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UNIVERSITY OF TOMORROW
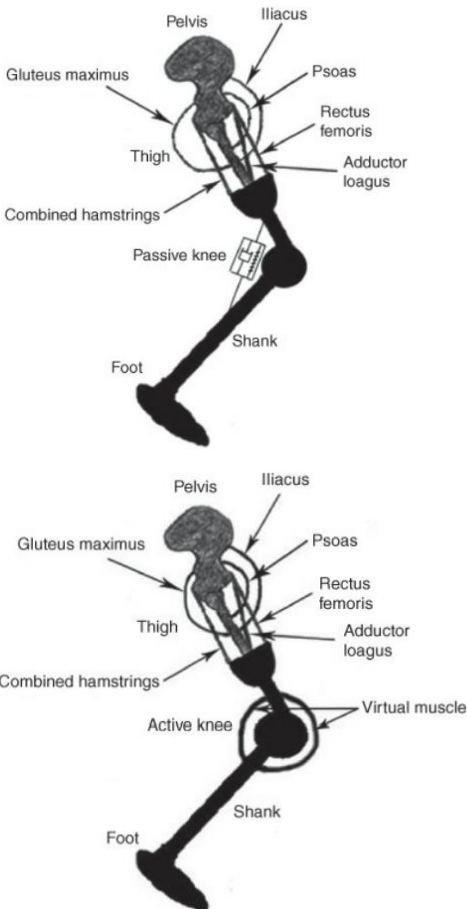
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

Course: B Tech (Mechatronics Engineering)   **Semester:** VII
Program: Biomedical Mechatronics   **Time** : 03 hrs.
Course Code: MECH 4010P   **Max. Marks:** 100

Instructions: All Questions are compulsory.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Elaborate the time scale of action potential?	4	CO1
Q 2	Differentiate between biomedical engineer, clinical engineer, and biomedical technician?	4	CO1
Q 3	Explain the B-Scan system in terms of obtaining the 3-D images using ultrasound?	4	CO2
Q 4	Discuss the role of surgical training simulator and haptic interface in it?	4	CO4
Q5	How can we identify the breast cancer using smart probes?	4	CO3

SECTION B
(4Qx10M= 40 Marks)

Q 6	Design the Einthoven diagram with explanation of leads and electrodes?	10	CO2
Q 7	Design the procedure for developing voxal of 2,3,4,6 in counterclockwise direction?	10	CO3
Q 8	How the Rehabilitation Robotics impacted the lives of patients? Discuss the importance of the various types of Rehabilitation Robots?	10	CO3
Q9	Describe the functionality of Cardiovascular Plaque detection? Or In the identification Esophagectomy, how the smart devices plays their vital role?	10	CO4

SECTION-C
(2Qx20M=40 Marks)

Q 10	From the given images, identify the type of prosthetic knee and design the governing equation of model for the prosthetic knee?		
		20	CO4
Q 11	A person feeling tiredness on regular bases. After a visit to cardiologist, doctor did not able to diagnose the heart condition. Doctor suggested patient to have ECG of heart at different times of the day. After recording the ECG at various times of the day, doctor told the patient about the heart disease to the patient. Suggest the disease with which patient is diagnose. Design and explain the type of ECG recorder for this heart condition? Or What are the Pharmaceutical and carrier components required for the nuclear imaging of pulmonary studies? What is is drug localization for these organs? How is the image quality varies between PET-CT scanner and SPECT-CT scanner?	20	CO2