagram explain structure and function of alveoli.
- f. Explain in detail blood supply to the kidney.
- g. Write in detail about the renin–angiotensin–aldosterone or RAA pathway.
- h. Enlist the phases of the Female Menstrual Cycle, and explain any two phases with respect to uterine and ovarian changes.
- i. Explain in detail hormonal regulation of the Testes.
