Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2022

Course: Introduction to Biomedical Engineering

Semester: I

Program: B.Tech Biomedical

Duration : 3 Hours

Course Code: HSBE1001 **Max. Marks: 100**

Instructions:

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q		1.5	
Q 1	State the four important components of medical instruments.	1.5	CO1
Q 2	The discovery that DNA is a double helix was discovered in year 1952. State true/false.	1.5	CO1
Q 3	National Health Portal is official health website of government of India. Write true/false	1.5	CO1
Q 4	List down branches of biomedical engineering	1.5	CO1
Q 5	Define 3D bioprinting technology	1.5	CO1
Q 6	State the principle of biosensor	1.5	CO1
Q 7	Define microfluidic system	1.5	CO1
Q 8	Charles A. Hufnagel invented the first artificial heart valve which was successfully implanted in 1952. State true/false	1.5	CO1
Q 9	State the working principle of Endoscopy.	1.5	CO1
Q 10	Explain briefly working principle of thermal imaging system.	1.5	CO2
Q 11	Identify the components of ultrasound (diagram)	1.5	CO2
Q 12	State any two the usage of ventilator	1.5	CO2
Q 13	Piezoelectric materials are used in ultrasound system. Explain its mechanism	1.5	CO2
Q 14	Classify the side effects of haemodialysis procedure	1.5	CO2
Q 15	Briefly explain Dialysate	1.5	CO2
Q 16	Provide the block diagram of cardiac defibrillators	1.5	CO2
Q 17	Write about Sepsis in two sentences	1.5	CO3

Q 18	**Illustrate the 2D cell culture (diagram)**	**1.5**	**CO3**
Q 19	**Give three uses of Reverse transcription polymerase chain reaction (RT PCR)**	**1.5**	**CO3**
Q 20	**Organ on a chip was first developed at the Cambridge university. State true/false**	**1.5**	**CO3**
Section B (4Qx5M=20 Marks)			
Q		**5**	
Q1	**State about patient safety considerations, artifacts and transducer interface problems in designing medical instruments.**	**5**	**CO1**
Q 2	**Define Bioelectric signals and Bio-impedance signals. Give examples.**	**5**	**CO1**
Q 3	**Explain the mechanism of cardiac pacemakers.**	**5**	**CO2**
Q 4	**Write a brief paragraph about polymerase chain reaction (PCR)**	**5**	**CO3**
Section C (2Qx15M=30 Marks)			
Q		**15**	
Q 1	**Interpret organ on a chip technology and briefly explain about its mechanism. List various organ on chip**	**10+5**	**CO3**
Q 2	**Evaluate about safety measures during X-ray machine operation. Also list out the name of the components of X-ray machine.**	**5+10**	**CO4**
Section D (2Qx10M=20 Marks)			
Q		**10**	
Q 1	**Describe various components of Positron emission tomography (PET) and briefly explain their working.**	**10**	**CO2**
Q 2	**Appraise about the good manufacturing practices for safety of individuals.**	**10**	**CO4**