BIO-MEDICAL SIGNAL PROCESSING

Subject Code: MTBM – 1.1

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions
All questions carry equal marks

1. What is meant by Classification of sequences, Basic operations on sequences,
      Discrete-time systems..
         (14)
2. List out different types of Discrete Fourier Transform in detail.
               (14)
3. What do you mean by Theory of Z-Transform. Explain atleast two methods of z-
      transform techniques.
         (14)
4. How do you make the electrophysiological origin of brain waves. EEG signal and
   its characteristics.   (14)
5. Define The autoregressive (AR) method in details.
               (14)
6. Define Basic electrocardiography. Discuss ECG lead system in detail.
               (14)
7. How do you generate the use of multi-scale analysis for parameters estimation of ECG
      waveforms.
         (14)
8. Write short notes: (a) ECG Data Reduction Techniques (b) The PRD index.   (14)

BIO-MEDICAL INSTRUMENTATION-I

Subject Code: MTBM – 1.2

Time:3 Hours   Max. Marks: 70
Answer any FIVE Questions
All questions carry equal marks

1. What is electrocardiography? Discuss various characteristic features of ECG amplifiers.
[14]
2. Explain a method of heart sound measurement   [14]
3. Explain the ECG recorders, (i) three channel, (ii) vector cardiograph   [14]
4. What is the importance of blood flow? Discuss the biomedical instruments that are used to measure the blood flow   [14]
5. Discuss about the electrodes and leads that are fixed to the body of the patient in order to record an electrocardiogram.   [14]
6. Write short notes on
        a)pacemakers   [7]
        b)defibrillators   [7]
7. What are the elements of intensive care monitoring? Also explain patient monitoring displays.   [14]
8. Discuss various respiratory therapy equipments. What are nebulizers. Explain the working principle of ultrasonic nebulizer   [14]

Elective-I: ANATOMY AND PHYSIOLOGY

Subject Code: MTBM – 1.3

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions

All questions carry equal marks

1. (a) Describe different types of cells and compare their properties.(7)
   (b) Briefly describe atleast two methods of cell division. (7)
2. (a) What is the structure of the brain and explain the properties of spinal cord. (7)
   (b) Describe atleast two special sensors in the human body. (7)
3. (a) How does metabolism take place. Describe the relation between nutrition and energy balancing. (7)
   (b) Explain Neuromuscular junction in detail. (7)
4. Write an essay on various aspects of Nutrition. (14)
5. Describe the following:
   (a) Anatomy of lungs. (7)
   (b) Hypoxia. (7)
6. (a) How does the gas exchange in lungs. Explain. (7)
   (b) Give an account of exercise physiology and add a note on isometric and isotonic exercises(7)

7. (a) Describe how kidney functions. What is ment by dialysis. (7)
   (b) What are the effects of kidney disorders in renelfunction. (7)

8. (a) Describe the structure of skeletal and smooth muscle. (7)
   (b) Explain the auditory pathway and visual pathway. (7)

Elective-I: EMI/EMC
Subject Code: MTBM – 1.3

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions

All questions carry equal marks

1. (a) List out sources of EMI in detail (7)

   (b)Explain about EM fields produced by lightening. (7)

2.(a) Explain about noise from relays and switches. (7)

   (b)Explain about Cross talk in transmission lines. (7)

3. (a)Explain propagation of surges in low- voltage AC lines. (7)

   (b)Define shielding effectiveness and explain different methods

       of shielding and design methodologies.(7)

4. (a)Explain power line filter design. (7)

   (b)Explain semiconductor transient suppressors. (7)

5. (a)What are the standards for RF interference? (7)

   (b)Explain how sun spot activity may affect communication? (7)

6. Describe Electromagnetic environment. List out the Frequency spectrum conservations. (14)

7. (a) Explain surges on main power supply. (7)

   (b) Explain in detail about open area test site measurements. (7)

8. (a) Explain about normalized site attenuation. (7)

(b)Explain characterization of conduction currents and voltages. (7)

Elective I: BIO-MECHANICS
Subject Code: MTBM – 1.3

Elective-II: PRINCIPLES OF ELECTROTHERAPY

Subject Code: MTBM-1.4

Time:3 Hours   Max. Marks: 70
Answer any FIVE Questions
All questions carry equal marks

1. What are the physiological effects of Low-frequency currents?   (14)

2. What is Diathermy? Explain the principle of Shortwave Diathermy with its circuit
diagram?   (14)

3. What are Infrared radiations and explain the techniques involved in the treatment? (14)

4. What are the physiological effects of ultraviolet radiations? Explain their production? (14)

5. What are the techniques involved in application of Ultrasound therapy?   (14)

6.(a) What are the therapeutic uses of Ultrasound?   (7)

   (b). Write a short notes on Phonophoresis?   (7)

7. What are the various techniques used in Administering cold?   (14)

8. Explain the physiological effects in therapeutic uses of Cold therapy?   (14)

Elective-II: ELECTRONICS DEVICES AND CIRCUITS

Subject Code: MTBM-1.4

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions. All questions carry equal marks.

1. (a) explain the volt ampere characteristics on PN diode (7)

    (b) explain the temperature dependence of VI characteristics (7)

2. (a) explain why abridge rectifier is over a center –tap rectifier (7)

    (b) a diode has an internal resistance of 20Ω and 1000Ω load from a 110V rms source of supply. Calculate (7)

        I. The efficiency of rectification

        II. The percentage of regulation from no load to full load

3. (a) Explain the input and output characteristics of common base transistor configuration (7)

(b) if the various parameters of a CE amplifier which uses the self bias method are $Vcc=12V, R`_1=10K\Omega, R_c=1K\Omega R_e=2K\Omega$ and $\beta=100$. Find

(7)

        (a) The coordinates of the operating point
        (b) The stability factor , assuming the transistor be on silicon.

    4. (a) Draw the self bias circuit and derive the expression for the stability of factor "S" .

(7)

    (b) Explain the bias compensation using sensistors.   (7)

5. (a) Explain the construction and operation of n-channel JFET.   (7)

    (b) Sketch the typical family of drain characteristics for an n-channel JFET with various levels of V_{gs} (7)

6. (a) What do you understand by feedback in amplifiers ? explain the terms feedback factors and open loop gain.   (7)

    (b) Calculate the gain ,input impedance ,output impedance of voltage series feedback amplifier having $A=300, R_i=1.5K, R_0=50K$ and $\beta=1/12$.   (7)

7. (a) Draw the circuit diagram of a RC phase shift oscillator using BJT.

    Derive the expression for frequency of oscillations.   (7)

    (b) Why Rc oscillators are not suitable for high frequency applications?   (7)

8. (a) What is an op-amp? Explain the working of its basic circuit.   (7)

    (b) Define CMRR of an op-amp. If a non inverting amplifier is designed for a gain of 100,using on op-amp with 95db CMRR, calculate the common mode output for a common mode input of 2V   (7)

Elective-II: MATHEMATICAL METHODS FOR ENGINEERS

Subject Code: MTBM-1.4

RESEARCH METHODOLOGY & IPR

**Credits:
2**

Subject Code: MTBM – 1.5   **Max.
Marks:** 70

Sessionals :30

AUDIT COURSE

Credits: 0

Subject Code: MTBM – 1.6

Max. Marks: 70

Sessionals : 30

BIO-MEDICAL INSTRUMENTATION – II

Subject Code: MTBM –2.1

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions

All questions carry equal marks

1. What are resting and action potentials? Explain with suitable diagrams? (14)

2. (a) Explain the characteristics of blood flow?   (7)

   (b) Explain different heart sounds?   (7)

3. (a) Explain the physiology of the respiratory system?   (7)

   (b) Explain in detail about lung-volume and capacities?   (7)

4. Discuss various types of respiratory therapy equipment?   (14)

5. (a) What is bio-telemetry? List out various applications of bio-telemetry? (7)

   (b) what are the physiological parameters adaptable to bio-telemetry?   (7)

6. Discuss the components of bio-telemetry system?   (14)

7. What are the methods of accident presentation?   (14)

8. Discuss about the shock hazards from electrical equipment?   (14)

PRINCIPLES OF RADIOLOGY

Subject Code: MTBM – 2.2

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions
All questions carry equal marks

1. Briefly explain different kinds of diseases that are associated with liver? (14)
2. (a). What are the problems associated with Female Genital tract?   (7)
   (b). how they are diagnosed by radiology?   (7)
3. (a). Differentiate helical CT and general CT?   (7)
   (b). Explain protocols involved in helical CT?   (7)
4. Discuss briefly about evaluation of Intestinal Volvulus?   (14)
5. (a). Difference between Crohns Disease and Ulcerative Colitis?   (7)
   (b). Short notes on Ischemic Colitis?   (7)
6. Write short notes on
   (a). Acute intra abdominal vascular emergencies   (7)
   (b). Haemorrhage   (7)
7. Explain the principle involved in Neuroimaging?   (14)
8. Explain the principle involved in Body imaging   (14)

Elective III: ORTHOPAEDICS AND REHABILITATION

Subject Code: MTBM – 2.3

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions

All questions carry equal marks

1. Explain the metabolism of vitamins C and D. Describe the structure of bone. (14)
2. What is an amputation and explain the reasons for it. What is the anatomy of upper and lower limbs.   (14)
3. Describe EMG, EOG, ERG in detail.   (14)
4. Explain the following in detail. (a)Bone Nutrition (b) Osteoblast   (14)
5. Describe Tarsal bones and vertebrae in detail.   (14)
6. Explain how blood formation takes place in detail   (14)
7.What are the diagnostic aids in orthopedics and describe two of them.   (14)
8. Write short notes on : (a) Fracture healing (b) Arthroscopy   (14)

Elective III: BIOLOGICAL EFFECTS OF RADIATION

Subject Code: MTBM – 2.3

Elective III: BIOMEMS AND BIOSENSORS

Subject Code: MTBM – 2.3

Elective-IV: MEDICAL IMAGE PROCESSING

Subject Code: MTBM – 2.4

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions
All questions carry equal marks

1. What is meant by CT. Explain it along with its applications.(14)

2. List out different types of Ultrasonic diagnostic methods and describe atleast two of them in detail. (14)

3. What do you mean by image resonance. Explain atleast two methods of imaging techniques. (14)

4. How do you make image smoothing. Explain imaging smoothing algorithm in frequency domain. (14)

5. Define image compression. Describe it using DCT. (14)

6. Define Voxel. Discuss Histogram equalization technique in detail. (14)

7. How do you generate X-Ray imaging. Explain X-ray detection techniques.(14)

8. Write short notes: (a) Power law (b) MRI techniques.(14)

Elective-IV: NANO TECHNOLOGIES AND APPLICATIONS

Subject Code: MTBM – 2.4

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions
All questions carry equal marks

1. What is meant by Nanotechnology? Explain its importance in daily life? (14)

2. Explain the application of Nanotechnology in the field of Electronics?   (14)

3. (a). Discuss about Nanoclusters   (7)

    (b). Explain the role of carbon in the field of Nanotechnology?   (7)

4. . (a). Explain the uses of carbon Nanotubes in the field of Healthcare?   (7)

    (b). Explain the effects of carbon Nanotubes on the materials?   (7)

5. What are Chip materials and Fabrication technologies involved in Lab-on-chip? (14)

6. (a). Explain the technology of Super X ray vision?   (7)

    (b). How Genes are mapped using Nanotechnology?   (7)

7. Discuss about Nucleic Acids with their structures?   (14)

8. Discuss about biological Nanostructures with their Applications?   (14)

Elective-IV: ROBOTICS AND ARTIFICIAL INTELLIGENCE

Subject Code: MTBM – 2.4

AUDIT COURSE

Credits: 0
Subject Code: MTBM – 2.5   **Max.**
Marks: 70

                                                                Sessionals :30

Elective V: CLINICAL MEDICINE

Subject Code: MTBM – 3.1

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions
All questions carry equal marks

1. (a) What is meant by Headache? Explain the classification of Headache, characteristics of

different kinds of headache?   (7)

  (b) Explain the principals of Headache evolution?   (7)

2. (a) Explain about Bruce protocol and explain modified Bruce protocol? (7)

  (b) Explain about exercise Echocardiograph?   (7)

3. (a) Explain the mechanism of Hyperglycemic Damage?   (7)

  (b) Management of post Prandial Hyper Glycaemia in Diabetes Mellitus?

                                                          (7)

4. (a) Write a short note on criteria for diagnosis of Diabetes Mellitus?   (7)

  (b) Explain the management of Type2 Diabetes Mellitus?   (7)

5. Explain briefly about Typhoid Fever?   (14)

6. Explain about

  (a). Causes of Drug Resistance   (7)

  (b). Explain Laboratory Diagnosis technique for Diagnosing Malaria?   (7)

7. Define Anemia and causes of Anemia and Management strategy for Anemia? (14)

Define Parkinson's disease? Explain clinical features of Parkinson's disease? (14)

Elective V: ELECTROCARDIGRAPHY SIGNAL ANALYSIS

Subject Code: MTBM – 3.1

Elective V: BIOMATERIALS AND ARTIFICIAL ORGANS

Subject Code: MTBM – 3.1

HOSPITAL MANAGEMENT AND SUPPORTING SYSTEM

Subject Code: MTBM – 3.2

Time:3 Hours   Max. Marks: 70

Answer any FIVE Questions

All questions carry equal marks

1. Explain the services involved in Outpatient department?   (14)
2. Explain the management of laboratory services?   (14)
3. What are the requirements of Central Sterile Supply Department? (14)
4. What are the ethics to be followed by Hospital Management? (14)
5. What are the requirements of Hospital Building?   (14)
6. Write a short note on
    (a). Autopsy and Mortuary management   (7)
    (b). Ambulance services   (7)
7. Explain about Hospital Waste Management?   (14)
8. What are the precautions to be followed by Hospital Administration to avoid Fire
Accident?   (14)