RW-6533 503201

M.Sc. DEGREE EXAMINATION APRIL 2011

Bioelectronics and Biosensors

TRANSDUCERS AND BIOSENSORS

(CBCS—2008 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

All questions carry equal marks.

1. How to differentiate noise from signal ?

2. Define analogue and digital transducers.

3. Define Primary and Secondary transducers.

4. What is strain gauge ?

5. What is capacitor and resistor ?

6. What is the radioactive transducer ?

7. What is pizeo crystal.

8. What is photoelectric effect ?

9. What is polaraizable electrode ?

10. Give two practical hints for using electrodes for biosensors applications.

Part B (5 × 5 = 25)

Answer **all** questions choosing **either** (a) **or** (b)

All questions carry equal marks.

11. (a) Describe :

(i) noise source and

(ii) effects of noise at interface.

(*Or*)

(b) Describe briefly Ion sensitive electrodes.

12. (a) Write note on capacitor and its behaviour with distance between plates, dielectric effect and area.

(*Or*)

(b) .Discuss principle and applications of diaphragms.

13. (a) Explain the principles of magnetastrictive proximity sensors.

(*Or*)

(b) Discuss about the resistance thermometers.

14. (a) Discuss the polarizable and non-polarizable electrodes.

(*Or*)

(b) Discuss the principles pizeo resistive sensors and applications.

15. (a) Explain the hall effect.

(*Or*)

(b) Discuss applications of electrochemical transducers in medical field.

Part C (3 × 10 = 30)

Answer any **three** questions.

All questions carry equal marks.

16. Discuss on body surface recording electrodes.

17. Explain the pizeo electric and photoelectric measurement systems.

18. Explain LVDT transducers principles and applications.

19. Explain the electrode-electrolyte interface in detail with models proposed.

20. Explain Mechanical springs, Bourdon tube, diaphragms, and bellows.

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RW-6534 **503202**

M.Sc. DEGREE EXAMINATION, APRIL 2011

Bioelectronics and Biosensors

APPLICATION OF NANOMATERIALS

(CBCS—2008 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks

1. Give at least two applications of photolithography.

2. What is single electron tunneling?

3. What are high density memories?

4. Write a short note on hyperthermia?

5. Give at least four different membranes for the application of purifying water?

6. Write a short note on ceramic valves?

7. What is Nanotoxicology?

8. Describe sensors for CO and NO.

9. What is dendrimer? Mention two of its applications.

10. What self assembly? Give two examples.

Part B (5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b)

All questions carry equal marks

11. (a) Explain the principle of STM and its applications to nano technology.

(*Or*)

(b) Describe the structure and conductive properties of carbon nanotube and application to electronics.

12. (a) Explain how the soft magnets can be used in high speed memories.

(*Or*)

(b) Explain the different types of drug delivery with suitable examples.

13. (a) Explain about the ceramic valves and its function.

(*Or*)

(b) Explain the applications of Ceramic and Composite material in tooth and bone substitute function.

14. (a) Explain few mechanisms by which organic dye can undergo degradation.

(*Or*)

(b) Give at least five water resistant composites for walls to prevent from fungal attack.

15. (a) Give at least three examples for functionlisation of Carbon nanotubes.

(*Or*)

(b) Explain the applications of nanoparticles in tissue culture and pharma.

Part C

(3 × 10 = 30)

Answer any **three** questions

All questions carry equal marks

16. Explain the mechanism and function of dyes acting as a sensor in solar cells.

17. Explain the applications of nanomagnetic materials to the biological systems.

18. Give at least five different ceramic materials for bone and tooth substitution and explain how these materials replacing the orginal material ?

19. How will you develop sensors for DNA? Explain the principle.

20. Explain the total process of tissue culture.

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RW-6535 **503203**

M.Sc. DEGREE EXAMINATION, APRIL 2011

Bioelectronics and Biosensors

BIOMATERIALS

(CBCS—2008 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks

1. Explain the term Sterlization

2. What are the types of biomaterials?

3. Define orthopedics.

4. What are composites?

5. Explain Plastic Surgery.

6. Define elastomers.

7. What are B-Cells?

8. What are cross lined polymers?

9. List out the properties of natural polymers.

10. Define immunity.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b)

All questions carry equal marks

11. (a) What are the interactions taking place between blood and materials.

(*Or*)

(b) Dicuss in briefly about hydrogel.

12. (a) Explain the history and its type of biomaterials.

(*Or*)

(b) List out the applications of orthopedics.

13. (a) Discuss about nano structured derive in DNA template FET and nano wires.

(*Or*)

(b) Write a note on microstructure diagnostics kit chemistry.

14. (a) Discuss briefly about the linear and branched polymers.

(*Or*)

(b) Give an account on the industrial applications of thermoplastic.

15. (a) Write a note on blood clotting.

(*Or*)

(b) Give an account in applications of dentistry.

Part C (3 × 10 = 30)

Answer any **three** questions

All questions carry equal marks

16. Give an detailed discussion on fibers and gels.

17. Discuss about failure and surface properties of biomaterials.

18. Explain about the degradation of implanted materials.

19. Write detailed explanation of opthomology implants.

20. List out the materials and ceramics in medicine with their properties.

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RW-6536 **503204**

M.Sc. DEGREE EXAMINATION, APRIL 2011

Bioelectronics and Biosensors

MICROPROCESSOR AND ITS APPLICATIONS

(CBCS—2008 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks

1. What is Mnemonic?

2. List out the types of Addressing modes of 8085.

3. Explain the function of handshake signals.

4. List out the major components of 8279 keyboard and display interface.

5. Write short note on operating mode of the 8255A programmable peripheral interface.

6. Identify the opcode and operand for the instruction CMPCX, DX and explain what does it mean.

7. What is the difference between a microprocessor and a micro controller?

8. Distinguish between Interrupt and polling.

9. Describe the function of pins E, R/N and RS in the LCD.

10. What is meant by signal conditioning?

Part B (5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b)

All questions carry equal marks

11. (a) Write a program to add any two 16 bit numbers and output the result in output port #01.

(*Or*)

(b) Listout the data transfer instructions and explain each with examples.

12. (a) Draw the block diagram of 8255 and explain its control logic.

(*Or*)

(b) Explain interfacing of DAC with 8085.

13. (a) Briefly explain the internal blocks of 8086 with appropriate diagram.

(*Or*)

(b) List out and explain the major instruction groups of the 8086 processor.

14. (a) Explain the purpose of each pin of the 8051 micro controller with pin diagram.

(*Or*)

(b) List out the timers of the 8051 and describe the various modes of the 8051 timers.

15. (a) Explain the data types and directives supported by the 8051 assembler.

(*Or*)

(b) Explain the addressing mode of 8051.

Part C

(3 × 10 = 30)

Answer any **three** questions

All questions carry equal marks

16. Explain the Architecture of 8085 with a neat diagram.

17. How the keyboard and display controller 8279 is interfaced with the 8085. Explain with sketches.

18. Describe the programming strategies of 8086.

19. Give a detailed account of the Interrupts of the 8051 microcontroller.

20. Describe the 8051 interfacing with a stepper motor and write a program to rotat it continuosly.

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RW-6537 **503401**

M.Sc. DEGREE EXAMINATION, APRIL 2011

Bioelectronics and Biosensors

BIOSENSORS—II

(CBCS—2008 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks.

1. Write down the essential features of biosensor.

2. Describe how diabetes affects the humans.

3. Write a short note on POCT.

4. How microfabrication helps in miniaturization ?

5. Define LSPR.

6. Define Non-invasive sensors.

7. Write a short note on the evanescent-wave solutions of the Schrödinger equation.

8. Write down the physical explanation for the existence of the evanescent wave.

9. Define Biochip.

10. Write a short note on microarray fabrication.

Part B (5 × 5 = 25)

Answer **all** questions, choosing **either** (a) **or** (b)

All questions carry equal marks.

11. (a) Draw a neat sketch and explain about the design of enzyme-based biosensor.

(*Or*)

(b) Explain how biosensors play a crucial role in diabetes management.

12. (a) Discuss the processes involved in microfabrication.

(*Or*)

(b) Write a short note on Point-of-care analyzers.

13. (a) Give an introductory note on non-invasive determination of metabolites in body fluids.

(*Or*)

(b) Write the physical principles of surface plasmon resonance (SPR).

14. (a) Discuss in detail about the properties of electromagnetic evanescent waves.

(*Or*)

(b) How can we produce evanescent waves ?

15. (a) Discuss in detail about biosensor based instruments.

(*Or*)

(b) Explain in detail about the applications of biochips in modern sciences.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail about the various components of a biosensor.

17. Write an essay on the construction and applications of microfabricated sensors.

18. Explain in detail about the surface plasmon resonance biosensor based on integrated optical waveguide.

19. Write an overview of biosensors based on evanescent waves.

20. How biosensors can be used in environmental monitoring ?

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RW-6538 **503402**

M.Sc. DEGREE EXAMINATION, APRIL 2011

Bioelectronics and Biosensors

BIOINFORMATICS

(CBCS—2008 Onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks.

1. NCBI.

2. KEGG.

3. Primary structure of Protein.

4. FASTA.

5. Functional genomics.

6. RT-PCR.

7. Antigen arrays.

8. Name a protein and a nucleic acid data base.

9. cDNA library.

10. Protein-ligand interaction.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b)

All questions carry equal marks.

11. (a) Comment on population genetics.

(*Or*)

(b) Outline the steps in PCR.

12. (a) List the data bases used to compare different structural levels of proteins ?

(*Or*)

(b) Give an account on spread sheet and presentation softwares.

13. (a) PAM model of sequence evolution.

(*Or*)

(b) Write a note on computer aided drug design.

14. (a) Explain the structure of Chromatin.

(*Or*)

(b) Discuss the various motifs in proteins.

15. (a) Explain the applications of bioinformatics in predicting macromolecular structure.

(*Or*)

(b) Explain Human genome project.

Part C (3 × 10 = 30)

Answer any **three** questions.

All questions carry equal marks.

16. Comment on the structure of nucleic acid and base pairing rules.

17. Explain in detail about gene prediction rules and softwares.

18. Comment on sequence variation with in and between species.

19. Write notes on pairwise sequence alignment and multiple sequence alignment.

20. Compare the applications of genomics and proteomics tools in detail

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