


Name: Enrolment No:			
UPES End Semester Examination, May 2025 Course: Regenerative Technologies and Artificial Organs Semester : 6th Program: B.Tech Biomedical Engineering Duration : 3 Hours Course Code: HSBE 3004			
		Max. Marks: 100	
Instructions: Attempt all the questions			
S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q1	State the importance of using heparin in a CPB machine.	1.5	CO4
Q2	Mention the name of polymer used in PoliValve type heart valves.	1.5	CO4
Q3	The eye-on-chip platform does not utilize microfluidic technology. Is this true or false?	1.5	CO2
Q4	Maintaining ion balance is one of the primary objectives of hemodialysis machine. Is this true or false?	1.5	CO3
Q5	Potassium ion content in the dialysate can reach a maximum of 4 mM. Is this true or false?	1.5	CO3
Q6	Which biomaterial is known for its excellent biocompatibility and mechanical properties, making it suitable for bone implants? a) Polystyrene b) Polyethylene c) Titanium alloy d) Polyvinyl chloride	1.5	CO1
Q7	What is the main advantage of composite biomaterials over single-component biomaterials? a) Lower cost	1.5	CO1

	b) Improved biocompatibility c) Enhanced mechanical properties d) Both b and c		
Q8	The boston kpro is used in patients with severe ocular disease. Is this true or false?	1.5	CO4
Q9	Porcine and bovine heart valves are examples of xenografting. Is this true or false?	1.5	CO4
Q10	Human cadaver heart tissues can be utilized for artificial heart valve development. Is this true or false?	1.5	CO4
Q11	Bionic eyes are an example of artificial organs. Is this true or false?	1.5	CO1
Q12	Define Reynold's number.	1.5	CO2
Q13	Mention the region of heart which has lowest Reynold's number.	1.5	CO2
Q14	Cardioplegia can be reversed using protamine. Is this true or false?	1.5	CO4
Q15	The biobrane skin substitute is made up of silicone, nylon mesh and collagen. Is this true or false?	1.5	CO1
Q16	The apligraf is used to treat venous leg ulcers. Is this true or false?	1.5	CO1
Q17	Modified cellulose is the most widely used membrane in hemodialysis. Is this true or false?	1.5	CO3
Q18	Wearable artificial kidney dialysate is continuously purified using nanostructured sorbents. Is this true or false?	1.5	CO3
Q19	Define heterograft method of skin grafting.	1.5	CO1
Q20	Define full thickness graft.	1.5	CO1
Section B (4Qx5M=20 Marks)			
Q 1	Write a short note on knee replacement surgery.	5	CO1
Q2	Explain the importance of wearable artificial kidney module.	5	CO3
Q3	Illustrate the importance of Boston type 2 keratoprosthesis.	5	CO4
Q4	Explain the importance of biomaterials in prosthetics and implants?	5	CO1
Section C (2Qx15M=30 Marks)			

Q 1	Discuss the importance of implementing lung on chips, in a clinical setting, by taking a suitable example.	15	CO2
Q2	Explain the fabrication of eye on chip platform.	15	CO2
<p style="text-align: center;">Section D (2Qx10M=20 Marks)</p>			
Q 1	Discuss the various types of skin grafting techniques.	10	CO1
Q2	Explain the operation of artificial pancreas.	10	CO4