R0219	Sub. Code
	508101

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

BioMedical Science

HUMAN ANATOMY AND PHYSIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which of the following organelles is responsible for producing energy in the cell? (CO1, K1)

   (a) Mitochondria (b) Chloroplasts

   (c) Golgi apparatus (d) Lysosomes

2. Which of the following blood cells are responsible for carrying oxygen to the tissues? (CO1, K1)

   (a) Erythrocytes (b) Leukocytes

   (c) Thrombocytes (d) Plasma

3. Which of the following valves prevents backflow of blood from the right ventricle to right atrium? (CO1, K1)

   (a) Mitral valve (b) Tricuspid valve

   (c) Pulmonary valve (d) Aortic valve

4. What is the function of motor neurons? (CO2, K1)

(a) To carry information from the sense organs to brain

(b) To carry information from the brain to the muscles

(c) To communicate with other neurons

(d) To control and coordinate the body's activities

5. The tiny air sacs present in human lungs is called (CO3, K1)

(a) Alveoli (b) Bronchus

(c) Bronchioles (d) All of the above

6. This artery passes blood to the kidney (CO3, K1)

(a) Common iliac (b) Cystic

(c) Renal (d) Coeliac

7. Urine formation involves three main processes namely (CO4, K1)

(a) Glomerular filtration

(b) Reabsorption

(c) Secretion

(d) All the above

8. Which of the following is the main function of the pancreas? (CO5, K1)

(a) To produce insulin and glucagon

(b) To filter blood

(c) To store iron

(d) To produce bile

9. Which of the following statement regarding blood pressure is not true? (CO5, K1)

(a) Blood pressure is constant throughout the body

(b) Blood pressure varies throughout the cardiac cycle

(c) Blood pressure is regulated by the renin-angiotensin-aldosterone pathway

(d) Blood pressure can be altered by the adrenaline

10. Which of the following is not a hormone? (CO4, K1)

(a) Insulin (b) Glucagon

(c) Oxytocin (d) Vitamin D

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) Difference between RBC and WBC. (CO1, K3)

Or

(b) Explain about ECG. (CO1, K5)

12. (a) Difference between arteries and veins. (CO2, K4)

Or

(b) How is potassium and calcium regulated in kidney? (CO2, K4)

13. (a) Write about the Structure and functions of reproductive organs. (CO3, K5)

Or

(b) General characteristics of Hypothalamus. (CO3, K2)

14. (a) Write short note on Digestion absorption and movement of GI tract. (CO4, K3)

Or

(b) Write short note on blood. (CO4, K3)

15. (a) Explain in brief about coronary circulation. (CO4, K5)

Or

(b) Write short note on spleen. (CO5, K6)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Explain the structure of heart with diagram. (CO1, K5)

Or

(b) Explain Cardiac cycle. (CO1, K5)

17. (a) Classify WBC's and write about its functions. (CO2, K4)

Or

(b) What is tissue? Classify them. Write functions of muscular tissue. (CO2, K4)

18. (a) Explain general characteristic and classification of hormone. (CO3, K4)

Or

(b) Briefly explain the structure of kidney and nephron. (CO3, K5)

19. (a) Describe the process involved in urine formation. (CO4, K5)

Or

(b) Explain the accessory organs of liver, spleen and pancreas. (CO4, K5)

20. (a) Define structure and function of Hemoglobin briefly. (CO5, K6)

Or

(b) Write in detail about hormonal regulation of ovulation and fertilization. (CO5, K5)

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R0220	Sub. Code
	508102

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Bio Medical Sciences

MEDICAL BIOCHEMISTRY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which type of cancers form in bone and soft tissues, including muscle, fat, blood vessels, lymph vessels, and fibrous tissue (such as tendons and ligaments). (CO2, K1)

   (a) Leukemia (b) Sarcoma

   (c) Lymphoma (d) Carcinoma

2. What gives people the best possible chance of survival? (CO1, K2)

   (a) Chemotherapy

   (b) Cancer Screening

   (c) Healthy lifestyle choices

   (d) Early diagnosis

3. Which cancer treatment uses cell killing (cytotoxic) drugs? (CO1, K1)

   (a) Biological therapy (b) Chemotherapy

   (c) Radiotherapy (d) Total body irradiation

4. ———————— studies of patient experience provide an essential perspective complementing the more traditional approach of research. (CO3, K3)

(a) Cross – selectional

(b) Qualitative

(c) Quantitative

(d) Longitudinal

5. Among cancer populations, reported prevalence rates of perceived posttraumatic growth range from ————————. (CO2, K4)

(a) 5% to 10% (b) 15% to 33%

(c) 47% to 51% (d) 53% to 90%

6. Which tumour marker is the most specific for pancreatic carcinoma? (CO2, K5)

(a) Alphafetoprotein (b) CA125

(c) CA15-3 (d) CD19-9

7. Which one of the following is a B cell neoplasm? (CO3, K2)

(a) Non-Hodgkin's lymphoma

(b) Acute lymphoblastic leukemia

(c) Burkitt's lymphoma

(d) Hodgkin's disease

8. The following are alkylating agents EXCEPT. (CO4, K3)

(a) Cyclophosphomide (b) Bleomycin

(c) Thiotepa (d) Treosulphan

9. Occurrence of an excessive fibrocollagenous stroma in neoplasm is known as (CO4, K4)

(a) Dysplasia (b) Desmoplasia

(c) Hyalinization (d) Metaplasia

10. Cytotoxic T cells are capable of recognizing. (CO5, K5)

(a) Peptide and nuclear antigen

(b) Membrane bounded antigen

(c) Cytoplasmic antigen

(d) All the above

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) What is a ligand? Explain the mechanical association with the ligand binding to a receptor. (CO1, K4)

Or

(b) Write short note on immunotherapy. (CO1, K2)

12. (a) What is angiogenesis? Explain the pro-angiogenetic, anti-angiogenetic pathways. (CO3, K5)

Or

(b) Distinguish the advantages and disadvantages of chemotherapy. (CO4, K3)

13. (a) Write the WHO classification on tumour. (CO4, K2)

Or

(b) Explain in detail about the drug delivery by using nanoparticles for the treatment of cancer. (CO1, K6)

14. (a) Summarize the relationship between the oncogene products and their growth factors. (CO3, K6)

Or

(b) Difference between oncogenes and tumour suppressor gene. (CO3, K4)

15. (a) What are the types of mutation? Structural and Numerical abnormalities. (CO3, K2)

Or

(b) What are the anti-cancer agents being used in the therapeutic approach of cancer? (CO1, K2)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Illustrate the mechanism of deregulation of cell cycle during cancer. (CO1, K2)

Or

(b) What is cell cycle? Explain in detail. (CO1, K2)

17. (a) What is cancer? Explain its types and classification of cancer tumour. (CO2, K2)

Or

(b) What is the critical analysis about the types of cancer therapy? (CO1, K4)

18. (a) What are the types of structural chromosomal abnormalities? Explain the types of translocations related with cancer. (CO1, K2)

Or

(b) Explain the types of vaccine in detail. (CO1, K4)

19. (a) What is a carcinogenesis? How are the mutation cause the loss of cell cycle control? (CO5, K1)

Or

(b) What is the currently available cancer diagnostic technique? Explain. (CO1, K2)

20. (a) Explain the targeted drug delivery system against anti-cancer activity with a diagram. (CO1, K5)

Or

(b) Explain the role of apoptosis and necrosis in cancer with diagram. (CO5, K2)

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R0221	Sub. Code
	508103

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Biomedical Sciences

CLINICAL PATHOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which of the following is NOT a sign of irreversible cell injury? (CO1, K2)

   (a) Nuclear degeneration

   (b) Swelling of cell organelles

   (c) Release of cellular enzymes

   (d) Influx of calcium into mitochondria

2. Regarding transudates: (CO1, K1)

   (a) There is increase in cells in transudate

   (b) There is rise in protein

   (c) There is decreased oncotic pressure due to decrease in albumin

   (d) There is increase in capillary permeability

3. A 6-year-old boy develops a facial rash that has the appearance of a slap to the face ("slapped cheek" appearance). The rash, which is composed of small red spots, subsequently involves the upper and lower extremities. This boy also has arthralgia and suddenly develops a life-threatening a plastic crisis of the bone marrow. What is the most likely diagnosis? (CO2, K3)

(a) Scarlet fever (second disease)

(b) Rubella (third disease)

(c) Atypical scarlet fever (fourth disease)

(d) Erythema infectiosum (fifth disease)

4. All the following viruses are associated with human cancer EXCEPT. (CO2, K6)

(a) hepatitis C virus (b) hepatitis B virus

(c) measles virus (d) human papilloma virus

5. Mallory bodies are pathological indicators found within which of the following cells? (CO3, K4)

(a) Mesangial cells (b) Hepatocytes

(c) Apoptotic cells (d) Melanocytes

6. A 12-year-old boy with sickle cell anemia presents with recurrent severe right upper quadrant colicky abdominal pain. At the time of surgery, multiple dark black stones are found within the gallbladder. These stones are composed of which one of the following substances? (CO1, K3)

(a) Bilirubin (b) Carbon

(c) Cholesterol (d) Struvite

7. A 38-year-old man presents with increasing weakness and is found to have a markedly elevated peripheral leukocyte count. Laboratory testing on peripheral blood finds a decreased leukocyte alkaline phosphatase (LAP) score, while chromosomal studies on a bone marrow aspirate find the presence of a Philadelphia chromosome. This abnormality refers to a characteristic chromosomal translocation that involves which oncogene? (CO4, K3)

(a) bcl-2 (b) c-abl

(c) c-myc (d) erb-B

8. Germ line mutations in the cationic trypsinogen (PRSS1) gene can produce an autosomal dominant disorder that usually begins in childhood and is characterized by recurrent bouts of severe inflammation that produces which one of the listed disorders? (CO4, K4)

(a) Acute cholecystitis

(b) Acute colitis

(c) Acute pancreatitis

(d) Chronic gastritis

9. A 47-year-old man presents with the sudden onset of fever, chills, and dysuria. Rectal examination finds the prostate gland to be edematous and very sensitive; examination is quite painful. Microscopic examination of prostatic secretions reveals the presence of numerous neutrophils. Which of the following organisms is the most likely cause of this illness? (CO5, K5)

(a) Bacillus Calmette-Guerin

(b) *Escherichia coli*

(c) *Proteus mirabillis*

(d) *Staphylococcus aureus*

10. It is seldom likely that a 'cure' for HIV is possible with available drugs because (CO5, K6)

(a) even in combination, the drugs hardly block viral replication completely

(b) they are often unable to penetrate virally-infected cells

(c) they cannot block viral transcription from integrated viral DNA

(d) they cannot penetrate the CNS

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) Outline the differences between hyperplasia and hypertrophy. (CO1, K1)

Or

(b) Summarise the pathomechanisms associated with atrophy and metaplasia. (CO1, K2)

12. (a) Explain the mode of action of the diphtheria toxin. (CO2, K5)

Or

(b) Outline the immunopathological and disease attributes of typhoid fever. (CO2, K2)

13. (a) Describe the etiology, pathology and clinical characteristics of emphysema. (CO3, K4)

Or

(b) Distinguish between rapidly progressive glomerulonephritis and acute post-streptococcal glomerulonephritis. (CO3, K5)

14. (a) Illustrate the mechanism of absorption of cyanocobalamine in the gastrointestinal tract. (CO4, K2)

Or

(b) Explain the pathology involving portal hypertension pertinent to porto-systemic anastomoses. (CO4, K2)

15. (a) Explain the characteristic features of cervical carcinoma. (CO4, K2)

Or

(b) Elucidate the pathological features of polycystic ovarian syndrome. (CO4, K6)

Part C ($5 \times 8 = 40$)

Answer **all** the questions not more than 1000 words each.

16. (a) Describe the immunological basis for organ transplantation. Add a note on the differences between acute, hyper-acute and chronic graft rejection. (CO1, K6)

Or

(b) Explain the pathomechanisms associated with apoptosis and necrosis. Add a note on their classifications. (CO1, K2)

17. (a) Explain the pathophysiological mechanisms associated with congestive heart failure. (CO1, K2)

Or

(b) Elucidate the pathogenesis of COVID – 19 with reference to the onset of multi-system organ failure (MSOF). (CO2, K3)

18. (a) Explain the pathological events associated with pulmonary tuberculosis. Add a note on the different forms of granuloma. (CO5, K5)

Or

(b) Discuss the mechanism of onset of peptic ulcer disease (PUD). Add a note on the diagnosis of PUD due to *Helicobacter pylori*. (CO3, K6)

19. (a) Explain the pathophysiology of immune thrombocytopenic purpura. Add a note on laboratory diagnosis and treatment. (CO4, K2)

Or

(b) Describe the pathological differences between alcoholic fatty liver disease and non-alcoholic fatty liver disease. (CO4, K6)

20. (a) Describe the pathology of invasive ductal carcinoma of the breast. Add a note on the prognostic and predictive factors of breast cancer. (CO5, K2)

Or

(b) Explain the mechanism of type 1 diabetes mellitus. Add a note on the long-term consequences of diabetes mellitus. (CO5, K4)

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R0222	Sub. Code
	508501

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Biomedical Sciences

Elective : BIOINFORMATICS AND IPR

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which of the following is an example of a Homology and similarity tool? (CO2, K2)

   (a) BLAST

   (b) RasMol

   (c) EMBOSS

   (d) PROSPECT

2. In which year did the SWISS-PROT protein sequence database begin? (CO2, K1)

   (a) 1988 (b) 1985

   (c) 1986 (d) 1987

3. Which of the following scientists created the first Bioinformatics database? (CO2, K3)

(a) Dayhoff

(b) Pearson

(c) Richard Durbin

(d) Michael.J.Dunn

4. The human genome contains approximately (CO1, K1)

(a) 6 billion case pairs

(b) 5 billion base pairs

(c) 3 billion base pairs

(d) 4 billion base pairs

5. The process of finding the relative location of genes on a chromosome is called (CO1, K1)

(a) Gene tracking

(b) Genome walking

(c) Genome mapping

(d) Chromosome walking

6. The term Bioinformatics was coined by _____. (CO1, K1)

(a) J.D Watson

(b) Pauline Hogeweg

(c) Margaret Dayhoff

(d) Frederic Sanger

7. _____ database is a Microarray gene expression database studying bioinformatics. (CO4, K4)

(a) GEO

(b) MMDB

(c) DDBJ

(d) EMBL

8. _____ alignment does not assume that the two sequences in question have similarity over the entire length. (CO3, K3)

(a) Local

(b) Global

(c) Heuristic

(d) Clustal

9. The _____ is a global network of computer networks that links government, academic, and business information. (CO3, K4)

(a) FTP

(b) Gmail

(c) Telenet

(d) Internet

10. The computational methodology that tries to find the best matching between two molecules, a receptor and ligand are called _____. (CO5, K6)

(a) Molecular fitting

(b) Molecular matching

(c) Molecular docking

(d) Molecule affinity checking

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each

11. (a) Explain the BLAST tool at NCBI in details. (CO3, K2)

Or

(b) Explain the Protein Information resources sequence database. (CO1, K2)

12. (a) Explain multiple sequence alignment and its type in details. (CO2, K2)

Or

(b) Write in details about the application of neural network in bioinformatics. (CO2, K4)

13. (a) Explain protein secondary sequence database in details. (CO3, K6)

Or

(b) Write the Gene array and analysis of gene array in bioinformatics in detail. (CO3, K4)

14. (a) Write EMBL nucleotide sequence database in details. (CO4, K4)

Or

(b) Explain the goals and scope and application of bioinformatics. (CO4, K3)

15. (a) Write in detail the application of molecular modeling in drug discovery. (CO5, K6)

Or

(b) Write notes on RASMOL, MOLMOL and CHIME with suitable example. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Write in detail about protein folding and challenges in bioinformatics. (CO1, K5)

Or

(b) Explain the different methods of drug target identification. (CO1, K4)

17. (a) Explain the protein structure classification database in detail.. (CO2, K2)

Or

(b) Explain the RCSB PDB database and protein data bank file format in detail. (CO2, K2)

18. (a) Write a note on the principles and applications of simulations. (CO2, K4)

Or

(b) What are microarrays? How is it constructed? (CO4, K3)

19. (a) Write a note patenting of biological materials and Intellectual property protection in India. (CO4, K3)

Or

(b) What is Sampling? Explain in detail the Types of Sampling, and non-sampling error. (CO4, K4)

20. (a) Write a note on molecular mechanics with reference to bio-molecules. Add a note on biological models of simulations. (CO1, K5)

Or

(b) Write in detail Next Generation Sequencing QC tools and add a note on basic NGS and explain goals and future challenges of the Human Genome Project. (CO4, K5)

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R0224	Sub. Code
	508301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Bio Medical Sciences

TOXICOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Who introduced the concept "the dose makes the poison"? (CO1, K1)

   (a) Albert Einstein (b) Isaac Newton

   (c) Paracelsus (d) Aristotle

2. Which sub-discipline of toxicology focuses on evaluating the effects of chemicals on the environment? (CO1, K1)

   (a) Clinical toxicology

   (b) Forensic toxicology

   (c) Environmental toxicology

   (d) Pharmaceutical toxicology

3. Which type of toxin is produced by living organisms such as bacteria and can cause a wide range of toxic effects? (CO2, K1)

   (a) Mycotoxins (b) Bacterial toxins

   (c) Animal toxins (d) Chemical additives

4. Which category of synthetic organic compounds includes substances like solvents, vapors, and chemicals found in cosmetics? (CO2, K1)

(a) Chemical additives in food

(b) Chemicals in the workplace

(c) Environmental toxicants

(d) Cosmetics

5. Multistage carcinogenesis involves the progression of cells from: (CO3, K1)

(a) Normal to malignant

(b) Malignant to normal

(c) Normal to pre-malignant

(d) Malignant to pre-malignant

6. Which of the following elements is known to be a carcinogen and is associated with health risks from occupational exposure? (CO3, K1)

(a) Oxygen (b) Nitrogen

(c) Arsenic (d) Hydrogen

7. Corrosive poisons primarily cause damage to which body system? (CO4, K1)

(a) Nervous system

(b) Cardiovascular system

(c) Gastrointestinal system

(d) Respiratory system

8. Which aspect of poisoning involves identifying the toxic substance and its effects on the body? (CO4, K1)

(a) Diagnosis

(b) Management

(c) Medicolegal aspects

(d) Clinical signs

9. Neurotoxicity primarily affects which bodily system? (CO5, K1)

(a) Gastrointestinal system

(b) Skin

(c) Nervous system

(d) Reproductive system

10. Which segment of reproductive toxicity studies evaluates the effects of a substance on embryo-fetal development? (CO5, K1)

(a) Segment I (b) Segment II

(c) Segment III (d) Segment IV

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) What are the routes of exposure to toxicants? (CO1, K4)

Or

(b) What are the different types of toxicity and how are they measured? (CO1, K3)

12. (a) What are biotoxins and how do they affect the body? (CO2, K3)

Or

(b) What are synthetic organic compounds and how do they affect the body? (CO2, K4)

13. (a) Discuss the industrial and inorganic carcinogens. (CO3, K5)

Or

(b) Discuss the mutagenesis, chromosomal alterations, DNA damage, teratogenicity and mutagenicity? (CO3, K5)

14. (a) What are the medicolegal aspects of corrosive poisoning? (CO4, K4)

Or

(b) What are the treatment options for corrosive poisoning? (CO4, K5)

15. (a) What is the difference between median effective dose (ED50), median toxic dose (TD50), and median lethal dose (LD50)? (CO5, K6)

Or

(b) What is the therapeutic index and therapeutic window? (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Discuss the history of toxicology and its scope. (CO1, K6)

Or

(b) Explain the principles of toxicology and their applications. (CO2, K5)

17. (a) Explain the environmental toxicants and their effects on the body. (CO2, K5)

Or

(b) Discuss the toxic responses of the blood, immune system, liver, kidney, nervous system, endocrine system, heart and vascular system to biotoxins and synthetic organic compounds. (CO2, K5)

18. (a) Discuss the classification of carcinogens and their categorization. (CO5, K5)

Or

(b) Explain the mechanisms of action of chemical carcinogens. (CO3, K6)

19. (a) Discuss the types of poisons, clinical signs and symptoms, diagnosis, management and medicolegal aspects of irritant poisons. (CO3, K5)

Or

(b) Discuss the types of poisons, clinical signs and symptoms, diagnosis, management and medicolegal aspects of corrosive poisons. (CO3, K5)

20. (a) Discuss the toxicity testing: Short-term tests for mutagenicity, genetic toxicity and mitagenesis assay: bacterial mutation tests-reversion test, ames test, fluctuation test, and eukaryotic mutation test. (CO4, K5)

Or

(b) Discuss the biochemical mechanisms of tissue toxicity, organ, neurotoxicity; gastrointestinal toxicity, skin toxicity/ photosensitivity, genetic toxicology, reproduction toxicity, carcinogenicity studies exaggerated and unwanted toxicological effects, single dose, repeat dose toxicity studies, safety pharmacology, studies (including segment I, II, and III). (CO5, K5)

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R0225	Sub. Code
	508302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Biomedical Sciences

MEDICAL ONCOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which type of cancers form in bone and soft tissues, including muscle, fat, blood vessels, lymph vessels, and fibrous tissue (such as tendons and ligaments). (CO1, K1)

   (a) Leukemia (b) Sarcoma

   (c) Lymphoma (d) Carcinoma

2. Which cancer treatment uses cell killing (cytotoxic) drugs? (CO1, K1)

   (a) biological therapy (b) chemotherapy

   (c) radiotherapy (d) total body irradiation

3. What gives people the best possible chance of survival? (CO2, K1)

   (a) Chemotherapy

   (b) Cancer Screenings

   (c) Healthy lifestyle choice

   (d) Early diagnosis

4. ———————— studies of patient experience provide an essential perspective complementing the more traditional approach of research. (CO2, K1)

(a) Cross-sectional (b) Qualitative

(c) Quantitative (d) Longitudinal

5. Which tumour marker is the most specific for pancreatic carcinoma? (CO2, K1)

(a) Alphafetoprotein (b) CA 125

(c) CA 15-3 (d) CD 19-9

6. Among cancer populations, reported prevalence rates of perceived posttraumatic growth range from ————————. (CO3, K1)

(a) 5% to 10% (b) 15% to 33%

(c) 47% to 51% (d) 53% to 90%

7. Which one of the following is a B cell neoplasm? (CO3, K1)

(a) Non-Hodgkin's lymphoma

(b) Acute lymphoblastic leukemia

(c) Burkitt's lymphoma

(d) Hodgkin's disease

8. Cytotoxic T cells are capable of recognizing (CO4, K1)

(a) Peptide and nuclear antigen

(b) Membrane bounded antigen

(c) Cytoplasmic antigen

(d) All the above

9. Occurrence of an excessive fibrocollagenous stroma in neoplasm is known as (CO4, K1)

(a) Dysplasia (b) Desmoplasia

(c) Hyalinization (d) Metaplasia

10. The following are alkylating agents EXCEPT (CO5, K1)
    (a) Cyclophosphomide
    (b) Bleomycin
    (c) Thiotepa
    (d) Treosulphan

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) What is a ligand? Explain the mechanical association with the ligand binding to a receptor. (CO1, K2)

Or

(b) Write short note on immunotherapy. (CO1, K3)

12. (a) What is angiogenesis? Explain the pro-angiogenetic, anti-angiogenetic pathways. (CO2, K4)

Or

(b) Distinguish the advantages and disadvantages of chemotherapy. (CO2, K4)

13. (a) Write the WHO classification on tumour. (CO3, K5)

Or

(b) Explain in detail about the drug delivery by using nanoparticles for the treatment of cancer. (CO3, K5)

14. (a) Summarize the relationship between the oncogene products and their growth factors. (CO4, K4)

Or

(b) Difference between oncogenes and tumour suppressor gene. (CO4, K4)

15. (a) What are the types of mutation? Structural and Numerical abnormalities? (CO5, K3)

Or

(b) What are the anti-cancer agents being used in the therapeutic approach of cancer? (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Illustrate the mechanism of deregulation of cell cycle during cancer. (CO1, K5)

Or

(b) What are the stages of cell cycle? Explain in detail. (CO2, K3)

17. (a) What is cancer? Explain its types and classification of abnormal cancer growth and metastasis. (CO3, K5)

Or

(b) What is the critical analysis about the types of cancer therapy? (CO3, K5)

18. (a) What are the types of structural chromosomal abnormalities? Explain the types of translocations related with cancer. (CO4, K3)

Or

(b) Explain the types of cancer imaging techniques in detail. (CO4, K3)

19. (a) What is a carcinogenesis? How are the mutation cause the loss of cell cycle control? (CO3, K4)

Or

(b) What is the currently available cancer diagnostic technique? Explain. (CO3, K4)

20. (a) Explain the targeted drug delivery system against anti-cancer activity with a diagram. (CO4, K5)

Or

(b) Explain the role of necrosis in cancer along with the mechanism of tumour necrotic factors with diagram. (CO5, K6)

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R0226	Sub. Code
	508505

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Biomedical Sciences

Elective – BIOMATERIALS AND TISSUE ENGINEERING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which of the following is an advantage of using polymers as biomaterials? (CO5, K1)

   (a) They are strong and durable

   (b) They are lightweight and easy to machine

   (c) They are biocompatible and non-toxic

   (d) All of the above

2. Which of the following is a disadvantage of using ceramics as biomaterials? (CO4, K1)

   (a) They are brittle and can easily break

   (b) They are difficult to machine and process

   (c) They are less biocompatible than metals and polymers

   (d) All of the above

3. Which of the following is NOT an advantage of using nanomaterials as implants? (CO1, K1)

(a) Increased surface area for cell adhesion and growth

(b) Improved mechanical properties

(c) Reduced risk of infection

(d) Reduced risk of rejection

4. Which of the following is a DESIRABLE reaction of the body to implanted materials? (CO1, K1)

(a) Inflammation

(b) Infection

(c) Rejection

(d) None of the above

5. Which of the following is NOT a material used for dental implants? (CO2, K1)

(a) Titanium

(b) Zirconia

(c) Stainless steel

(d) Acrylic

6. What is the main mode of dental implant failure? (CO2, K1)

(a) Loosening of the implant

(b) Fracture of the implant

(c) Peri-implantitis

(d) All of the above

7. Which of the following is NOT a protein that interacts with implanted materials? (CO4, K1)

(a) Fibronectin

(b) Vitronectin

(c) Laminin

(d) Collagen

8. What is the main function of cellular recognition of proteins adsorbed on material surfaces? (CO4, K1)

(a) To promote cell adhesion

(b) To initiate the foreign-body response

(c) To promote tissue regeneration

(d) All of the above

9. What is the role of the extracellular matrix in tissue engineering? (CO3, K1)

(a) To provide a scaffold for cell growth and differentiation

(b) To deliver nutrients to cells

(c) To remove waste products from cells

(d) All of the above.

10. Which of the following is NOT a stem cell property? (CO5, K1)

(a) Self-renewal

(b) Pluripotency

(c) Unipotency

(d) All of the above are stem cell properties

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Discuss the different types of biomaterials and their advantages and disadvantages. (CO1, K6)

Or

(b) Explain the factors that need to be considered when choosing a biomaterial for a particular application. (CO1, K5)

12. (a) Discuss the advantages and disadvantages of using nanomaterials as implants. (CO2, K6)

Or

(b) Explain the different modes of failure of implanted materials. (CO2, K5)

13. (a) Discuss the different materials used for dental implants and their advantages and disadvantages. (CO3, K6)

Or

(b) Explain the different modes of cartilage implant failure. (CO2, K5)

14. (a) What are three main types of protein interactions with implanted materials? (CO4, K1)

Or

(b) Explain the cellular response to implanted materials. (CO4, K5)

15. (a) Discuss the different types of stem cells and their potential applications in tissue engineering. (CO5, K6)

Or

(b) Explain the role of cellular signaling in tissue engineering. (CO5, K5)

Part C ($5 \times 8 = 40$)

Answer **all** the questions not more than 1000 words each.

16. (a) Write a critical essay on the challenges and opportunities in the development of new biomaterials for biomedical applications. (CO1, K2)

Or

(b) Outline the applications of biomaterials in Medicine, Dentistry. (CO2, K6)

17. (a) Write a critical essay on the challenges and opportunities in the development of new nanomaterial's for biomedical implants. (CO2, K4)

Or

(b) Discuss the ethical implications of using nanomaterial's in biomedical implants. (CO2, K3)

18. (a) Write a critical essay on the challenges and opportunities in the development of new materials for cartilage implants. (CO3, K2)

Or

(b) Discuss the ethical implications of using cartilage implants. (CO3, K6)

19. (a) Essay on the challenges and opportunities in the development of new biomaterials that can promote tissue regeneration and reduce the foreign-body response. (CO5, K2)

Or

(b) Discuss the ethical implications of using protein-coated implants. (CO4, K5)

20. (a) Essay on the challenges and opportunities in the development of new stem cell-based tissue engineering therapies. (CO5, K5)

Or

(b) Discuss the ethical implications of using stem cells in tissue engineering. (CO5, K5)

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