

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, JULY-2018
ANATOMY INCLUDING RADIOGRAPHIC ANATOMY
PAPER - I

[Time allotted: Three hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagrams wherever necessary

A : Short answer questions:

(7 x 9 = 63)

- Q. 1.** Draw a well labeled diagram of lymph node. Enumerate the components of lymphatic system (4+3=7)
- Q. 2.** Enumerate supports of uterus. Draw a well labeled diagram of normal anatomy of uterus. (4+3=7)
- Q. 3.** Enumerate the branches of external carotid artery. Describe the carotid sheath. (3+4=7)
- Q. 4.** Write a note on muscles of mastication. (7)
- Q. 5.** Write/flow diagram/well labeled diagram showing cerebrospinal fluid circulation. (7)
- Q. 6.** Enumerate paired & unpaired intracranial venous sinuses. (7)
- Q. 7.** Describe thyroid gland. (7)
- Q. 8.** Write short note on femoral triangle. Enumerate the muscles of front of thigh with their action and nerve supply. (3+4=7)
- Q. 9.** Write short note on axilla. Give lymphatic drainage of breast. (3.5+3.5=7)

Regn. No.....

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, JULY-2018
ANATOMY INCLUDING RADIOGRAPHIC ANATOMY
PAPER - I (MCQ)

Time allotted for MCQ-15 minutes

(½ x 14= 7)

B : MCQs (Single response type):

Select the most appropriate answer and encircle the alphabet against it.

1. All of the following structures form boundaries of digastric triangle except :
 - a. Posterior belly of digastric muscle
 - b. Anterior belly of digastric muscle
 - c. Superior belly of omohyoid muscle
 - d. Base of mandible
2. Select correct statement about parotid gland:
 - a. Located in preauricular area
 - b. Composed of mucous acini
 - c. Secreto-motor supply by facial nerve
 - d. Devoid of capsule
3. Brainstem consist of all except:
 - a. Midbrain
 - b. Pons
 - c. Medulla oblongata
 - d. Cerebellum
4. All abdominal viscera protected by thoracic cage except:
 - a. Liver
 - b. Spleen
 - c. Appendix
 - d. Stomach
5. Retroperitoneal organ is:
 - a. Kidneys
 - b. Liver
 - c. Spleen
 - d. Stomach
6. Subpubic angle of female pelvis:
 - a. About 10 degree
 - b. About 80-90 degree
 - c. About 20 degree
 - d. About 50 degree
7. Conus medullaris present in:
 - a. Spinal cord
 - b. Medulla
 - c. Mid brain
 - d. Cerebellum
8. Most important function of hand in human is:
 - a. Power grip
 - b. Hook grip
 - c. Precision grip
 - d. None of the above
9. Muscles of pectoral region include all except:
 - a. Pectoralis major
 - b. Serratus anterior
 - c. Pectoralis minor
 - d. Subclavius
10. Nerve that lies in the groove behind the medial epicondyle of humerus:
 - a. Median
 - b. Ulnar
 - c. Radial
 - d. Musculocutaneous
11. Lingula is a tongue shaped projection from:
 - a. Upper lobe of right lung
 - b. Upper lobe of left lung
 - c. Lower lobe of right lung
 - d. Lower lobe of left lung
12. Keystone of medial longitudinal arch of foot:
 - a. Calcaneum
 - b. Cuboid
 - c. Talus
 - d. Navicular
13. Collection of nerve fibers outside the CNS is called:
 - a. Tract
 - b. Nerve
 - c. Ganglion
 - d. Nucleus
14. All of following are example of synovial joint except:
 - a. Pivot
 - b. Saddle
 - c. Syndesmosis
 - d. Ellipsoid

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, JULY - 2018
PHYSIOLOGY INCLUDING BASIS OF DISEASES
PAPER - II

[Time allotted: Three hours]**[Max Marks: 70]****Note:** Attempt all questions

Draw suitable diagram wherever necessary

A : Short answer questions:**(7 x 9 = 63)**

- Q. 1.** Draw a labelled diagram of neuro-muscular junction and describe how end-plate potential is generated. (3+4=7)
- Q. 2.** Define cardiac output and cardiac index giving normal values and draw a labeled diagram showing medullary regulation of CVS. (2+2+3=7)
- Q. 3.** Enumerate the muscles involved in respiration with role of each one. Draw a labelled diagram showing changes in intra-pleural, intra-pulmonary pressure and lung volume changes with respiratory cycle. (4+3=7)
- Q. 4.** Answer the following: (3+4=7)
a. Name the different cell types in gastric mucosa with functions.
b. Write briefly on digestion and absorption of carbohydrates.
- Q. 5.** Answer the following: (1+1+2=4)
a. What is GFR? What is the normal value? List factors influencing GFR. (3)
b. Write briefly on renal function tests.
- Q. 6.** Enumerate the various ascending tracts and mention sensations carried by each one. Draw a labelled diagram of pain pathway. (4+3=7)
- Q. 7.** Enumerate the anterior pituitary hormones. Write briefly on functions of thyroid hormone. What is myxedema? (3+3+1=7)
- Q. 8.** Define immunity. Compare and contrast innate and acquired immunity. (1+6=7)
- Q. 9.** Compare and contrast the following: (3.5 x 2=7)
a. Upper and lower motor neuron lesion.
b. Active and passive transport process.

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, JULY - 2018
PHYSIOLOGY INCLUDING BASIS OF DISEASES
PAPER - II (MCQ)

Time allotted for MCQ-15 minutes

B : MCQs (Single response type):

(½ x 14= 7)

Select the most appropriate answer and **encircle** the alphabet against it.

1. The cells involved in humoral immunity are:
 - a. Neutrophils
 - b. Lymphocytes
 - c. Monocytes
 - d. Eosinophils
2. The properties of a neuron include all **except**:
 - a. All or none law
 - b. Accomodation
 - c. Excitation-contraction coupling
 - d. Conductivity
3. The predominant ion in muscle responsible for contraction is:
 - a. Calcium
 - b. Bicarbonate
 - c. Sodium
 - d. Potassium
4. The juxtaglomerular apparatus comprises of all **except**:
 - a. Proximal convoluted tubule
 - b. Distal convoluted tubule
 - c. Afferent arteriole
 - d. Efferent arteriole
5. The following are properties of synapse **except**:
 - a. Delay
 - b. Summation
 - c. Regeneration
 - d. Occlusion
6. Increased parasympathetic activity during yoga session:
 - a. Increases heart rate
 - b. Decreases heart rate
 - c. Increases blood pressure
 - d. Increases respiratory rate
7. The first heart sound in cardiac cycle corresponds to _____.
 - a. Atrial systole
 - b. Ventricular systole
 - c. Atrial diastole
 - d. Ventricular diastole
8. The volume of air remaining in lungs at the end of normal expiration is called:
 - a. Residual volume
 - b. Expiratory reserve volume
 - c. Functional residual capacity
 - d. Expiratory capacity
9. Excessive bleeding and sudden loss of fluid results in _____ shock.
 - a. Anaphylactic
 - b. Cardiogenic
 - c. Hypovolemic
 - d. Septicemic
10. Exposure to high altitude causes _____ hypoxia.
 - a. Anemic
 - b. Hypoxic
 - c. Histotoxic
 - d. Stagnant
11. HCl in stomach is secreted by _____ cell.
 - a. Gastric
 - b. Mucus
 - c. Chief
 - d. Parietal
12. Husky and hoarse voice with weight gain is typical sign of _____.
 - a. Diabetes mellitus
 - b. Hypothyroidism
 - c. Hyperthyroidism
 - d. Addison's disease
13. Increased secretion of growth hormone after puberty leads to:
 - a. Acromegaly
 - b. Cretinism
 - c. Dwarfism
 - d. Gigantism
14. The pain sensations are carried by _____.
 - a. Anterior spinothalamic tract
 - b. Dorsal column pathway
 - c. Lateral spinothalamic tract
 - d. Spinocerebellar tract

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, JULY - 2018
RADIATION PHYSICS
PAPER - III

[Time allotted : Three hours]**[Max Marks : 70]****Note:** Attempt all questions

Draw suitable diagrams wherever necessary

A : Short answer questions:**(7 x 9 = 63)**

- Q. 1.** What is atomic number? Draw Bohr's model of the atom.
- Q. 2.** Write note on radioactivity.
- Q. 3.** What is difference between isotope and isotone?
- Q. 4.** What is difference between electron and photon?
- Q. 5.** Write note on Bremsstrahlung radiation.
- Q. 6.** Write short note on Compton effect in radiotherapy.
- Q. 7.** Write note on ionization.
- Q. 8.** What is half life? Write note on decay of cobalt 60?
- Q. 9.** Write note on half value layer.

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, JULY - 2018
RADIATION PHYSICS
PAPER - III (MCQ)

Time allotted for MCQ-15 minutes

B : MCQs (Single response type):

($\frac{1}{2} \times 14 = 7$)

Select the most appropriate answer and encircle the alphabet against it

1. L shell has.....electrons.
 - a. 8
 - b. 2
 - c. 18
 - d. 32
2. Symbol of wave length is:
 - a. Z
 - b. Λ
 - c. N
 - d. μ
3. One curie is equal to _____
 - a. 3.7×10^4 dps
 - b. 3.7×10^2 dps
 - c. 3.7×10^{10} dps
 - d. 3.7×10^{12} dps
4. Positrons are _____
 - a. Negatively charged
 - b. Positively charged
 - c. Neutral
 - d. None of these
5. HVL is _____
 - a. Half value layer
 - b. High value layer
 - c. High value lead
 - d. Half value lead
6. Nuclear forces are because of:
 - a. Protons & neutrons
 - b. Neutrons & neutrons
 - c. Protons & electrons
 - d. Electrons & neutrons
7. Isotope of an element contains equal number of:
 - a. Electrons
 - b. Protons
 - c. Neutrons
 - d. Positrons
8. 1 amu = _____
 - a. $\frac{1}{12}$ of mass of ${}_6\text{C}^{12}$
 - b. $\frac{1}{12}$ of mass of ${}_8\text{O}^{16}$
 - c. $\frac{1}{12}$ of mass of ${}_{16}\text{S}^{32}$
 - d. None of these
9. Co^{60} half life is _____
 - a. 5.26 days
 - b. 5.26 years
 - c. 5.26 hours
 - d. None of these
10. SI unit of absorbed dose is _____
 - a. Gray
 - b. Becquerel
 - c. Roentgen
 - d. Joule
11. Atomic mass is equal to _____
 - a. Protons
 - b. Electrons
 - c. Protons + neutrons
 - d. Neutrons
12. Positron is produced in:
 - a. Compton
 - b. Photoelectric
 - c. Pair production
 - d. All of above
13. $\text{\AA}$ is unit of length equal to _____
 - a. 10^{-8} cm
 - b. 10^{10} cm
 - c. 10^{-6} cm
 - d. 10 mm
14. Hydrogen atom has:
 - a. 1 electron
 - b. 1 proton
 - c. $Z=1$
 - d. All of these

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, JULY - 2018
RADIOTHERAPY EQUIPMENTS & BASIC RADIOBIOLOGY
PAPER - IV

[Max Marks : 70]

[Time allotted : Three hours]

Note: Attempt all questions

Draw suitable diagrams wherever necessary

(7 x 9 = 63)

A : Short answer questions:

- Q. 1. What are characteristics of super voltage radiation?
- Q. 2. Illustrate production of X-rays with a diagram.
- Q. 3. Write briefly about modern treatment couch used in LINAC.
- Q. 4. Write a short note on the life of Marie Curie.
- Q. 5. Describe 5 R's used in Radiobiology.
- Q. 6. Describe briefly the use of lasers in treatment planning.
- Q. 7. Write advantages of conformal radiotherapy over conventional RT.
- Q. 8. Draw schematic diagram of a Linear Accelerator.
- Q. 9. Write short note on:
 - a. Penumbra
 - b. HVL

(4+3)

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, JULY - 2018
RADIOTHERAPY EQUIPMENTS & BASIC RADIOBIOLOGY
PAPER - IV (MCQ)

Time allotted for MCQ-15 minutes

B : MCQs (Single response type):

(½ x 14 = 7)

Select the most appropriate answer and **encircle** the alphabet against it

1. Which is a type of penumbra?
 - a. Transmission
 - b. Geometric
 - c. Physical
 - d. All of the above
2. Electron charge is:
 - a. Negative
 - b. Positive
 - c. Not charged
 - d. None of the above
3. Most radio-sensitive phase in cell cycle:
 - a. G1
 - b. S
 - c. G2
 - d. M
4. Half life of AU198 is:
 - a. 5.26 years
 - b. 30 days
 - c. 74 days
 - d. 2.697 days
5. Photons are:
 - a. Negatively charged
 - b. Positively charged
 - c. Neutral
 - d. None of the above
6. Shielding blocks in MV radiation are kept on:
 - a. Patient surface
 - b. Tray
 - c. Collimator
 - d. Not used
7. In radiotherapy room how much lasers are needed?
 - a. 1
 - b. 3
 - c. 2
 - d. 4
8. Which of the following is **not** one of 4R's of radiobiology?
 - a. Repopulate
 - b. Repair
 - c. Reoxygenate
 - d. Resume
9. Which of the following is most radio-sensitive?
 - a. Bone
 - b. Muscle
 - c. Lymphocyte
 - d. Erythrocyte
10. Radiation acts on ----- of the biological cell.
 - a. Cytoplasm
 - b. Cell wall
 - c. DNA
 - d. Mitochondria
11. Thermoplastic cast is heated at which temperature?
 - a. 70 degrees
 - b. 80 degrees
 - c. 100 degrees
 - d. 10 degree
12. Atomic mass is number of:
 - a. Proton
 - b. Electron
 - c. Proton + neutron
 - d. Neutron
13. 1 nanometer is equal to:
 - a. 10^{-9} meter
 - b. 10^6 m
 - c. 10^3 m
 - d. 10^{10} m
14. Which of the following is used in beam modification?
 - a. Blocks
 - b. Wedge
 - c. Bolus
 - d. All of the above

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Regn. No. DD.....

Paper Code: BRT101

**B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, AUGUST - 2019
ANATOMY INCLUDING RADIOGRAPHIC ANATOMY
PAPER - I**

[Time allotted: Three hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagram wherever necessary

A : Short answer questions:

(7 x 9 = 63)

- Q. 1.** Draw well labelled diagram of brachial plexus. Write a note on carpal tunnel syndrome.
- Q. 2.** Draw well labelled diagram/flow chart of CSF circulation.
- Q. 3.** Write a note on temporomandibular joint - type, bones forming joint, ligaments, movements & muscles producing these movements, applied.
- Q. 4.** Write a note on sciatic nerve.
- Q. 5.** Write a note on systemic circulation. Write difference between artery and vein.
- Q. 6.** Draw a well labelled diagram of lymph node. Write a note on lymphatic drainage of uterus.
- Q. 7.** Write a note on cubital fossa – location, boundaries, contents, applied.
- Q. 8.** Write a note on thoracoabdominal diaphragm.
- Q. 9.** Write a note on bronchopulmonary segments.

**B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, AUGUST - 2019
ANATOMY INCLUDING RADIOGRAPHIC ANATOMY
PAPER - I (MCQ)**

Time allotted for MCQ - 15 minutes

B : MCQs (Single response type):

(½ x 14 = 7)

Select the most appropriate answer and **encircle** the alphabet against it.

1. Radial nerve injury causes:
 - a. Loss of abduction
 - b. Carpal tunnel syndrome
 - c. Claw hand
 - d. Wrist drop
2. Extension is:
 - a. Decreasing the joint angle
 - b. Increasing the joint angle
 - c. Carry away from midline
 - d. Carry towards the midline
3. Eversion and inversion movement occur at:
 - a. Ankle joint
 - b. Subtalar joint
 - c. Radioulnar joint
 - d. Thumb
4. An example of sesamoid bone is:
 - a. Radius
 - b. Pisiform
 - c. Maxilla
 - d. Occipital bone
5. Pancreas is:
 - a. Endocrine gland
 - b. Exocrine gland
 - c. Sweat gland
 - d. Both endocrine and exocrine gland
6. 7th cervical vertebra is used to:
 - a. Count lower vertebra
 - b. Count ribs
 - c. Palpate iliac crest
 - d. Palpate liver
7. Superior thyroid artery is a branch of:
 - a. Internal carotid artery
 - b. External carotid artery
 - c. Lingual artery
 - d. None of the above
8. 4th cranial nerve is:
 - a. Facial nerve
 - b. Trigeminal nerve
 - c. Oculomotor nerve
 - d. Trochlear nerve
9. Wrist joint is:
 - a. Hinge joint
 - b. Ball and socket joint
 - c. Pivot joint
 - d. Ellipsoid joint
10. Unlocking is done by:
 - a. Popliteus muscle
 - b. Rectus femoris muscle
 - c. Sartorius muscle
 - d. Semitendinosus muscle
11. Dorsalis pedis artery is continuation of:
 - a. Femoral artery
 - b. Popliteal artery
 - c. Anterior tibial artery
 - d. Posterior tibial artery
12. Initiation (0-15degree) of abduction is done by:
 - a. Deltoid muscle
 - b. Supraspinatus muscle
 - c. Infraspinatus muscle
 - d. Biceps brachii muscle
13. Sigmoid colon is part of:
 - a. Small intestine
 - b. Large intestine
 - c. Urinary system
 - d. Genital system
14. Inferior mesenteric artery is branch of:
 - a. Abdominal aorta
 - b. Thoracic aorta
 - c. Arch of aorta
 - d. Common carotid artery

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, AUGUST - 2019
PHYSIOLOGY INCLUDING BASIS OF DISEASES
PAPER - II

[Time allotted: Three hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagram wherever necessary

A : Short answer questions:

(7 x 9 = 63)

- Q. 1.** Describe hypothalmo-hypophysial axis. What are the hormones secreted from pituitary and what are the major functions they perform?
- Q. 2.** Define cardiac cycle. Describe the properties of cardiac muscles. Why the heart muscle does not fatigue?
- Q. 3.** Describe the methods of transport across cell membrane. Why is sodium potassium pump important to a cell?
- Q. 4.** Describe the transport of O₂ from lung to tissue and CO₂ from tissue to lung. Enumerate the partial pressure of the gases in arterial and venous blood.
- Q. 5.** Explain the formation of temporary haemostatic plug. Enumerate the differences between the intrinsic & extrinsic pathways.
- Q. 6.** Define GFR and its normal value in adult. Discuss the factors affecting glomerular filtration rate.
- Q. 7.** Discuss field defects due to lesion of visual pathway. What are the various errors of refraction and how are they corrected?
- Q. 8.** Draw an illustrated diagram of a synapse and discuss the properties of synapse.
- Q. 9.** Describe the functions of liver and discuss the digestion of carbohydrates in our body.

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, AUGUST - 2019
PHYSIOLOGY INCLUDING BASIS OF DISEASES
PAPER - II

Time allotted for MCQ - 15 minutes

B : MCQs (Single response type):

($\frac{1}{2} \times 14 = 7$)

Select the most appropriate answer and **encircle** the alphabet against it.

1. ECG waves do **not** represent:
 - a. Atrial depolarization
 - b. Ventricular repolarization
 - c. Atrial repolarization
 - d. Ventricular depolarization
2. All are functions of kidney **except**:
 - a. Glycogen storage
 - b. Acid base balance
 - c. Water overload
 - d. Erythropoietin secretion
3. Blood capillaries in liver are:
 - a. Continuous
 - b. Fenestrated
 - c. Discontinuous
 - d. Non fenestrated
4. Immunoglobulin that can cross placenta:
 - a. IgG
 - b. IgM
 - c. IgA
 - d. IgE
5. Lack of Vitamin K causes deficiency of all **except**:
 - a. Prothrombin
 - b. Fibrinogen
 - c. Factor X
 - d. Factor VII
6. Cell membrane shows fluidity due to:
 - a. Phospholipid
 - b. Cholesterol
 - c. Glycoprotein
 - d. Glycolipid
7. True statement about juxtaglomerular apparatus of kidney is all **except**:
 - a. Source of renin
 - b. Source of angiotension
 - c. Consist of macula densa
 - d. Has JG cells
8. Net filtration pressure in normal kidney is **not** affected by:
 - a. Hydrostatic pressure in bowman space
 - b. Permeability of capillary
 - c. Oncotic pressure in bowman space
 - d. Oncotic pressure in capillary
9. All are functions of GIT **except**:
 - a. Provide immunity
 - b. Absorbs Ca^{2+}
 - c. Digest fibres
 - d. Secrete cholesterol
10. Posterior column tracts carry sensation of:
 - a. Fine touch
 - b. Crude touch
 - c. Temperature
 - d. Pain
11. Lipid digestion begins in:
 - a. Stomach
 - b. Duodenum
 - c. Mouth
 - d. Small intestine
12. Mean blood pressure is:
 - a. Same in each organ
 - b. 100 mmHg
 - c. Average of SBP and DBP
 - d. Difference of SBP and DBP
13. Na-K ATPase helps in maintenance of which of the following?
 - a. Intracellular pH
 - b. Cell volume
 - c. Low ECF Na
 - d. High ECF K
14. Hormone secreted by hypothalamus is:
 - a. PIH
 - b. ACTH
 - c. TSH
 - d. FSH

Regn. No. DD.....

Paper Code: BRT103

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, AUGUST - 2019
RADIATION PHYSICS
PAPER - III

[Time allotted: Three hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagrams wherever necessary

A : Short answer questions:

(7 x 9 = 63)

- Q. 1. What is atom? Describe atomic structure of Co-60.
- Q. 2. What is radioactivity? Describe decay law with formula.
- Q. 3. Describe electromagnetic spectrum in detail.
- Q. 4. Describe the Compton effect with its silent features.
- Q. 5. Describe exposure and absorbed dose with formula.
- Q. 6. Find the activity of Co-60 source after 2 half life. Activity of Co-60 is 10Ci and half life is 5.26 years
- Q. 7. Calculate radioactive decay constant (λ) for element whose half life is 30 years.
- Q. 8. Describe excitation and ionization with examples.
- Q. 9. Describe the Co-60 decay process with schematic diagram.

B. Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, AUGUST - 2019
RADIATION PHYSICS
PAPER - III (MCQ)

Time allotted for MCQ - 15 minutes

B : MCQs (Single response type):

(½ x 14 = 7)

Select the most appropriate answer and encircle the alphabet against it.

1. Atomic number of tungsten is:
 - a. 82
 - b. 74
 - c. 60
 - d. 76
2. Melting point of cerrobend is.....°C.
 - a. 70
 - b. 100
 - c. 3370
 - d. 60
3. Energy of photon is:
 - a. $H\nu$
 - b. Mc^2
 - c. N/λ
 - d. None of the above
4. Unit of activity is:
 - a. Kg
 - b. Ci
 - c. Cm
 - d. Coulomb
5. One curie is equal to..... disintegration/sec:
 - a. 3.7×10^4
 - b. 3.7×10^2
 - c. 3.7×10^{10}
 - d. 3.7×10^{12}
6. Which of the following has maximum ionization potential?
 - a. Electron
 - b. Proton
 - c. Helium ion
 - d. Gamma photon
7. Electrons are:
 - a. Negatively charged
 - b. Positively charged
 - c. Neutral
 - d. None of the above
8. HVL is:
 - a. Half value layer
 - b. High value layer
 - c. High value lead
 - d. Half value lead
9. Atomic number of lead is:
 - a. 32
 - b. 27
 - c. 52
 - d. 82
10. 1 mev equals to electron volts (ev).
 - a. 10^{-6}
 - b. 10^6
 - c. 10^{10}
 - d. 10^{-9}
11. Beta particle has mass equal to:
 - a. 1/1837 of proton
 - b. 1/1837 of electron
 - c. 1/1837 of neutron
 - d. 1 mev
12. The angstrom ($\text{\AA}$) is unit of length equal to:
 - a. 10^{-8} cm
 - b. 10^{10} cm
 - c. 10^{-6} cm
 - d. 10 mm
13. Atomic number is number of:
 - a. Proton
 - b. Electron
 - c. Proton + neutron
 - d. Neutron
14. Alpha particle has:
 - a. $2N + 1P$
 - b. $2N + 2P$
 - c. $1N + 1P$
 - d. $1P$

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, AUGUST - 2019
RADIOTHERAPY EQUIPMENTS & BASIC RADIOBIOLOGY
PAPER - IV

[Time allotted: Three hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagrams wherever necessary

A : Short answer questions:

(7 x 9 = 63)

Q. 1. Write short notes on:**a.** Particulate radiation

(3)

b. Characteristic X-ray with suitable diagram

(4)

Q. 2. Write short notes on:**a.** Penumbra

(3)

b. Bolus

(4)

Q. 3. What is the difference between Cobalt-60 unit and LINAC?**Q. 4.** Define cell survival curve. Explain the linear quadratic model.**Q. 5.** Write note on immobilization devices used in radiotherapy planning.**Q. 6.** What are the components located in treatment head of linear accelerator? Explain any one of them in detail.**Q. 7.** Write short note on personal monitoring devices.**Q. 8.** Explain the 5Rs in radiotherapy.**Q. 9.** What is indirect effect of radiation at cellular level? Draw cell cycle diagram.

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, AUGUST - 2019
RADIOTHERAPY EQUIPMENTS & BASIC RADIOBIOLOGY
PAPER - IV (MCQ)

Time allotted for MCQ - 15 minutes

B : MCQs (Single response type):

(½ x 14 = 7)

Select the most appropriate answer and **encircle** the alphabet against it.

1. Tungsten melting point:
 - a. 3.370 °C
 - b. 3375 °C
 - c. 33.70 °C
 - d. 337.0 °C
2. Photon charge is:
 - a. Negative
 - b. Positive
 - c. No charge
 - d. None of the above
3. Which of the following has maximum ionization potential?
 - a. Electron
 - b. Proton
 - c. Helium ion
 - d. Gamma photon
4. Half life of Co-60:
 - a. 5.26 years
 - b. 5.26 days
 - c. 30years
 - d. 30 days
5. X-ray beam of energy in megavoltage therapy:
 - a. ≥ 1 mev
 - b. ≤ 1 mev
 - c. ≥ 1 kev
 - d. ≤ 1 kev
6. HVL is:
 - a. Half value layer
 - b. High value layer
 - c. High value lead
 - d. Half value lead
7. In radiotherapy room how many lasers are needed?
 - a. 1
 - b. 3
 - c. 2
 - d. 4
8. CT simulator couch is made up of:
 - a. Wood:
 - b. Carbon fibre
 - c. Lead
 - d. None of the above
9. Which of the following is most radio sensitive?
 - a. Bone
 - b. Muscles
 - c. Lymphocyte
 - d. Erythrocyte
10. Radiation acts on ----- of the biological cell.
 - a. Cytoplasm
 - b. Cell wall
 - c. DNA
 - d. Mitochondria
11. Lead apron is needed during:
 - a. CT simulation
 - b. X-ray unit
 - c. Electron
 - d. Photon
12. Atomic mass is number of:
 - a. Proton
 - b. Electron
 - c. Proton + neutron
 - d. Neutron
13. 1 millimeter is equal to:
 - a. 10^{-3} m
 - b. 10^6 m
 - c. 10^3 m
 - d. 10^{10} m
14. Which one is not a non-ionizing radiation?
 - a. Microwaves
 - b. Radiowaves
 - c. X rays
 - d. Infrared waves

Regn. No.....

Paper Code: BRT101

**B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, NOVEMBER - 2019
ANATOMY INCLUDING RADIOGRAPHIC ANATOMY
PAPER - I**

lib

[Time allotted: Three hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagrams wherever necessary

A : Short answer questions:

(7 x 9 = 63)

- Q. 1. Describe the hip joint under the following headings: type of joint, bones forming the joint, ligaments, muscles producing the movements and applied anatomy.
- Q. 2. Write a note on the boundaries and contents of cubital fossa with its applied anatomy.
- Q. 3. Classify synovial joint giving examples of each type.
- Q. 4. Write about right coronary artery.
- Q. 5. Write a note on femoral triangle.
- Q. 6. Draw a well labeled diagram to show the visceral relations of the anterior surface of right & left kidney.
- Q. 7. Enumerate dural venous sinuses. Write a note on cavernous sinus.
- Q. 8. Write a note on cerebrospinal fluid circulation.
- Q. 9. Write a note on the temporomandibular joint.

Regn. No.....

Paper Code: BRT101

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, NOVEMBER - 2019
ANATOMY INCLUDING RADIOGRAPHIC ANATOMY
PAPER - I
(MCQ)

Time allotted for MCQ - 15 minutes

B : MCQs (Single response type):

(½ x 14 = 7)

Select the most appropriate answer and **encircle** the alphabet against it.

1. Substantia nigra is seen in:
 - a. Pons
 - b. Diencephalon
 - c. Midbrain
 - d. Medulla oblongata
2. Brodmann's number for Broca's motor speech area is:
 - a. Area no. 44,45
 - b. Area no. 6
 - c. Area no. 17,18,19
 - d. Area no. 4
3. The only depressor of the mandible:
 - a. Masseter
 - b. Temporalis
 - c. Medial pterygoid
 - d. Lateral pterygoid
4. Sphenoid bone is an example of:
 - a. Long bone
 - b. Short bone
 - c. Sesamoid bone
 - d. Pneumatic bone
5. Infranuclear lesions of facial nerve will lead to paralysis of:
 - a. Contralateral half of face
 - b. Ipsilateral half of face
 - c. Ipsilateral lower part of face
 - d. Contralateral lower part of face
6. Which is true about kidney?
 - a. Vein is anterior-most at hilum
 - b. Left kidney is lower in position
 - c. Duodenum is related to the left kidney
 - d. Renal artery is branch of suprarenal artery
7. The commonest position of appendix is:
 - a. Pelvic
 - b. Splenic
 - c. Subcaecal
 - d. Retrocaecal
8. Injury to upper trunk of brachial plexus leads to:
 - a. Winging of scapula
 - b. Klumpke's paralysis
 - c. Erb's paralysis
 - d. Claw hand
9. What is the root value of femoral nerve?
 - a. L3, 4, 5
 - b. L3, 4
 - c. L4, 5
 - d. L2, 3, 4
10. Taenia coli are specific to:
 - a. Colon
 - b. Duodenum
 - c. Liver
 - d. Stomach
11. The ligament attached to antero-superior surface of liver is:
 - a. Lesser omentum
 - b. Greater omentum
 - c. Falciform ligament
 - d. None of the above
12. Pain in hip is referred to knee due to involvement of:
 - a. Femoral nerve
 - b. Obturator nerve
 - c. Deep peroneal nerve
 - d. Superior gluteal nerve
13. Lingual artery is a branch of:
 - a. Internal carotid artery
 - b. Subclavian artery
 - c. Maxillary artery
 - d. External carotid artery
14. Internal capsule is made up of:
 - a. Commissural fibres
 - b. Association fibres
 - c. Projection fibres
 - d. None of the above

Regn. No.....

Paper Code: BRT102

**B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, NOVEMBER - 2019
PHYSIOLOGY INCLUDING BASIS OF DISEASES
PAPER - II**

[Time allotted: Three hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagram wherever necessary

A : Short answer questions:

(7 x 9 = 63)

- Q. 1. Name the plasma proteins and give their normal values. Describe the functions of plasma proteins.
- Q. 2. Describe the ionic basis of action potential in a nerve fibre.
- Q. 3. Define the blood pressure. Explain short term mechanism of its regulation.
- Q. 4. Define lung capacities and give their normal values.
- Q. 5. Explain the mechanism of secretion of HCl in the stomach.
- Q. 6. Draw a well labelled diagram of juxtaglomerular apparatus. Enumerate its function.
- Q. 7. Give functional division of cerebellum and describe its functions.
- Q. 8. Draw a diagram of rod and briefly describe rhodopsin cycle.
- Q. 9. Name the posterior pituitary hormone. Describe the various effect of oxytocin in humans.

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, NOVEMBER - 2019
PHYSIOLOGY INCLUDING BASIS OF DISEASES
PAPER - II
(MCQ)

Time allotted for MCQ - 15 minutes

B : MCQs (Single response type):

(½ x 14 = 7)

Select the most appropriate answer and **encircle** the alphabet against it.

1. The number of oxygen molecules carried by one hemoglobin molecule:
 - a. 1
 - b. 2
 - c. 4
 - d. 8
2. IgM molecule consist of:
 - a. 5 subunits
 - b. 4 subunits
 - c. 3 subunits
 - d. 2 subunits
3. Vitamin K dependent factor is:
 - a. Factor XII
 - b. Factor IV
 - c. Prothrombin
 - d. Factor V
4. In anemia concentration of 2,3 DPG is:
 - a. Decreased
 - b. Increased
 - c. Increased or decreased
 - d. Not changed
5. Muscle spindle detects:
 - a. Tension
 - b. Length
 - c. Proprioception
 - d. Stretch
6. ATPase activity is present in:
 - a. Actin
 - b. Myosin
 - c. Troponin
 - d. None
7. Role of bile salts:
 - a. Vitamin B12 absorption
 - b. Formation of lipid bilayer
 - c. Emulsification of fat
 - d. Fatty acid degeneration
8. Liver synthesizes all, **except**:
 - a. C3 complement component
 - b. Haptoglobin
 - c. Fibrinogen
 - d. Immunoglobulin
9. Which of the following does **not** lie in renal medulla?
 - a. JG apparatus
 - b. Collecting duct
 - c. Vasa recta
 - d. Loop of Henle
10. Slowest conduction is in:
 - a. SA node
 - b. Purkinje fibre
 - c. AV node
 - d. Bundle of His
11. Surfactant acts by decreasing:
 - a. Pleural pressure
 - b. Intrathoracic pressure
 - c. Surface tension
 - d. Pleural fluid secretion
12. The normal CSF in man is:
 - a. 50 ml
 - b. 100 ml
 - c. 150 ml
 - d. 200 ml
13. Which of the following types of nerve fibre carry pain?
 - a. A-alpha
 - b. A-beta
 - c. A-gamma
 - d. A-delta
14. Which is a cerebellar nucleus?
 - a. Caudate
 - b. Subthlamic
 - c. Globus pallidus
 - d. Dentate

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Regn. No. DD.....

Paper Code: BRT101

**B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, SEPTEMBER - 2020
ANATOMY INCLUDING RADIOGRAPHIC ANATOMY
PAPER - I**

[Time allotted: Two Hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagram wherever necessary

A: Short answer questions:

(06 x 10 = 60)

- Q. 1.** Draw a well labelled diagram of synovial joint. Write a note on classification of synovial joint with one example of each.
- Q. 2.** Write a note on axillary lymph node. Write a note on lymphatic drainage of breast.
- Q. 3.** Write a note on bronchopulmonary segments with their applied aspects.
- Q. 4.** Discuss appendix under following heading: Situation, different position, blood supply, nerve supply and applied aspect.
- Q. 5.** Discuss popliteal fossa under heading of: Boundaries, contents and applied aspect.
- Q. 6.** Describe deltoid muscle under origin, insertion, nerve supply, action and its applied aspects.

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, SEPTEMBER - 2020
ANATOMY INCLUDING RADIOGRAPHIC ANATOMY
PAPER - I
(MCQ)

Time allotted for MCQ - 15 minutes

B: MCQs (Single response type):

(01 x 10 = 10)

Select the most appropriate answer and encircle the alphabet against it.

1. Most important factor for stability of joint:
 - a. Fibrous capsule
 - b. Ligaments
 - c. Atmospheric pressure
 - d. Muscles
2. Smallest carpal bone is:
 - a. Lunate
 - b. Capitate
 - c. Pisiform
 - d. Scaphoid
3. Axillary nerve is a branch of:
 - a. Lateral cord
 - b. Medial cord
 - c. Posterior cord
 - d. Direct branch from root
4. Typical ribs are:
 - a. 2nd to 10th
 - b. 2nd to 9th
 - c. 3rd to 9th
 - d. 3rd to 10th
5. Apex of heart is formed by:
 - a. Left ventricle
 - b. Left atrium
 - c. Left auricle
 - d. Right auricle
6. All are part of small intestine **except**:
 - a. Duodenum
 - b. Jejunum
 - c. Ileum
 - d. Caecum
7. Superior mesenteric artery arises from:
 - a. Thoracic aorta
 - b. Abdominal aorta
 - c. Ascending aorta
 - d. Common carotid artery
8. Ovary:
 - a. Is a male gonad
 - b. Is a female gonad
 - c. Produces sperm
 - d. Lies in male pelvis
9. Great saphenous vein drains into:
 - a. Femoral vein
 - b. Popliteal vein
 - c. Superior vena cava
 - d. Portal vein
10. Buccinator is supplied by:
 - a. Ophthalmic nerve
 - b. Maxillary nerve
 - c. Mandibular nerve
 - d. Facial nerve

**B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, SEPTEMBER - 2020
PHYSIOLOGY INCLUDING BASIS OF DISEASES
PAPER - II**

[Time allotted: Two Hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagrams wherever necessary

A : Short answer questions:

(06 x 10 = 60)

- Q. 1. Enlist the properties of a neuron. Define action-potential & draw a labelled diagram showing the various phases of action-potential of a neuron.
- Q. 2. Define cardiac cycle and enlist the mechanical events of cardiac cycle with normal duration. Draw a labelled diagram of normal ECG showing different waves and reason for each waveform.
- Q. 3. Define and explain various lung volumes and capacities with a labelled diagram.
- Q. 4. Enlist the functions of stomach. Give the composition and functions of gastric juice.
- Q. 5. Write briefly on functions of kidney. Compare and contrast cortical and juxta-medullary nephrons.
- Q. 6. Draw and describe the various descending tracts. Differentiate between upper and lower motor neuron lesions.

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, SEPTEMBER - 2020
PHYSIOLOGY INCLUDING BASIS OF DISEASES
PAPER - II
(MCQ)

Time allotted for MCQ - 15 minutes

(01 x 10 = 10)

B: MCQs (Single response type):

Select the most appropriate answer and **encircle** the alphabet against it.

1. The cells involved in cell-mediated immunity are:
 - a. Eosinophils
 - b. B-lymphocytes
 - c. Monocytes
 - d. T-lymphocytes
2. The properties of action potential of a neuron include all **except**:
 - a. All or none law
 - b. Accommodation
 - c. Automaticity
 - d. Refractory period
3. The calcium ion binding protein in skeletal muscle involved in muscle contraction is:
 - a. Actin
 - b. Myosin
 - c. Tropomyosin
 - d. Troponin
4. The juxtaglomerular apparatus includes all **except**:
 - a. Afferent arteriole
 - b. Efferent arteriole
 - c. Macula densa
 - d. Proximal convoluted tubule
5. The potential generated at the synapse include mainly:
 - a. Excitatory post synaptic potential
 - b. Inhibitory post synaptic potential
 - c. Both excitatory and inhibitory post synaptic potential
 - d. End plate potential
6. Increased sympathetic activity during exercise leads to:
 - a. Decreased cardiac output
 - b. Increased cardiac output
 - c. Decreased systolic blood pressure
 - d. Increased intestinal secretions
7. The first heart sound in cardiac cycle is due to:
 - a. Closure of atrio-ventricular valves
 - b. Opening of atrio-ventricular valves
 - c. Closure of semi-lunar valves
 - d. Opening of semi-lunar valves
8. The amount of air breathed out forcefully following maximal inspiration is called:
 - a. Expiratory capacity
 - b. Inspiratory capacity
 - c. Total lung capacity
 - d. Vital capacity
9. Excessive vomiting and diarrhoea in an individual results in _____ shock.
 - a. Anaphylactic
 - b. Cardiogenic
 - c. Hypovolemic
 - d. Septicemic
10. Congestive cardiac failure leads to _____ hypoxia.
 - a. Anemic
 - b. Hypoxic
 - c. Histotoxic
 - d. Stagnant

**B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, SEPTEMBER - 2020
RADIATION PHYSICS
PAPER - III**

[Time allotted: Two Hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagrams wherever necessary

A: Short answer questions:

(06 x 10 = 60)

- Q. 1. Explain atomic mass and energy unit in detail.
- Q. 2. Explain the Nuclear Forces briefly.
- Q. 3. Explain the Half Life and Mean Life and derive the relationship between these two.
- Q. 4. What will be the activity of a 5,000-Ci ^{60}Co source after 4 years?
- Q. 5. What are the types of radioactive decay? Explain them briefly.
- Q. 6. Explain following:
 - a. Exposure with its unit
 - b. Absorbed dose with its unit

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, SEPTEMBER - 2020
RADIATION PHYSICS
PAPER - III
(MCQ)

Time allotted for MCQ - 15 minutes

B: MCQs (Single response type):

(01 x 10 = 10)

Select the most appropriate answer and **encircle** the alphabet against it

1. 1 eV is equal to:
 - a. $1.602 \times 10^{-19} \text{J}$
 - b. $2 \times 10^{-27} \text{J}$
 - c. $1.9 \times 10^{-21} \text{J}$
 - d. $9.1 \times 10^{-31} \text{J}$
2. 1 amu = _____ MeV.
 - a. 521 MeV
 - b. 0.511 MeV
 - c. 931 MeV
 - d. 231 MeV
3. One curie is equal to:
 - a. $3.7 \times 10^4 \text{ dps}$
 - b. $3.7 \times 10^2 \text{ dps}$
 - c. $3.7 \times 10^{10} \text{ dps}$
 - d. $3.7 \times 10^{12} \text{ dps}$
4. Decay constant:
 - a. $0.693/T_{1/2}$
 - b. $T_{1/2}/0.693$
 - c. $0.693/T_a$
 - d. None of the above
5. Co^{60} half life:
 - a. 5.26 days
 - b. 5.26 years
 - c. 5.26 hours
 - d. 73.8 days
6. SI unit of activity is:
 - a. Curie
 - b. Becquerel
 - c. Roentgen
 - d. Joule
7. 1 millimeter is equal to:
 - a. 10^{-3} m
 - b. 10^6 m
 - c. 10^3 m
 - d. 10^{10} m
8. Number atom/g:
 - a. A_w / N_A
 - b. N_A / A_w
 - c. $N_A \cdot Z / A_w$
 - d. None of the above
9. Mass Attenuation Coefficient:
 - a. μ/ρ
 - b. ρ/μ
 - c. $1/\mu$
 - d. $1/\rho$
10. 1 MeV equals to:
 - a. 10^{-6} electron volts (eV)
 - b. 10^6 eV
 - c. 10^{10} eV
 - d. 10^{-9} eV

Regn. No. DD.....

Paper Code: BRT104

**B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, SEPTEMBER - 2020
RADIOTHERAPY EQUIPMENTS & BASIC RADIOBIOLOGY
PAPER - IV**

[Time allotted: Two Hours]

[Max Marks: 70]

Note: Attempt all questions

Draw suitable diagrams wherever necessary

A : Short answer questions:

(06 x 10 = 60)

- Q. 1.** Write a note on 5 R's of radiobiology.
- Q. 2.** Discuss the Medical Linear Accelerator with schematic diagram.
- Q. 3.** Write note on importance of shoulder in cell survival curve.
- Q. 4.** Write short note on Grenz Ray therapy and Orthovoltage therapy.
- Q. 5.** Write note on carcinogenesis.
- Q. 6.** Discuss about the Van De Graff generator with a schematic diagram.

B.Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY)
FIRST YEAR EXAMINATION, SEPTEMBER - 2020
RADIOTHERAPY EQUIPMENTS & BASIC RADIOBIOLOGY
PAPER - IV
(MCQ)

Time allotted for MCQ - 15 minutes

B : MCQs (Single response type):

(01 x 10 = 10)

Select the most appropriate answer and **encircle** the alphabet against it:

1. Unit of activity is:
 - a. ci
 - b. kg
 - c. cm
 - d. Coulomb
2. One curie is equal to.....disintegration/sec (dps):
 - a. 3.7×10^4 dps
 - b. 3.7×10^2 dps
 - c. 3.7×10^{10} dps
 - d. 3.7×10^{12} dps
3. Which of the following has maximum ionization potential?
 - a. Electron
 - b. Proton
 - c. Helium ion
 - d. Gamma photon
4. Auger electrons are produced during:
 - a. Crompton effect
 - b. Photoelectric effect
 - c. Pair production
 - d. Coherent scattering
5. Electrons are:
 - a. Negatively charged
 - b. Positively charged
 - c. Neutral
 - d. None of the above
6. HVL is:
 - a. Half value layer
 - b. High value layer
 - c. High value lead
 - d. Half value lead
7. Atomic number of lead is:
 - a. 32
 - b. 27
 - c. 52
 - d. 82
8. 1 MeV equals to electron volts (eV):
 - a. 10^{-6} eV
 - b. 10^6 eV
 - c. 10^{10} eV
 - d. 10^{-9} eV
9. Beta particle has mass equal to:
 - a. 1/1837 of proton
 - b. 1/1837 of electron
 - c. 1/1837 of neutron
 - d. 1 BeV
10. The angstrom ($\text{\AA}$) is unit of length equal to:
 - a. 10^{-8} cm
 - b. 10^{10} cm
 - c. 10^{-6} cm
 - d. 10 mm