

GANPAT UNIVERSITY**B. Tech. Semester: VIII Biomedical & Instrumentation Engineering****Regular Examination May/June 2014****2BM801 Biological Digital Image Processing****Time: 3 Hours****Total Marks: 70**

- Instruction:**
1. Write each section in separate answer books.
 2. All questions are compulsory.
 3. Draw figures and assume data wherever necessary.
 4. Conventional terms / notations are used.
 5. Figure to the right indicates full marks.

SECTION - I

Que. – 1 **12**

- (a) How image enhancement is non specific technique? Write the condition to be corrected by contrast stretching technique. Explain contrast stretching technique with example.
- (b) With diagram give the distribution of light receptor on the surface of retina. Explain all the light receptors in detail.

OR

Que. – 1 **12**

- (a) What is the aim of histogram equalization? Write the condition to be satisfied by histogram equalization transformation function and also derive the histogram equalization equation.
- (b) What do you mean by spatial domain and frequency domain enhancement? With diagram explain the point, neighborhood and global processing.

Que. – 2 **11**

- (a) Give the application of smoothing filter. With the mask explain the smoothing linear filter.
- (b) What do you mean by image compression? Explain the broad categories of image compression techniques.

OR

Que. – 2 **11**

- (a) Discuss the complete mechanism of spatial filtering and derive the equation for linear filtering response and convolution equation.
- (b) For image restoration explain with diagram and mathematical expression all the noise PDF.

Que. – 3 **12**

- (a) What do you mean by image negative? For which type of image this method is useful.
- (b) For image display system explain the function of serializer, palette, addressing logic and timing circuit.
- (c) Define the digital image and give the digital image properties.

SECTION – II

Que. – 4

12

- (a) What is Image Smoothing? Explain Frequency domain Smoothing Filters and their applications in Detail.
- (b) How frequency domain filtering is different from spatial domain filtering? Explain basic steps for filtering in frequency domain.

OR

Que. – 4

12

- (a) Explain UnsharpMasking, Highboost filtering and high frequency emphasis filtering with its applications.
- (b) Explain different color transformations to improve quality of a color image.

Que. – 5

11

- (a) Explain Homomorphic filtering and discuss its applications.
- (b) Define Gradient operator. Explain different gradient operators used for edge detection in detail

OR

Que. – 5

11

- (a) Define thresholding. Discuss various types of Thresholding. Explain basic Algorithm used for Global thresholding.
- (b) Explain Region growing and splitting approach for segmentation.

Que. – 6

12

- (a) Define morphological image processing. Discuss Dilation and erosion operation with example.
- (b) What is interpolation? Explain three different interpolation techniques in detail.

----- END OF PAPER -----

Student Exam No: _____

GANPAT UNIVERSITY
B.TECH SEM.VIII BIOMEDICAL & INSTRUMENTATION ENGINEERING
REGULAR EXAMINATION MAY/JUNE-2014
BME-804: PROSTHETICS AND ORTHOTICS

TIME: 3 HOURS

TOTAL MARKS-70

INSTRUCTION: -1. Answers to the 2 sections must be written in the separate answer books
2. Figures to the right indicate marks.
3. Conventional terms or notation are used.

Section-I

Que.-1 12
(a) Define and explain following terms with examples (1) artificial organ (2) organ transplant (3) assist device (4) orthotist (5) orthopedic prosthesis

(b) Describe and differentiate path sounder and mowat sensor
OR

Que.-1 12
(a) Describe bubble oxygenator in detail
(b) What are the components of upper extremity prosthesis? What are the functions performed by UEP?

Que.-2 11
(a) Draw and explain schematic diagram of basic heart lung machine.
(b) What is the basic principle of Electronic travelling aids? Explain it in detail

OR

Que.-2 11
(a) Explain in detail A microprocessor based multifunction myoelectric control of prosthesis.
(b) Compare natural lung to an artificial lung

Que.-3 12
(a) What are the functions of orthosis. Explain each function with an example in detail
(b) What is cardio-pulmonary bypass? Explain it in detail

Section-II

Que.-4 12
(a) Explain with neat diagram the construction of jarvik-7 artificial heart.
(b) Enlist the types of the circulatory assist devices. And explain IABP in detail.

OR

Que.-4 12
(a) Explain the working of LVAD with neat diagram.
(b) Write the short note on C-leg knee prosthesis.

Que.-5 11
(a) Enlist the ideal characteristics of artificial heart valve.
(b) Explain in brief pressure gradient, EOA in detail.

OR

Que.-5

11

- (a) Explain different flow patterns and turbulent shear stress in artificial heart valve.
- (b) Describe in brief durability and regurgitation in detail.

Que.-6

12

- (a) Explain non porous type artificial trachea with neat diagram.
- (b) Write the short note on pneumatic larynxes, electrical artificial larynxes.

END OF PAPER

GANPAT UNIVERSITY
B.TECH. 8TH SEM BIOMEDICAL AND INSTRUMENTATION ENGINEERING
REGULAR EXAMINATION MAY/JUNE 2014
2BM804: TISSUE ENGINEERING (OPEN ELECTIVE)

TIME: 3 HOURS**TOTAL MARKS: 70****INSTRUCTIONS:**

1. Use separate answer sheets for the two sections
2. Figures on the right side indicate marks
3. Please explain with the help of diagram wherever it is necessary

SECTION – I

- Que.1** Write answers of the following questions. **12**
- A Explain the need of tissue engineering.
- B Explain the role of stem cell in tissue engineering.
- C Write a note on phase contrast microscopy.

OR

- Que.1** Write answers of the following questions. **12**
- A Explain in detail the apoptosis.
- B Write a note on fiber bonding technique of scaffold synthesis.
- C Explain the collagen based vessel construct.

- Que.2** Write answers of the following questions. **11**
- A Write a note on extracellular matrix.
- B Explain the growth kinetics of cells in culture.

OR

- Que.2** Write answers of the following questions. **11**
- A Explain in short various parameters to determine the cell differentiation.
- B Compare and contrast all the strategies of growth factor delivery.

- Que.3** Write answers of the following questions. **12**
- A How tissue engineering works?
- B Explain the cell microenvironment.
- C Write a note on telomeres and self-renewal in stem cells.

SECTION – II**Que.4 Write answers of the following questions.****12**

- A Describe briefly the development of tissues in human embryo. What is stem cell and what is its function in an organism.
- B Write note on Marrow Stroma and its support to different lineage pathways. How in-vivo and in-vitro micro-environment can influence Mesenchymal stem cells (MSCs).
- C Define: 1) Progenitor cell 2) Graft

OR**Que.4 Write answers of the following questions.****12**

- A Giving examples of in-vivo cartilage formation prove that study of embryonic tissue formation is required in order to repair/regenerate tissue.
- B Write steps for formation of bone from Demineralised bone matrix (BMPs). Mention BMPs threshold concentrations required in this process. Give Example of BMPs with their function.
- C Define: 1) Adult stem cells 2) Morphogenesis

Que.5 Write answers of the following questions.**11**

- A Which physical delivery methods are used to deliver gene into selected cells. How non-viral gene delivery complexes can be transported within the cytoplasm and nucleus.
- B What is Cellular Cardiomyoplasty and Write the design considerations required for successful cardiac tissue engineering.

OR**Que.5 Write answers of the following questions.****11**

- A Explain burn wounds. Describe various compositions used as skin substitute. write the limitations of bioengineered skin substitute
- B Explain delivery of drugs to cells or tissues by use of cell carriers

Que.6 Write answers of the following questions. (Any 3)**12**

- A Write normal wound healing procedure. Enumerate the functions of Platelet Derived GFs.
- B Which are the two fundamental types of bone deformities? How deformity can be repaired using surgical graft.
- C Write note on cartilage tissue engineering.
- D Describe the role of Basic fibroblast GF as angiogenic factor.

-----END OF THE PAPER-----

Evening.

Date: 19/05/2014.

Student Exam. No. _____

GANPAT UNIVERSITY

B. Tech. Semester: VIIIth (Biomedical & Instrumentation) Engineering

Regular Examination May – June 2014

2BM804 Embedded System Design

Time: 3 Hours

Marks-70

Total

Instructions:-

1. All the questions are compulsory.
2. Answer of each section must be written in separate answer books.
3. Figure to the right indicate marks.
4. Assume data, if needed.
5. Conventional terms / notations are used.

Section – I

Que.1

[12]

- a). 1). What is the full form of PIC?
- 2). The PIC18 is _____ bit microprocessor.
- 3). Register WREG is _____ bit wide.
- 4). PIC18F series has program memory addressing upto _____
- 5). How many ports are there in PIC18F452?
- 6). The instruction "ADDWFC file reg, W" places the sum in _____
- b). Explain 1). IORWF 2). COMF 3). MULWF
- 4). BZ 5). GOTO 6). DECFSZ

OR

Que.1.

[12]

- a). What is the Philosophy of PIC Architecture? Discuss PIC instruction pipelining.
- b). Assuming the clock pulses are fed into pin T0CKI, write a program for counter 0 in 8-bit mode to count the pulses and display the state of the TMROL count on PORTB.

Que.2.

[11]

- a). Which of the following is a real time embedded system? Justify your answer
- (a) Ceiling Fan (b) Microwave Oven
- (c) Television Set (d) Desktop Key Board
- (e) Digital Camera

- b). A switch is connected to pin RB0 and an LED to pin RB7. Write a program to get the status of the switch and send it to the LED.

OR

Que.2 [11]

- a). Draw the block diagram of embedded system and explain.
b). Enumerate various features of PIC18F-series microcontrollers

Que.3. Answer any two. [12]

- a). Explain Asynchronous serial communication and data framing.
b). Assume that ROM space starting at 500H contains the message "Biomedical". Write a program to bring it into CPU one byte at a time and place the bytes in RAM locations starting at 40H.
c). Explain T0CON. Enumerate the steps to program Timer0 in 16 bit mode.

Section – II

Que.4. [12]

- a). Give comparison of different arm architectures.
b).
1. Explain different processor mode in ARM.
2. Explain memory management types.

OR

Que.4. [12]

- a). Describe Data Processing instruction of ARM processor in detail.
b). Explain ARM BUS technology.

Que.5. [11]

- a). Explain CPU registers of MSP430.
b). Explain nomenclature of MSP430 and briefly describe different families of it.

OR

Que.5. [11]

- a). Draw and explain functional block diagram of MSP430.
b). Explain memory mapping of MSP430F2XXX.

Que.6. [12]

- a). Is ARM processor a purely RISC Architecture? Explain briefly.
b). Explain CPSR register of ARM Processor.
c). Why MSP430 is not a pure RISC machine?

END OF PAPER

Evening.

Date: 27/05/2014.

Student Exam No. _____

GANPAT UNIVERSITY

B. Tech. Semester: VIII (Biomedical & Instrumentation) Engineering

Regular Examination May - June 2014

2BM803 Transportation Phenomena in Living Systems

Time: 3 Hours

Total Marks: 70

- Instruction:**
- 1 Write each section in separate answer book.
 - 2 Answer should be brief and to the point.
 - 3 Figure to the right indicates marks.
 - 4 Assume suitable data, if necessary.

Section - I

Que. - 1

12

- a) Differentiate Heat and Temperature.
- b) How the radiation heat transfer is takes place in human body? Write the mathematical equation for it and determine the heat transfer rate.

OR

Que. - 1

12

- a) How the conduction heat transfer is takes place in human body? Write the mathematical equation for it and determine the heat transfer rate.
- b) Why is the heat of vaporization more at body temperature? Also give a mathematical proof.

Que. - 2

11

- a) What are the assumptions of Pennes bioheat model? Write the standard thermal diffusion equation for pennes model.
- b) Write short note on: Chen-Holmes (CH) continuum model

OR

Que. - 2

11

- a) What is Biomedical Mass Transport? Analyze the respiration gas transport process.
- b) Draw the neat diagram for mass transfer across systemic capillaries. Explain in detail.

Que. - 3

12

- a) Draw the structure of blood perfused tissue and explain in detail. Show the temperature equilibration between blood and tissue.
- b) Draw the functional block diagram of dialysis system. Explain how mass transfer occurs in this system.

Section – II

Que. – 4

12

- a) Explain oxygen transport in human body with necessary equations.
- b) Explain Reverse osmosis membrane structures and properties.

OR

Que. – 4

12

- a) Define an electroosmosis. What is the cause of electro osmosis?
- b) Define mass transfer with appropriate examples
- c) Derive the equation for the average heat transfer coefficient.

Que. – 5

11

- a) What is the difference of heterogeneous and homogeneous reactions?
- b) Derive the equation for the average heat transfer coefficient.

OR

Que. – 5

11

- a) Describe mass transport in circulatory system.
- b) Define:
 - 1. Reaction rate 2. First order reaction 3. Equilibrium constant
 - 4. Chloride shift 5. Haldane effect

Que. – 6

12

- a) Write short note on diffusion controlled reaction.
- b) What is the importance of activation energy in chemical reaction and catalyst?

END OF PAPER