**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, November 2022**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **3BT5106** | Roll No. | Total Printed Pages: 2 |
| **3BT5106** |  |
| B. Tech. III Year V- Semester (Main) End Semester Examination, November 2022  **(EC)** | |
| **BEC05109 : Biomedical Instrumentation** | | | |

# Time: **3** Hours. Total Marks: **60**

Min. Passing Marks: **21**

Attempt **five** questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Use of following supporting material is permitted during examination for this subject.

# **1.--------------------------Nil--------------------** **2.------------------Nil-----------------------**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | What are the various objectives of biomedical instrumentation system? Name the organizations and societies which look after the developments and research in area biomedical instrumentation. | **(6)** | **Knowing and**  **remembering** |
|  |  |  |  |  |
|  | **(b)** | With the help of neat diagrams explain the working and function of the major physiological system of the body. | **(6)** | **Creating** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.2** | **(a)** | How would you design the block diagram of man instrumentation system? | **(6)** | **Creating** |
|  |  |  |  |  |
|  | **(b)** | What are the various problems encountered in measuring a living systems? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **UNIT-II (CO2)** |  |  |
|  |  |  |  |  |
| **Q.3** | **(a)** | What is an electroencephalogram (EEG)? What are various frequency bands present in an EEG? Give the condition for their generation | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Explain the action and resting potentials with suitable diagram. Also explain the propagation of action potential. | **(6)** | **Evaluating** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.4** | **(a)** | Give the construction and working of a sphygmomanometer with the help of a block diagram | **(6)** | **Analyzing** |
|  |  |  |  |  |
|  | **(b)** | Write short notes on:  i) Electrical and mechanical activities of the heart.  ii) Function of respiratory system | **(6)** | **Applying** |
|  |  |  |  |  |
|  |  | **UNIT-III (CO3)** |  |  |
|  |  |  |  |  |
| **Q.5** | **(a)** | Draw the waveform of ECG. Give typical amplitude and intervals for normal person. | **(6)** | **Remembering** |
|  |  |  |  |  |
|  | **(b)** | Describe working principle of electromagnetic blood flow meter with suitable diagram. | **(6)** | **Remembering** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Q.6** | **(a)** | Define 'Blood Pressure'. How blood pressure can be measured in blood vessels using indirect measurement method? | **(6)** | **Remembering** |
|  |  |  |  |  |
|  | **(b)** | Explain the construction and working of a Gas - Liquid Chromatograph with the help of black diagram | **(6)** | **Remembering** |
|  |  |  |  |  |
|  |  | **UNIT-IV (CO4)** |  |  |
|  |  |  |  |  |
| **Q.7** | **(a)** | What is meant by diagnostic X-Rays? Explain the generation of X- Rays with a suitable diagram. | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Compare ultrasonic, X- Ray and MRI imaging techniques. | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.8** | **(a)** | Explain the types and principle of chromatography. Discuss its medical applications | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | What is meant by hemoglobin? How it can be measured? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **UNIT V (CO5)** |  |  |
|  |  |  |  |  |
| **Q.9** | **(a)** | What are various types of pacemakers? Describe Asynchronous type pacemaker with a suitable diagram. | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | What is meant by 'Diathermy'? What are various types of diathermy used? Explain in brief | **(6)** | **Analyzing** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.10** | **(a)** | What types of instruments are normally available in an intensive care unit? | **(6)** | **Analyzing** |
|  |  |  |  |  |
|  | **(b)** | What are the various physiological effects electric current on human body? Also explain why? | **(6)** | **Analyzing** |