

Name:

Enrolment No:



UPES

End Semester Examination, May 2024

Course: Bionics and Microprocessor

Program: B.Tech (Biomedical Engineering)

Course Code: ECEG2047

Semester : IV

Duration : 3 Hours

Max. Marks: 100

Instructions: 1. All the questions are compulsory.
2. This question Paper contains 28 questions.
2. Calculators are not allowed.

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	The field of bionics aims to create _____ that mimic or emulate natural biological systems.	1.5	CO1
Q 2	A microprocessor is an integrated circuit that contains the functions of a _____ in a single component.	1.5	CO2
Q 3	Bionic limbs are designed to restore _____ to individuals who have lost their natural limbs.	1.5	CO1
Q 4	The primary goal of using microprocessors in bionic devices is to provide _____ and precise control over the device's movements.	1.5	CO3
Q 5	The development of advanced microprocessors has significantly improved the _____ of bionic prosthetics.	1.5	CO4
Q 6	Bionic eye implants, also known as retinal _____, utilize microprocessors to restore vision for individuals with certain types of visual impairment.	1.5	CO5
Q 7	One of the key challenges in bionics is achieving seamless _____ between the bionic device and the user's nervous system.	1.5	CO4
Q 8	The utilization of microprocessors in bionics has led to the creation of sophisticated _____ that can adapt to the user's movements and preferences.	1.5	CO2
Q 9	Bionics and microprocessors have revolutionized the field of _____, offering new possibilities for individuals with physical disabilities.	1.5	CO3
Q 10	As microprocessor technology continues to advance, the potential for creating more _____ and functional bionic devices increases.	1.5	CO1
Q 11	What is the primary objective of bionic technology?	1.5	CO4

	<p>A) Enhancing natural biological systems</p> <p>B) Creating artificial systems that mimic natural biological functions</p> <p>C) Developing advanced medical imaging techniques</p> <p>D) Improving agricultural practices</p>		
Q 12	<p>Which of the following is an example of a bionic application?</p> <p>A) Advanced weather prediction systems</p> <p>B) Virtual reality gaming consoles</p> <p>C) Bionic limbs for amputees</p> <p>D) Solar energy harvesting technologies</p>	1.5	CO5
Q 13	<p>How do microprocessors contribute to bionic devices?</p> <p>A) By regulating atmospheric conditions for bionic implants</p> <p>B) By providing power through wireless charging mechanisms</p> <p>C) By enabling precise control over the movements of bionic devices</p> <p>D) By facilitating communication with extraterrestrial life form</p>	1.5	CO2
Q 14	<p>What is the primary function of bionic eye implants?</p> <p>A) Enhancing hearing abilities</p> <p>B) Restoring visual acuity in individuals with visual impairments</p> <p>C) Monitoring blood glucose levels</p> <p>D) Facilitating telepathic communication</p>	1.5	CO3
Q 15	<p>What is a key challenge in the field of bionics?</p> <p>A) Overcoming limitations in internet connectivity for bionic devices</p> <p>B) Achieving seamless integration between bionic devices and the user's nervous system</p> <p>C) Reducing the cost of bionic technologies to make them more affordable</p> <p>D) Implementing bionic solutions for space exploration missions</p>	1.5	CO4
Q 16	<p>True or False: Bionics is a field that involves creating artificial systems that mimic natural biological functions and processes.</p>	1.5	CO5
Q 17	<p>True or False: Microprocessors are not utilized in the development of bionic devices and prosthetics.</p>	1.5	CO1
Q 18	<p>True or False: Bionic eye implants, also known as retinal prostheses, utilize microprocessors to restore vision for individuals with visual impairments.</p>	1.5	CO3
Q 19	<p>True or False: One of the key challenges in bionics is achieving seamless integration between the bionic device and the user's nervous system.</p>	1.5	CO2
Q 20	<p>True or False: The primary goal of using microprocessors in bionic devices is to provide imprecise control over the device's movements.</p>	1.5	CO1
<p>Section B (4Qx5M=20 Marks)</p>			

Q 21	Write a very short 8086 assembly language program to display the character 'A' on the screen and then terminate the program.	5	CO2
Q 22	Provide an example of a bionic application outside of medical prosthetics.	5	CO4
Q 23	What are the key challenges associated with achieving seamless integration between bionic devices and the user's nervous system?	5	CO1
Q 24	How do bionic eye implants utilize microprocessor technology to restore vision for individuals with visual impairments?	5	CO5
Section C (2Qx15M=30 Marks)			
Q 25	Bionic limbs powered by microprocessors have significantly improved the lives of individuals with limb loss. However, replicating the natural complexity and fluidity of human movement remains a challenge. Discuss the current limitations of bionic limbs in terms of achieving natural movement patterns. How can advancements in microprocessor technology and the integration of neural interfaces bridge the gap between prosthetic function and natural movement?	15	CO2
Q 26	As a researcher in the field of bionics, you are exploring the use of microprocessors in developing a neural-controlled bionic hand for individuals with upper limb amputations. Explain the potential challenges and considerations in integrating microprocessor technology with the user's nervous system to enable intuitive and dexterous control of the bionic hand.	15	CO5
Section D (2Qx10M=20 Marks)			
Q 27	Write an 8086 assembly language program to add two 16-bit numbers stored in memory locations 2000H and 2002H. Store the result in memory location 3000H. Use appropriate instruction mnemonics and data movement operations to perform the addition and store the result.	10	CO1
Q 28	Describe the technological advancements in microprocessor-driven bionic eye implants and their potential to revolutionize visual restoration for individuals with visual impairments.	10	CO4