Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18BM3010** | **Duration :** | **3hrs** |
| **Sub. Name :** | **HUMAN COMPUTER INTERFACE** | **Max. Marks :** | **100** |

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| **Q. No.** | **Sub Div.** | **Questions** | **Course Outcome** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | | |
| 1. | a. | With block diagram, explain the general framework of Brain Computer Interface system. | CO1 | 8 |
| b. | Categorize the classification of Brain Computer Interface System. | CO1 | 8 |
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| 2. | a. | Summarize different methods of improving signal quality and feature extraction. | CO2 | 8 |
| b. | Elaborate hidden Markov Model classifiers for EEG signal Analysis and BCI applications. | CO2 | 8 |
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| 3. | a. | Highlight the importance of BCI applications based on control signal type and their implications for future research and development. | CO3 | 8 |
| b. | Justify: Human computer Interface – An Emererging interaction technology. | CO3 | 8 |
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| 4. | a. | Discuss the issues and challenges in designing P300 paradigms. | CO4 | 8 |
| b. | Justify the need for human - computer interaction in biomedical applications. | CO4 | 8 |
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| 5. | a. | Explain how image segmentation is done using Hidden Markov Gaussian model. | CO5 | 8 |
| b. | Compare different classification methods for EEG-based brain computer interfaces. | CO5 | 8 |
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| 6. | a. | Discuss wavelet transform method of recognizing and diagnosing of EEG signal. | CO3 | 8 |
| b. | How Autoregressive (AR) methods helps in estimating the power spectrum density (PSD) of the EEG using a parametric approach. | CO2 | 8 |
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| 7. | a. | Disscuss different stages of EEG signal processing. | CO1 | 8 |
| b. | Elaborate how power spectral density estimation of EEG signal is computed using fourier transform. | CO3 | 8 |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | With block diagram, explain the BCI controlled assistive Lower Limb devices based on motor imagery. | CO6 | 10 |
| b. | Design a BCI Controlled Robotic Assistant for Quadriplegic People in Domestic and Professional Life. | CO6 | 10 |